

APPENDICES

REMEDIAL INVESTIGATION REPORT FINAL – AGENCY REVIEW DRAFT

Alexander Avenue Petroleum Tank Facilities Site
Tacoma, Washington

Ecology Facility Site No. 1377/Cleanup Site No. 743

Prepared for: Port of Tacoma and
Mariana Properties, Inc.

Project No. 130097-01D • December 30, 2016 AGENCY REVIEW DRAFT



APPENDIX A - Boring Logs

Soil Classification		Terms Describing Relative Density and Consistency		
		Density	SPT ⁽²⁾ blows/foot	
Coarse-Grained Soils - More than 50% Retained on No. 200 Sieve	Gravels - More than 50% ⁽¹⁾ of Coarse Fraction Retained on No. 4 Sieve	Well-graded gravel and gravel with sand, little to no fines	Very Loose 0 to 4	
	Sands - 50% ⁽¹⁾ or More of Coarse Fraction Passes No. 4 Sieve	GP	Poorly-graded gravel and gravel with sand, little to no fines	Loose 4 to 10
		GM	Silty gravel and silty gravel with sand	Medium Dense 10 to 30
	Fine-Grained Soils - 50% or More Passes No. 200 Sieve	GC	Clayey gravel and clayey gravel with sand	Dense 30 to 50
		SW	Well-graded sand and sand with gravel, little to no fines	Very Dense >50
		SP	Poorly-graded sand and sand with gravel, little to no fines	Consistency
SM		Silty sand and silty sand with gravel	Very Soft 0 to 2	
Highly Organic Soils	SC	Clayey sand and clayey sand with gravel	Soft 2 to 4	
	ML	Silt, sandy silt, gravelly silt, silt with sand or gravel	Medium Stiff 4 to 8	
	CL	Clay of low to medium plasticity; silty, sandy, or gravelly clay, lean clay	Stiff 8 to 15	
	OL	Organic clay or silt of low plasticity	Very Stiff 15 to 30	
	MH	Elastic silt, clayey silt, silt with micaceous or diatomaceous fine sand or silt	Hard >30	
	CH	Clay of high plasticity, sandy or gravelly clay, fat clay with sand or gravel		
Highly Organic Soils	OH	Organic clay or silt of medium to high plasticity		
	PT	Peat, muck and other highly organic soils		

Component Definitions	
Descriptive Term	Size Range and Sieve Number
Boulders	Larger than 12"
Cobbles	3" to 12"
Gravel	3" to No. 4 (4.75 mm)
Coarse Gravel	3" to 3/4"
Fine Gravel	3/4" to No. 4 (4.75 mm)
Sand	No. 4 (4.75 mm) to No. 200 (0.075 mm)
Coarse Sand	No. 4 (4.75 mm) to No. 10 (2.00 mm)
Medium Sand	No. 10 (2.00 mm) to No. 40 (0.425 mm)
Fine Sand	No. 40 (0.425 mm) to No. 200 (0.075 mm)
Silt and Clay	Smaller than No. 200 (0.075 mm)

Estimated Percentage		Moisture Content
Percentage by Weight	Modifier	
<5	Trace	Dry - Absence of moisture, dusty, dry to the touch
5 to 15	Slightly (sandy, silty, clayey, gravelly)	Slightly Moist - Perceptible moisture
15 to 30	Sandy, silty, clayey, gravelly	Moist - Damp but no visible water
30 to 49	Very (sandy, silty, clayey, gravelly)	Very Moist - Water visible but not free draining
		Wet - Visible free water, usually from below water table

Symbols	
Sampler Type	Description
2.0" OD Split-Spoon Sampler (SPT)	Continuous Push
Bulk sample	Non-Standard Sampler
Grab Sample	3.0" OD Thin-Wall Tube Sampler (including Shelby tube)
	Portion not recovered

(1) Percentage by dry weight	(5) Combined USCS symbols used for fines between 5% and 15% as estimated in General Accordance with Standard Practice for Description and Identification of Soils (ASTM D-2488)
(2) (SPT) Standard Penetration Test (ASTM D-1586)	
(3) In General Accordance with Standard Practice for Description and Identification of Soils (ASTM D-2488)	
(4) Depth of groundwater	ATD = At time of drilling BGS = below ground surface

Classifications of soils in this report are based on visual field and/or laboratory observations, which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field or laboratory testing unless presented herein. Visual-manual and/or laboratory classification methods of ASTM D-2487 and D-2488 were used as an identification guide for the Unified Soil Classification System.

	<h1>Exploration Log Key</h1>	DATE:	PROJECT NO.
		DESIGNED BY:	
		DRAWN BY:	FIGURE NO.
		REVISED BY:	A-1



Boring Log

Project Number
130097

Boring Number
B-101

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

7.2 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

7/17/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)	
1		S1	B101-2-4	0.0			Slightly moist, brown, sandy GRAVEL (GW); fine to coarse sand, fine to coarse gravel	1	
2				0.2			Moist, brownish gray SAND (SP); fine to coarse sand, predominantly fine to medium; no odor	2	
3				0.2					3
4				0.1					4
5			S2	B101-6-10-GW B101-8-9	0.1			Becomes wet and gray black; strong petroleum odor from 7.5' - 13' bgs	5
6		0.4				6			
7		0.6				7			
8		207				8			
9			S3	B101-20-21.5	404				9
10		832				10			
11		30				11			
12		328				12			
13			S4	B101-20-24-GW	126			Wet, light gray, silty CLAY (CL); no odor	13
14		33.6				14			
15		9.3				15			
16		28				16			
17			S5	B101-20-24-GW	2.1			Wet, dark grayish brown, silty SAND (SM); numerous organic fibers	17
18		2.5				18			
19		0.7				19			
20		0.0				20			
21			S6	B101-20-24-GW	0.0			Wet, gray black, SAND (SP); fine to coarse sand, predominantly fine to medium, iron oxide staining, no odor	21
22		0.0				22			
23		0.0				23			
24		0.0				24			
25							Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.	25	

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: **SDM**

No Recovery

Static Water Level

Approved by: **JJP**

Continuous Core

Water Level (ATD)

Figure No. **A - 2**



Boring Log

Project Number
130097

Boring Number
B-102

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

6.8 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

7/17/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/Recovery (inches)	Material Type	Description	Depth (ft)	
1		S1	B102-3-4	0.1			Slightly moist, reddish brown, sandy GRAVEL (GW); fine to coarse gravel, fine to coarse sand	1	
2				0.0			Moist, reddish-brown to gray SAND (SP); fine to coarse sand, predominantly fine to medium, mottling, no odor	2	
3				0.0					3
4				0.0					4
5			S2	B102-6-10-GW B102-8-9	0.0			Becomes very moist	5
6		0.0							6
7		0.0							7
8		3.1							8
9		5.8						9	
10		5.8						10	
11		0.3	S3	B102-20-21.5	1.6			Trace coarse sand and trace shell fragments	11
12		1.3							12
13		0.6							13
14		0.0							14
15		0.0	S4	B102-20-24-GW	0.0			Wet, light brown gray, clayey SILT (MH); no odor	15
16		0.0							16
17		0.0							17
18		0.0							18
19		0.0						19	
20		0.0	S5	B102-20-24-GW	0.0			Wet, dark brown, sandy SILT (ML); fine to medium sand, numerous organic fibers, no odor	20
21		0.0							21
22		0.0							22
23		0.0							23
24		0.0						24	
25							Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.	25	

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: **SDM**

No Recovery

Static Water Level

Approved by: **JJP**

Continuous Core

Water Level (ATD)

Figure No. **A - 3**



Boring Log

Project Number
130097

Boring Number
B-103

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexnder Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) 16.3 ATD

Sampling Method: Continuous Core

Start/Finish Date 8/25/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)
1		S1	B103-3-4	0.0		Asphalt	1	
2				0.0		Dry, gray, GRAVEL (GP); crushed rock fill	2	
3				0.0		Moist, dark gray SAND (SP); fine to medium sand, trace gravel	3	
4							4	
5				Scattered shells at 5' bgs	5			
6			S2	B103-6-10-GW	8.9		Petroleum odor from 6-7.5' bgs	6
7		82.8					7	
8		79.1					8	
9					31.8		Wet, dark gray, slightly silty SAND (SP-SM); petroleum odor	9
10					10.2			10
11							Wet, black SAND (SP); fine to medium sand, scattered shells, petroleum odor	11
12			S3		4.1			12
13		10.2					13	
14		4.5					14	
15								15
16		▽ 8/25/2014						16
17			S4	B103-20-24-GW	1.7			17
18					0.7			18
19								19
20			S5	B103-22-24	2.5			20
21					21			21
22					0.0			22
23							Shells and faint petroleum odor from 23-24' bgs	23
24							Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.	24
25							25	

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: **SDM**

○ No Recovery

▼ Static Water Level

Approved by: **JJP**

▬ Continuous Core

▽ Water Level (ATD)

Figure No. **A - 4**



Boring Log

Project Number
130097

Boring Number
B-104

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) 7.4 ATD

Sampling Method: Continuous Core

Start/Finish Date 8/25/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)				
1						Asphalt		1				
2						Moist, brown, gravelly SAND (SP); trace silt, fine to medium sand, fine to coarse gravel, with cobbles	1					
3												
4												
5												
6												
7						8/25/2014						
8											Becomes wet at 7' bgs	
9												
10						Boring pressure grouted to surface						
11									0.9		Wet, black SAND (SP); fine to medium sand	
12									4.6		Wood chips at 11' bgs	
13									4.3		1" lens of sandy SILT (ML);	
14									0.8			
15											Wet, gray, SILT (ML); scattered shells	
16											Becomes very sandy at 16'	
17												
18											Wet, gray, silty SAND (SM); medium sand	
19												
20											Wet, black SAND (SP); fine to medium sand	
21												
22											1" pocket of SILT at 22' bgs	
23												
24												
25						Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.						

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: **SDM**

No Recovery

Static Water Level

Approved by: **JJP**

Continuous Core

Water Level (ATD)

Figure No. **A - 5**



Boring Log

Project Number
130097

Boring Number
B-105

Sheet
1 of 1

Project Name: **Port of Tacoma - Petroleum Tank Facilities**

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

6.6 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

7/23/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)	
1		S1	B105-3-4	0.0		Asphalt		1	
2				0.0		Slightly moist, sandy GRAVEL (GW); fine to coarse sand, fine to coarse crushed gravel		2	
3				0.0		Slightly moist, dark brown and white SAND (SP); fine to medium sand, fine subangular crushed gravel			
4				0.0					
5				0.0				Becomes wet	
6		S2	B105-7-8 B105-6-10-GW	0.1				6	
7				374.9		Wet, dark gray, slightly sandy SILT (ML); fine sand		7	
8				24.6		Wet, dark brown, silty SAND (SM); fine sand, shell fragments, petroleum odor			
9				19.2		Petroleum sheen from 7' - 7.5' bgs			
10				9.0					
11				3.2					
12				5.6					
13				3.2					
14				1.3					
15				1.9				Wet, dark gray, very sandy SILT (ML); fine sand	15
16	2.5								
17	1.2	S4		1.2		Wet, dark brown, very silty SAND (SM); fine to medium sand, shell fragments		17	
18	1.2								
19	1.7								
20		S5	B105-20-21 B105-20-24-GW	0.1				18	
21				3.2		Wet, dark brown SAND (SP); trace silt, fine to medium sand		21	
22				0.0					
23				0.0		Wet, dark gray, very sandy SILT (ML); fine sand		22	
24				1.8				23	
25				3.1				24	
				0.7				22	
				0.3				23	
							Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.	24	
								25	

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: JLO

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 6



Boring Log

Project Number
130097

Boring Number
B-106

Sheet
1 of 1

Project Name: **Port of Tacoma - Petroleum Tank Facilities**

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

6.5 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

7/16/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)		
1		S1	B106-1-3	48.1		Asphalt	Moist, dark brown gray SAND (SP); fine to medium sand, predominantly medium, petroleum odor	1		
2				92.3		69.1		Frequent very thin silt lamina between 2.5 - 3.0' bgs	2	
3				55.7		30.0			3	
4					21.9			4		
5			S2	B106-6.5-8 B106-6-10-GW, B500-6-10-GW (Duplicate)	465.8		Becomes wet		5	
6					387.5				15.2	6
7					398.4				36.9	7
8					140.9					8
9							Numerous shell fragments below 10.5' bgs	9		
10			S3		0.9				10	
11					3.7				0.0	11
12					1.6				0.0	12
13					0.0			Wet, brownish gray SILT (ML); trace fine sand, low plasticity, slight petroleum odor	13	
14			S4		0.0				Becomes very sandy at 16.75' bgs: fine to medium sand, predominantly medium, with numerous shell fragments	14
15					79.9		0.4			15
16				1.1		Slight petroleum odor	16			
17				4.5			Wet, brown gray SAND (SP); predominantly medium sand, numerous shell fragments, slight petroleum odor	17		
18				2.2		Becomes very sandy at 16.75' bgs: fine to medium sand, predominantly medium, with numerous shell fragments		18		
19		S5	B106-20-22 B501-20-22 (Duplicate)	4.7					19	
20				0.4		17.8	14.4		20	
21				63.4		Wet, brown gray SILT (ML); trace fine sand, scattered 0.5" pockets of medium sand, low plasticity silt, numerous shell fragments at 22.5' bgs, no odor	21			
22				18.3			Bottom of boring at 24' bgs. Groundwater sample collected using a drive point screen assembly placed from 6-10' bgs. Borehole abandoned using pressurized grout.	22		
23				13.3				23		
24				14.4					24	
25				3.9			25			
				0.9						
				0.2						

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: **MML**

No Recovery

Static Water Level

Approved by: **JJP**

Continuous Core

Water Level (ATD)

Figure No. **A - 7**



Boring Log

Project Number
130097

Boring Number
B-107

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

6.8 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

7/17/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/Recovery (inches)	Material Type	Description	Depth (ft)			
1		S1					Slightly moist, light brown, sandy GRAVEL (GW); fine to coarse gravel, fine to coarse sand	1			
2							Moist, redd brown to black SAND (SP); trace silt, fine to medium sand, petroleum odor	2			
3								3			
4								4			
5								5			
6		S2		B107-5-6.5	40.0 60.0			Very thin bed of silty, fine sand at 4.5' bgs with strong petroleum odor	5		
7								B107-5-9-GW	50.0	Becomes wet	7
8								B107-7.5-8.5	55.0		8
9									9		
10									10		
11		S3			0.1 0.0 0.0 0.0 0.0			Scattered, very thin silt beds	11		
12									12		
13									13		
14									14		
15									15		
16	S4			0.0 0.0			Wet, brownish gray SILT (ML); trace fine sand, disturbed, no odor	16			
17								17			
18								18			
19								19			
20								20			
21	S5		B107-20-22	0.0 0.0			Wood chunks at 20' bgs, becomes mottled black & red	21			
22								22			
23								23			
24								24			
25								25			

▽ 7/17/2014

Boring pressure grouted to surface

ENV PROBE LOG ALEXANDER AVENUE - POT.GPJ November 21, 2014

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: **SDM**

No Recovery

Static Water Level

Approved by: **JJP**

Continuous Core

Water Level (ATD)

Figure No. **A - 8**



Boring Log

Project Number
130097

Boring Number
B-108

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexnder Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

6.5 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

7/15/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)	
1		S1	B108-1.5-3.5	101.0			Moist, brown, sandy GRAVEL (GW); trace silt, fine to coarse angular gravel, fine to coarse sand, Moist, dark gray brown SAND (SP); fine to medium sand, predominantly medium, petroleum odor	1	
2				115.3				2	
3				178.2				3	
4				152.4				4	
5				72.2				5	
6		88.8	B108-5-10-GW	584.3	6		Becomes wet with visible free phase petroleum product from 6' - 7' bgs	6	
7		150.7		7					
8		881.1		8					
9		S2	B108-6-7		394.5			1 pocket of medium to low plasticity silt	9
10					381.6				10
11					5.3				11
12					6.8				12
13					9.9				13
14		S3			6.5			2 pocket of silt	14
15					4.5				15
16					323.3				16
17					323.0				17
18					43.2				18
19		S4			18.5			Wet, dark brown gray SILT (ML); trace fine sand, low plasticity, petroleum odor	19
20					10.0				20
21					2.9				21
22					2.3				22
23					1.0				23
24		S5	B108-20-22		1.5			Wet, dark brown gray SAND (SP); predominantly medium sand, no odor	24
25	0.3				25				
26				0.1			Bottom of boring at 24' bgs. Groundwater sample collected using a drive point screen assembly placed from 5-10' bgs. Borehole abandoned using pressurized grout.	26	
27				0.1				27	

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: MML

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 9



Boring Log

Project Number
130097

Boring Number
B-109

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) 11 ATD

Sampling Method: Continuous Core

Start/Finish Date 7/16/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/Recovery (inches)	Material Type	Description	Depth (ft)	
1		S1	B109-2.5-3.5	9.7			Asphalt	1	
2				8.4			Moist, dark brown gray SAND (SP); predominantly medium sand, petroleum odor	2	
3				4.8			Dark petroleum staining	3.7	3
4				30.5				4	
5		63.9	S2	B109-6.5-8	72.3			Visible petroleum product 6' to 8' bgs	5
6		8.5			6				
7		7.8			7				
8		283			8				
9		457	S3	B109-9-13-GW	660			Heaving sands, saturated with apparent petroleum product	9
10		603			10				
11		50.0			11				
12					12				
13			S4	B109-20-21	1.4			Wet, gray brown, silty SAND (SM); predominantly fine sand, trace shell fragments, petroleum odor	15
14		7.1			16				
15		2.4			17				
16		0.9			18				
17		0.5	S5	B109-20-21	4.1			Wet, brown gray, very sandy SILT (ML); fine to medium sand, no odor	19
18		1.6			20				
19		0.4			21				
20		0.7			22				
21		0.2			0.2			Very thinly bedded woodchips and coarse sand	21
22								Wet, brown gray SAND (SP); predominantly medium sand, scattered 1 pockets of low plasticity silt	22
23									23
24									24
25							Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 9-13' bgs. Borehole abandoned using pressurized grout.	25	

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: MML

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 10



Boring Log

Project Number
130097

Boring Number
B-110

Sheet
1 of 1

Project Name: **Port of Tacoma - Petroleum Tank Facilities**

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) 7.1 ATD

Sampling Method: Continuous Core

Start/Finish Date 7/23/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)	
1		S1	B110-3-4	0.0		Asphalt	Slightly moist, brown, very gravelly SAND (SP); fine to medium sand, fine subrounded gravel	1	
2				0.0		Moist, brown SAND (SP); fine to medium sand	2		
3				0.0			3		
4				0.0			4		
5			S2	B110-7-8 B110-6-10-GW	57.6			Wet, dark gray SAND (SP); trace silt, fine sand, petroleum odor	5
6		124.9							6
7		178.5							7
8		64.2							8
9		1456							9
10		1415							10
11		771	S3	B110-20-21	671.9			Trace shell fragments, petroleum odor and sheen	11
12		375.9							12
13		181.2							13
14		113.7							14
15		42.5							15
16		43.8							16
17		20.3	S4	B110-20-24-GW	13.7			Wet, dark gray, very silty SAND (SM); fine sand	17
18		2.9							18
19		1.1							19
20		1.8							20
21		1.5							21
22		3.4							22
23		5.1	S5	B110-20-21	3.9			Wet, dark brown SAND (SP); trace silt, fine to medium sand, petroleum odor	23
24		1.1							24
25	1.1					25			
26	0.9						Wet, dark gray, very sandy SILT (ML); fine to medium sand, shell fragments	26	
27	0.7			27					
28	Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.							28	

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: JLO

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 11



Boring Log

Project Number
130097

Boring Number
B-111

Sheet
1 of 1

Project Name: **Port of Tacoma - Petroleum Tank Facilities**

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

7.0 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

7/17/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)			
1		S1	B111-5-6 B111-6-10-GW B111-8-9	0.0			Slightly moist, brown, sandy GRAVEL (GW); fine to coarse gravel, fine to coarse sand, no odor	1			
2				0.0			Moist, brown SAND (SP); trace silt, fine to medium sand, no odor	2			
3				0.0						3	
4										4	
5						20.0					5
6						20.0					6
7				▽ 7/17/2014	S2	2.0					7
8						300				Becomes wet, dark gray brown, with strong petroleum odor and sheen from 7.5' to 13' bgs	8
9						2300					9
10						2400					10
11						240					11
12						331					12
13					S3	234					13
14						51					14
15						24					15
16						4.0				Wet, brown, ORGANIC SILT (OL); numerous roots and grass	16
17						7.1				Wet, gray, clayey SILT (MH);	17
18					S4	2.9				Wet, dark gray brown, slightly silty SAND (SM-SP); silt clasts	18
19						1.8				Wet, grayish brown to black SAND (SW); trace silt, fine to coarse sand, trace wood chips, no odor	19
20						1.4					20
21						2.0				Wet, gray black to red SAND (SP); fine to medium sand	21
22					S5	B111-20-22	1.0				22
23						B111-20-24-GW	0.7			Wet, gray, silty SAND (SM); fine to medium sand, abundant silt clasts, disturbed	23
24							0.5				24
25				0.2				25			

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: **SDM**

No Recovery

Static Water Level

Approved by: **JJP**

Continuous Core

Water Level (ATD)

Figure No. **A - 12**



Boring Log

Project Number
130097

Boring Number
B-112

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) 7.3 ATD

Sampling Method: Continuous Core

Start/Finish Date 7/21/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)	
1		S1	B112-4-5 B504-4-5 (Duplicate)	0.0			Dry, brown SAND (SP); fine to medium sand	1	
2				0.0			Becomes moist at 1.5' bgs	2	
3				0.0				3	
4				0.0				4	
5			S2	B112-6-10-GW	0.0				5
6		0.4						6	
7		11.4							7
8				B112-8.5-9.5	2.2			Becomes wet at 7.25'	8
9			S3		0.3				9
10		0.3						10	
11		0.3						11	
12			S4		0.1				12
13		1.5						13	
14		0.8						14	
15		4.0						15	
16			S5	B112-20-24-GW B112-22.5-23.5	2.2				16
17		1.3						17	
18		0.3						18	
19					0.3			Wet, dark gray SAND (SW); fine to medium sand, fishy petroleum odor	19
20					0.5				20
21					0.6				21
22					1.5			Becomes silty	22
23								Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.	23
24									24
25								25	

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: JLO

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 13



Boring Log

Project Number
130097

Boring Number
B-113

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

6.5 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

7/18/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)		
1		S1	B113-2-4	0.0		Asphalt		1		
2				0.0		Moist, brown, gravelly SAND (SP); fine to medium sand, fine to coarse subrounded to subangular gravel	2			
3										3
4										4
5								5		
6					0.0				6	
7					0.0				7	
8			S2	B113-6-10-GW	7.1		Wet, dark gray to black, slightly silty SAND (SM); fine to medium sand		8	
9				B113-8-9	11.4				9	
10					0.4		Very thin silt bed at 9.75'		10	
11					0.3		Numerous shell fragments below 10'		11	
12					0.0				12	
13			S3		0.0				13	
14					0.0				14	
15					0.0		Moist, black, sandy SILT (ML); fine sand, 0.25" lamina of white, fibrous material		15	
16					0.0		Moist, dark gray CLAY (CL);		16	
17			S4		0.0		Moist, dark gray, very silty SAND (SM); fine to medium sand, shell fragments		17	
18									18	
19									19	
20					8.1		Wet, dark gray SAND (SW); fine to coarse sand		20	
21			S5	B113-20-22	3.4				21	
22					2.1				22	
23				B113-20-24-GW	1.4				23	
24					1.8				24	
25							Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.	25		

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: JLO

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 14



Boring Log

Project Number
130097

Boring Number
B-114

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) 7.0 ATD

Sampling Method: Continuous Core

Start/Finish Date 7/18/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/Recovery (inches)	Material Type	Description	Depth (ft)			
1		S1	B114-2.5-3.5	0.0		Asphalt	Moist, brown, very gravelly SAND (SW); fine to coarse sand, fine subrounded gravel	1			
2				0.0			Moist, dark gray, SAND (SP); fine to medium sand	2			
3				0.0					3		
4										4	
5							0.0			5	
6							0.0			6	
7				▽ 7/18/2014	S2	B114-6-10-GW	0.0			Becomes wet at 7'	7
8							0.0				8
9						B114-9-10	0.1				9
10				Boring pressure grouted to surface			.2				10
11							0.0			Wet, dark gray, SAND (SP); fine to medium sand, numerous shell fragments	11
12					S3		0.0				12
13							0.0				13
14							0.0				14
15							0.0			Moist, dark gray, slightly sandy SILT (ML); fine sand	15
16							0.0			Moist, dark gray, slightly sandy CLAY; fine sand	16
17					S4		0.5				17
18							4.1			Moist, dark gray SAND (SP); fine to medium sand	18
19							3.6				19
20							6.2			Wet, dark gray, slightly sandy CLAY (CL); fine sand	20
21					S5	B114-20-22 B114-20-24-GW	5.6			Wet, dark gray SAND (SP); fine to medium sand, numerous shell fragments and wood chips, petroleum odor	21
22							6.4				22
23							3.1				23
24										Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.	24
25								25			

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: AET, JLO

○ No Recovery

▼ Static Water Level

Approved by: JJP

▬ Continuous Core

▽ Water Level (ATD)

Figure No. A - 15



Boring Log

Project Number
130097

Boring Number
B-115

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexnder Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) 7.2 ATD

Sampling Method: Continuous Core

Start/Finish Date 7/18/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)	
1	 Boring pressure grouted to surface 7/18/2014	S1	B115-2-3	0.0		Concrete	Slightly moist to dry, brown SAND (SP); fine to medium sand	1	
2				0.0		2			
3				0.0		3			
4		S2	B115-6-10-GW	0.0		Becomes moist	4		
5				0.0		Becomes wet	5		
6				0.0		6			
7		S3	B115-10-11	0.0		Wet, dark brown gray SAND (SP); fine to medium sand, scattered shell fragments	7		
8				0.0			8		
9				0.0			9		
10						0.0			10
11						0.0			11
12						0.0			12
13						0.0			13
14						0.0			14
15						0.0			15
16							Bottom of boring at 15' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs. Borehole abandoned using pressurized grout.	16	
17								17	
18								18	
19								19	
20								20	
21								21	
22								22	
23								23	
24								24	
25								25	

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: JLO

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 16



Boring Log

Project Number
130097

Boring Number
B-116

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) 8.25 ATD

Sampling Method: Continuous Core

Start/Finish Date 7/18/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)
1	 Boring pressure grouted to surface 7/18/2014	S1	B116-1-2	0.1		 Asphalt Slightly moist, brown SAND (SP); fine to medium sand Becomes moist, dark brown Becomes wet Very thin silt bed at 13.5' Bottom of boring at 15' bgs. Groundwater samples collected using a drive point screen assembly placed from 7-11' bgs. Borehole abandoned using pressurized grout.	1	
2				0.1			2	
3				0.0			3	
4		S2	B116-7-11-GW	0.0	4			
5				0.0	5			
6				0.0	6			
7		S3	B116-10-11	0.0	7			
8				0.0	8			
9				0.0	9			
10					0.0		10	
11					0.0		11	
12					0.0		12	
13					0.0		13	
14					0.0		14	
15					0.0		15	
16					16			
17					17			
18					18			
19					19			
20					20			
21					21			
22					22			
23					23			
24					24			
25					25			

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: JLO

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 17



Boring Log

Project Number
130097

Boring Number
B-117

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

6.8 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

7/22/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/Recovery (inches)	Material Type	Description	Depth (ft)
1		S1	B117-3-4	0.0	-	Asphalt	Slightly moist, gray, very sandy GRAVEL (GW); medium to coarse sand, fine to coarse subangular to subrounded gravel Moist, brown SAND (SP); fine to medium sand	1
2				0.0		2		
3				0.0		3		
4				0.0		4		
5		S2	B117-6-10-GW B117-9-10	0.0	-	-	Becomes wet	5
6				0.0				6
7				0.0				7
8				0.0				8
9				0.0				9
10				0.0				10
11		S3	-	-	0.0	-	Wet, dark brown SAND (SP); fine to medium sand, trace silt, shell fragments, thinly laminated silt	11
12					0.0			12
13					0.0			13
14					0.6 2.7 0.6			14
15		S4	-	-	0.0	-	Wet, dark brown, very silty SAND (SM); fine sand	15
16					0.0			16
17					0.0			17
18					0.0			18
19		S5	B117-20-24-GW B117-21-23.5	-	0.0	-	Wet, dark brown SAND (SP); fine to medium sand	19
20					0.0			20
21					0.0			21
22					0.0			22
23		-	-	-	0.0	-	-	23
24					0.0			24
25	Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.							25

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: JLO

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 18



Boring Log

Project Number
130097

Boring Number
B-118

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

7.1 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

7/22/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)	
1		S1	B118-3-4	0.0			Asphalt	1	
2							Slightly moist, gray, very sandy GRAVEL (GW); medium to coarse sand, fine to coarse subangular to subrounded gravel	2	
3							Moist, brown SAND (SP); fine to medium sand	3	
4								4	
5			S2	B118-6-10-GW	0.0			Becomes wet	5
6								6	
7								7	
8			S3	B118-9-10	0.0			Wet, dark brown SAND (SP); fine to medium sand, trace silt, shell fragments	8
9								9	
10								10	
11			S4	B506-21-23	0.0			Wet, dark brown, very silty SAND (SM); fine sand, wood fragments	11
12								12	
13								13	
14			S5	B118-21-23	0.0			Wet, dark gray, slightly sandy SILT (ML); wood fragments	14
15								15	
16								16	
17			S6	B118-20-24-GW	0.0			Wet, dark brown SAND (SP); fine to medium sand, shell fragments, very thinly laminated silt	17
18								18	
19								19	
20									20
21									21
22									22
23									23
24									24
25							Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.	25	

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: JLO

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 19



Boring Log

Project Number
130097

Boring Number
B-119

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

6.4 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

8/26/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)
1		S1	B119-6-10-GW	0.0		Asphalt	Moist, brown gray, sandy GRAVEL (GP); fill	1
2						Moist, dark gray SAND (SP); fine to medium sand	2	
3							3	
4							4	
5							5	
6							6	
7							7	
8							8	
9							9	
10							10	
11							11	
12							12	
13							13	
14							14	
15							15	
16							16	
17							17	
18							18	
19							19	
20							20	
21							21	
22							22	
23							23	
24							24	
25		25						

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: **SDM**

No Recovery

Static Water Level

Approved by: **JJP**

Continuous Core

Water Level (ATD)

Figure No. **A - 20**



Boring Log

Project Number
130097

Boring Number
B-120

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

7.1 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

8/26/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/Recovery (inches)	Material Type	Description	Depth (ft)
1		S1				Asphalt	1	
2						Moist, gray, sandy GRAVEL (GP); fill	2	
3						Moist, dark gray SAND (SAND); fine to medium sand	3	
4							4	
5							5	
6						B120-6-10-GW	348.3	
7						B120-6.5-7.5	724.5	
8							528.8	
9							54.3	Very thin, sandy silt bed at 8.5' bgs
10							44.6	
11							45.0	
12						S3	34.1	
13							9.7	Product sheen at 13' bgs
14							6.5	
15							1.0	Wet, dark gray, sandy SILT (ML);
16							3.2	
17						S4	4.8	Wet, dark brown, very silty SAND (SM);
18							3.5	
19							1.2	
20							0.2	Wet, dark gray, sandy SILT (ML);
21							2.0	Wet, black SAND (SP); fine to medium sand, no odor
22						S5	1.6	
23						B120-20-24-GW	2.4	
24						B120-22-24	1.4	
25		2.1	Very thin silt bed at 23.5' bgs					
25			Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.					

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: **SDM**

No Recovery

Static Water Level

Approved by: **JJP**

Continuous Core

Water Level (ATD)

Figure No. **A - 21**



Boring Log

Project Number
130097

Boring Number
B-121

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) 6.3 ATD

Sampling Method: Continuous Core

Start/Finish Date 8/26/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)	
1		S1	B121-6-10-GW B121-6-7	2.7		Asphalt	Asphalt	1	
2				42.9		Moist, gray, sandy GRAVEL (GP); fill	Moist, gray, sandy GRAVEL (GP); fill	2	
3				27.1		Moist, dark gray to black SAND (SP); fine to medium sand	Moist, dark gray to black SAND (SP); fine to medium sand	3	
4				555.1				4	
5				702.7				5	
6		941.9		S2	198.3		Product on grains from 6 to 7' bgs	Product on grains from 6 to 7' bgs	6
7		26.7				Thin sandy silt bed with scattered organics at 7.75' bgs	Thin sandy silt bed with scattered organics at 7.75' bgs	7	
8								8	
9								9	
10				S3	2.1				10
11		3.6						11	
12		4.0						12	
13		3.2						13	
14		1.3						14	
15				S4					15
16									16
17									17
18				S5					18
19									19
20					B121-20-24-GW	0.2		Wet, dark gray, sandy SILT (ML);	Wet, dark gray, sandy SILT (ML);
21					0.0		Wet, black SAND (SP); fine to medium sand, trace seashells	Wet, black SAND (SP); fine to medium sand, trace seashells	21
22					0.0		Trace shells	Trace shells	22
23									23
24					B121-22-24	0.0			
25						Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.	Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.	25	

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: **SDM**

No Recovery

Static Water Level

Approved by: **JJP**

Continuous Core

Water Level (ATD)

Figure No. **A - 22**



Boring Log

Project Number
130097

Boring Number
B-122

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) 6.9 ATD

Sampling Method: Continuous Core

Start/Finish Date 7/22/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/Recovery (inches)	Material Type	Description	Depth (ft)	
1		S1	B122-3-4	0.0		Asphalt	Slightly moist, gray, very sandy GRAVEL (GW); medium to coarse sand, fine to coarse subangular to subrounded gravel	1	
2						Moist, brown SAND (SP); trace silt, fine to medium sand	2		
3								3	
4								4	
5		S2	B122-6-10-GW B122-9-10	0.0			Becomes wet		5
6									6
7									7
8									8
9		S3	B122-21-22.5 B122-20-24-GW	0.0			Wet, dark brown SAND (SP); fine to medium sand, trace silt, shell fragments		9
10									10
11									11
12									12
13		S4		0.0			Wet, dark brown, very silty SAND (SM); fine sand		13
14									14
15									15
16									16
17				0.0			Wet, dark gray, sandy SILT (ML); fine sand		17
18									18
19									19
20									20
21				0.0			Wet, dark brown, very silty SAND (SM); fine to medium sand, shell fragments		21
22									22
23									23
24									24
25			1.6			Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.		25	

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: JLO

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 23



Boring Log

Project Number
130097

Boring Number
B-123

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) 7.7 ATD

Sampling Method: Continuous Core

Start/Finish Date 7/21/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)
1		S1	B123-4-5	0.0		Asphalt	Dry, gray, sandy GRAVEL (GW); medium to coarse sand, fine to coarse subangular to subrounded gravel	1
2						Moist, brown SAND (SP); fine to medium sand	2	
3						Very thinly bedded mottled silt	3	
4							4	
5							5	
6		S2	B123-6-10-GW B123-8-10 B505-8-10 (Duplicate)	0.0			Moist, brown, slightly silty SAND (SM-SP); fine sand	6
7						Moist to wet, dark brown SAND (SP); fine to medium sand, shell fragments	7	
8							8	
9							9	
10							10	
11							11	
12							12	
13							13	
14							14	
15							15	
16		S3	B123-20-24-GW	0.0			Wet, dark brown, slightly silty SAND (SP-SM); fine to medium sand, shell fragments	16
17						Wet, dark gray, slightly sandy SILT (ML); fine sand	17	
18						Wet, dark brown, silty SAND (SM); fine sand	18	
19						Wet, dark brown, very silty SAND (SM); fine sand, shell fragments	19	
20						Wet, dark brown SAND (SP); fine to medium sand	20	
21		S4	B123-23-24	0.0			Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.	21
22							22	
23							23	
24							24	
25								25

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: JLO

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 24



Boring Log

Project Number
130097

Boring Number
B-124

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexnder Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

8.3 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

7/21/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)				
1		S1	B124-4-5	0.0		Asphalt	Dry, gray, sandy GRAVEL (GW); medium coarse sand, fine to subangular to subrounded coarse gravel,	1				
2						Moist, brown SAND (SP); fine to medium sand	2					
3						Very thin silt bed at 2.75' bgs	3					
4							4					
5							5					
6							6					
7							7					
8						7/21/2014	B124-6-10-GW	0.0	0.0		Becomes wet, with shell fragments from 8.25' to 9.75' bgs	8
9							B124-9-10	0.0	0.0		Becomes dark brown at 10' bgs	9
10						Boring pressure grouted to surface		0.0	0.0			10
11								0.0	0.0			11
12							S3		0.0			12
13									0.2			13
14									0.2			14
15									0.0			15
16									0.0			16
17							S4		0.0		Wet, dark brown, very silty SAND (SM); fine sand	17
18									0.0			18
19									0.0			19
20									0.0			20
21									0.0			21
22							S6	B124-20-24-GW	0.0		Wet, dark brown SAND (SP); fine to medium sand, trace silt	22
23								B124-22-23	0.0			23
24											Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.	24
25							25					

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: JLO

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 25



Boring Log

Project Number
130097

Boring Number
B-125

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexnder Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

8.1 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

7/21/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)	
1		S1	B125-3-4	0.0			Slightly moist, gray brown, sandy GRAVEL (GW); fine to coarse sand	1	
2				0.0			Moist, brown SAND (SP); fine to medium sand, no odor	2	
3				0.0					3
4				0.0					4
5		S2	B125-6-10-GW B125-8-9	0.0			Becomes wet at 7.5' bgs	5	
6				0.0				6	
7				0.0				7	
8				0.0				8	
9		S3	B125-20-24-GW	0.0			Shell fragments below 10' bgs	9	
10				0.0				10	
11				0.0				11	
12				0.0				12	
13		S4	B125-23-24	0.0			Wet, dark brown, very silty SAND (SM); fine sand	13	
14				0.0				14	
15				1.9			Wet, dark brown SAND (SP); fine to medium sand, trace silt, shell fragments	15	
16				1.7			Wet, dark gray, very sandy SILT (ML); fine sand, wood fragments	16	
17		S5	B125-23-24	3.0			Wet, dark brown SAND (SP); fine to medium sand, trace silt	17	
18								18	
19								19	
20				1.7				20	
21				0.0					21
22				0.0					22
23				0.0					23
24				0.0					24
25							Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.	25	

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: JLO

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 26



Boring Log

Project Number
130097

Boring Number
B-126

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexnder Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

7.8 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

7/22/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)
0.0						Asphalt		0
0.0						Fill: slightly moist, gray, very sandy GRAVEL (GW); medium to coarse sand, fine to coarse subrounded to subangular gravel		0
0.0						Moist, brown SAND (SP); fine to medium sand, trace silt		0
0.0			B126-3.5-4.5	0.0				0
0.0				0.0				0
0.0				0.0				0
0.0				0.0				0
2.5		S2	B126-6-10-GW	2.5		Wet		5
8.3				8.3				5
5.2				5.2				10
35.3		S3	B126-10-12	35.3		Wet, dark brown, silty SAND (SM); fine to medium sand, shell fragments, petroleum odor		10
9.9				9.9				10
1.8				1.8				10
3.4				3.4		Becomes very silty		10
5.0				5.0				15
4.6		S4		4.6		Wet, dark gray, very sandy SILT (ML); fine sand, shell fragments		15
5.0				5.0				15
1.5				1.5		Wet, dark brown, very silty SAND (SM); fine to medium sand, shell fragments, petroleum odor		20
0.2				0.2				20
0.7				0.7		Wet, dark brown SAND (SP); fine to medium sand, shell fragments, petroleum odor		20
10.0		S5	B126-20-24-GW	10.0				25
12.7			B126-22-24	12.7				25
0.8				0.8		Scattered very thinly laminated silt		25
1.4				1.4				25
1.1		S6		1.1				25
1.9			B126-27-29	1.9		Wet, dark gray, very sandy SILT (ML); fine sand		30
								30
							Bottom of boring at 30' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.	30

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: JLO

○ No Recovery

▼ Static Water Level

Approved by: JJP

▬ Continuous Core

▽ Water Level (ATD)

Figure No. A - 27



Boring Log

Project Number
130097

Boring Number
B-127

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexnder Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) 6.6 ATD

Sampling Method: Continuous Core

Start/Finish Date 7/16/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)			
1	 Boring pressure grouted to surface 7/16/2014	S1	B127-1.5-3.5	0.9			Moist, brown, sandy GRAVEL (GW); trace silt, fine to coarse gravel, fine to coarse sand	1			
2				39.3				Moist, dark gray brown SAND (SP); fine to medium sand, predominantly medium, rare organic fibers, dark staining, petroleum odor	2		
3				78.2					3		
4				62.7					4		
5				681.4					5		
6		666.1	S2	B127-6.5-8.5 B127-5-10-GW			866.0		Becomes wet	6	
7		889.5								7	
8		345.4								8	
9		125.2								9	
10		87.5								10	
11		41.9	S3				38.1			Wet, gray brown, slightly sandy SILT (ML); fine sand	11
12		29.5									12
13		6.7									13
14		6.7									14
15		6.0									15
16	4.0			5.6		Bottom of boring at 15' bgs. Groundwater samples collected using a PVC screen assembly placed from 5-10' bgs. Borehole abandoned using pressurized grout.	16				
17				17							
18				18							
19				19							
20				20							
21				21							
22				22							
23				23							
24				24							
25				25							

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: **MML**

No Recovery

Static Water Level

Approved by: **JJP**

Continuous Core

Water Level (ATD)

Figure No. **A - 28**



Boring Log

Project Number
130097

Boring Number
B-128

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

6.0 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

7/16/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)		
1	 Boring pressure grouted to surface 7/16/2014	S1	B128-0-3	18			Moist, brown, sandy GRAVEL (GW); trace silt, fine to coarse gravel, fine to coarse sand	1		
2				1043				Moist, dark gray brown SAND (SP); trace silt, predominantly fine sand, petroleum odor	2	
3				1503				Becomes darker gray brown	3	
4				623					4	
5				649					5	
6		S2	B128-5-10-GW B128-6-8	2497				Becomes wet	6	
7				1126						7
8				1156						8
9										9
10										10
11		S3		5.7				Numerous shell fragments below 10' bgs	11	
12				6.1						12
13				14.1						13
14				2.0						14
15				5.4						15
16	8.2		16							
17	4.0		17							
18	6.0		18							
19	6.5		19							
20	3.2		20							
21			21							
22			22							
23			23							
24			24							
25			25							

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: MML

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 29



Boring Log

Project Number
130097

Boring Number
B-129

Sheet
1 of 1

Project Name: **Port of Tacoma - Petroleum Tank Facilities**

Ground Surface Elev _____

Location: 709 Alexnder Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) 7.8 ATD

Sampling Method: Continuous Core

Start/Finish Date 8/25/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)	
1			B129-3-5 B129-6-10-GW B129-12-14 B129-20-24-GW B129-21-23	0		Asphalt		1	
2				0		Dry, gray, sandy GRAVEL (GP); fill		2	
3				0		Moist, brown SAND (SP); fine to medium sand		3	
4				0				4	
5				0				5	
6				0				6	
7				0				7	
8				0				Grades to wet, dark gray	8
9				0				Scattered seashells at 9'	9
10				0					10
11				0.1					11
12				0.4				Scattered 1" pockets of silty sand, with very faint petroleum odor	12
13				0.3					13
14				0.4					14
15				0.1				Wet, dark gray, sandy SILT (ML); fine sand	15
16				0				Very sandy SILT (ML) to very silty SAND (SM); fine sand	16
17									17
18									18
19									19
20				0				Wet, black SAND (SP); fine to medium sand	20
21				0				Scattered, very thin silt beds	21
22				0					22
23									23
24								Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 6-10' bgs and from 20-24' bgs. Borehole abandoned using pressurized grout.	24
25						25			

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: **SDM**

No Recovery

Static Water Level

Approved by: **JJP**

Continuous Core

Water Level (ATD)

Figure No. **A - 30**



Boring Log

Project Number
130097

Boring Number
B-130

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexnder Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

7.8 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

8/25/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)
1	<p>Boring pressure grouted to surface</p> <p>8/25/2014</p>	S1	B130-3-5	0.0		Asphalt	1	
2						Slightly moist, gray sandy GRAVEL (GP); coarse sand, fine to coarse gravel	2	
3						Moist, dark gray SAND (SP); fine to medium sand, trace fine gravel	3	
4							4	
5							5	
6						B130-6-10-GW	6	
7							7	
8							8	
9						B130-8-10	9	
10							10	
11							11	
12							12	
13			13					
14		B130-13-15	14					
15			15					
16			16					
17		S4	B130-20-24-GW	0.2	0.5		Wet, dark gray SILT (ML); rapid dilatancy	17
18							Wet, dark gray, slightly silty SAND (SP-SM); fine sand	18
19							Wet, dark gray SILT (ML);	19
20			20					
21			21					
22			22					
23			23					
24			24					
25		25						

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: **SDM**

No Recovery

Static Water Level

Approved by: **JJP**

Continuous Core

Water Level (ATD)

Figure No. **A - 31**



Boring Log

Project Number
130097

Boring Number
B-131

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

7.0 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

9/10/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)	
1						Asphalt	1		
2						Slightly moist, gray, sandy GRAVEL (GP); fine to coarse sand, fine rounded gravel	2		
3						Slightly moist, brown SAND (SP); fine to medium sand	3		
4							4		
5						Slightly moist, brown SILT (ML);	5		
6						Moist, brown SAND (SP); fine to medium sand, mottling from 6-6.75 ft bgs	6		
7						Wet, dark gray, very silty SAND (SM); fine sand, trace wood fibers	7		
8						1" silt lens	8		
9						Wet, dark grey and red SAND (SP); fine to medium sand	9		
10						Slight petrol odor, organics (shell fragments), trace silt	10		
11							11		
12							12		
13							13		
14						2" silt lens	14		
15						Wet, gray SILT (ML); organics (wood), slight petroleum odor	15		
16							16		
17							17		
18						Wet, dark gray and red SAND (SP); trace silt, fine to medium sand	18		
19							19		
20						B131-20-21	0.1	Becomes fine sand, slight petroleum odor	20
21							0.3	Wet, gray SILT (ML); slight petroleum odor	21
22						B131-20-24-GW	0.1	Wet, dark gray and red SAND (SP); trace silt, fine sand, slight petroleum odor	22
23									23
24								Bottom of boring at 24' bgs. Groundwater samples collected using a drive point assembly placed from 20-24' bgs. Borehole abandoned using pressurized grout	24
25				25					

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: JLO

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 32



Boring Log

Project Number
130097

Boring Number
B-132

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexander Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) 7.5 ATD

Sampling Method: Continuous Core

Start/Finish Date 9/10/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)
1						Asphalt	1	
2						Slightly moist, gray, sandy GRAVEL (GP); fine to coarse sand, fine rounded to angular gravel	2	
3						Slightly moist, brown SAND (SW); fine to coarse sand, organics (shell fragments), mottling at 5.25', seams of white rounded medium sand	3	
4							4	
5							5	
6							6	
7							7	
8							8	
9							9	
10							10	
11							11	
12							12	
13							13	
14							14	
15							15	
16							16	
17							17	
18							18	
19							19	
20							20	
21							21	
22							22	
23							23	
24							24	
25		25						

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: JLO

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 33

ENV PROBE LOG ALEXANDER AVENUE - POT.GPJ November 21, 2014



Boring Log

Project Number
130097

Boring Number
B-133

Sheet
1 of 1

Project Name: **Port of Tacoma - Petroleum Tank Facilities**

Ground Surface Elev _____

Location: 709 Alexnder Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

8.0 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

9/10/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)
1						Asphalt	1	
2						Slightly moist, gray, sandy GRAVEL (GP); fine to coarse sand, rounded gravel	2	
3						Moist, brown SAND (SP); fine to medium sand	3	
4							4	
5							5	
6							6	
7							7	
8						Becomes gray, fine sand	8	
9						Becomes wet, dark gray, fine to medium sand, slight petroleum odor	9	
10							10	
11						Becomes dark gray and red, organics (shell fragments), slight petroleum odor	11	
12							12	
13						Becomes fine sand	13	
14							14	
15						Wet, gray SILT (ML);	15	
16						Organics (wood)	16	
17							17	
18						Wet, dark gray, very silty SAND (SM); fine to medium sand, organics (shell fragments), slight petroleum odor	18	
19							19	
20							20	
21						Wet, dark gray and red SAND (SP); trace silt, fine to medium sand, slight petroleum odor	21	
22							22	
23							23	
24							24	
25	Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 20-24' bgs. Borehole abandoned using pressurized grout.	25						

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: JLO

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 34



Boring Log

Project Number
130097

Boring Number
B-134

Sheet
1 of 1

Project Name: **Port of Tacoma - Petroleum Tank Facilities**

Ground Surface Elev _____

Location: 709 Alexnder Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) 7.25 ATD

Sampling Method: Continuous Core

Start/Finish Date 9/10/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)
1	<p>Boring pressure grouted to surface</p> <p>9/10/2014</p>	S1		0		Asphalt	1	
2						Slightly moist, gray, sandy GRAVEL (GP); fine to coarse sand, fine rounded to angular gravel,	2	
3		Moist, brown SAND (SP); fine to medium sand				3		
4		Becomes fine sand				4		
5		Becomes wet at 7.25 ft bgs				5		
6		Organics (shell fragments)				6		
7						7		
8						8		
9						9		
10						10		
11						11		
12						12		
13						13		
14						14		
15						15		
16						16		
17						17		
18						18		
19						19		
20						20		
21						21		
22						22		
23						23		
24						24		
25		25						

B134-21-22
B134-20-24-GW

Sampler Type: No Recovery Continuous Core
 PID - Photoionization Detector (Headspace Measurement) Logged by: **JLO**
 Static Water Level Approved by: **JJP**
 Water Level (ATD) Figure No. **A - 35**

ENV PROBE LOG ALEXANDER AVENUE - POT.GPJ November 21, 2014



Boring Log

Project Number
130097

Boring Number
B-135

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexnder Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) _____

8.5 ATD

Sampling Method: Continuous Core

Start/Finish Date _____

9/19/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)
1	Boring pressure grouted to surface	S1		0.0		Asphalt		1
2				0.1		Crushed gravel fill		2
3				0.2		Moist, brown, slightly gravelly SAND (SP); medium sand		3
4				0.3		Moist, brown gray, sandy GRAVEL (GP); Moist, brown SAND (SP); trace gravel, fine to medium sand		4
5		S2		0.0				5
6	0.0						6	
7	0.0						7	
8	0.0						8	
9	▽ 9/19/2014	S3		0.0				9
10	0.0						10	
11	0.0						11	
12	0.0						12	
13		S4		0.0		Wet, dark gray SILT (ML); Wet, black SAND (SP); fine to medium sand with numerous seashells		13
14	0.0						14	
15	0.0						15	
16	0.0						16	
17		S5		0.0		Wet, dark gray to black SILT (ML); Wet, black SAND (SP); fine to medium sand with scattered seashells		17
18	0.0						18	
19	0.0						19	
20	0.0						20	
21		S6		0.0		Wet, black, silty SAND (SM); fine to medium sand Wet, dark gray SILT (ML); trace organics		21
22	0.0						22	
23	0.0						23	
24	0.0						24	
25						Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 20-24' bgs. Borehole abandoned using pressurized grout.		25

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: AET

○ No Recovery

▼ Static Water Level

Approved by: JJP

▬ Continuous Core

▽ Water Level (ATD)

Figure No. A - 36



Boring Log

Project Number
130097

Boring Number
B-136

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexnder Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) 6 ATD

Sampling Method: Continuous Core

Start/Finish Date 9/19/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)	
1		S1	B136-20-24-GW B136-22-24	0.0		Asphalt		1	
				0.0		Gravel fill		1	
2		0.0			Moist, brown SAND (SP); fine to medium sand		2		
3		0.0					3		
4		0.0					4		
5		0.0					5		
6		0.0		S2	0.0		Wet, dark gray, silty SAND (SM); fine to medium sand, scattered organics		6
7		0.0				Wet, black SAND (SP); fine to medium sand		7	
8		0.0					Wet, dark gray SILT (ML); no sand		8
9		0.0							9
10		0.0							10
11		0.0							11
12		0.0		S3	0.0		Wet, black sand (SP); fine to medium sand, trace seashells		12
13		0.0						13	
14		0.0							14
15		0.0							15
16		0.0							16
17		0.0		S4	0.0		Wet, dark gray, slightly clayey SILT (ML);		17
18		0.0							18
19		0.0							19
20		0.0		S5	0.0		Wet, black, slightly silty, SAND (SP-SM); fine to medium sand		20
21		0.0						Wet, dark gray, sandy SILT (ML); fine sand	
22		0.0						numerous organics	22
23		0.0						Wet, black SAND (SP); fine to medium sand, trace fibrous organics	23
24	0.0					Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 20-24' bgs. Borehole abandoned using pressurized grout.	24		
25							25		

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: AET

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 37



Boring Log

Project Number
130097

Boring Number
B-137

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities

Ground Surface Elev _____

Location: 709 Alexnder Ave, Tacoma, WA

Driller/Method: Cascade Drilling / Direct Push Probe

Depth to Water (ft BGS) 7 ATD

Sampling Method: Continuous Core

Start/Finish Date 9/19/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Drive/ Recovery (inches)	Material Type	Description	Depth (ft)
1				0.0		Asphalt	Moist, brown gray, sandy GRAVEL (GP); fill	1
2						S1	Moist, brown SAND (SP); fine to medium sand	2
3								3
4								4
5								5
6							6	
7						S2	Wet, dark gray, very sandy SILT (ML); numerous organics	8
8							Wet, dark gray, slightly clayey SILT (ML);	9
9							Wet, black, SAND (SP); fine to medium sand	10
10							Wet, black, SAND (SP) with scattered seashells interbedded with dark gray SILT (ML)	12
11							11	
12						S3	Wet, black SAND (SP); fine to medium sand	15
13							Wet, black, slightly clayey SILT (ML);	16
14							Wet, black, silty SAND (SM); fine to medium sand	17
15							Wet, black SAND (SP); fine to medium sand, scattered seashells	18
16							19	
17						S4	Wet, black, slightly silty SAND (SP-SM); fine to medium sand	20
18							Wet, black SAND (SP); fine to medium sand with trace seashells	21
19								22
20								23
21						S5	B137-20-24-GW	22
22							B137-22-24	23
23							24	
24							25	
25	Bottom of boring at 24' bgs. Groundwater samples collected using a drive point screen assembly placed from 20-24' bgs. Borehole abandoned using pressurized grout.							25

Sampler Type:

PID - Photoionization Detector (Headspace Measurement)

Logged by: AET

No Recovery

Static Water Level

Approved by: JJP

Continuous Core

Water Level (ATD)

Figure No. A - 38



Monitoring Well Construction Log

Project Number
130097

Well Number
MW-102-15

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities Ground Surface Elev. _____
 Location: 709 Alexander Ave, Tacoma, WA Top of Casing Elev. _____
 Driller/Method: Cascade Drilling / Direct Push Probe Depth to Water (ft BGS) 7.0 ATD
 Sampling Method: Continuous Core Start/Finish Date 8/27/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	8 Flushmount monument in concrete Concrete (0'-2')						See boring log MW-102-25 for lithology information	1
2	Bentonite Chips (2'-3')							2
3								3
4	10/20 Prepacked Sand Filter Pack (4'-14')							4
5								5
6								6
7	▽ 8/27/2014							7
8	2/12 Sand backfill Around Prepack (3'-14')							8
9								9
10								10
11	0.010 slot Schedule 40 PVC 2 Well Screen (4'-14')							11
12								12
13								13
14	Threaded end cap							14
15							Bottom of boring at 14' bgs Ecology Well Log BID-646	15
16								16
17								17
18								18
19								19
20								20
21								21
22								22
23								23
24								24
25								25

MONITORING WELL - ALEXANDER AVENUE - POT.GPJ November 21, 2014

Sampler Type:

No Recovery

PID - Photoionization Detector

▼ Static Water Level

▽ Water Level (ATD)

Logged by: AET

Approved by: JJP

Figure No. A - 41



Monitoring Well Construction Log

Project Number
130097

Well Number
MW-102-25

Sheet
1 of 1

Project Name: **Port of Tacoma - Petroleum Tank Facilities**

Ground Surface Elev. _____

Location: **709 Alexander Ave, Tacoma, WA**

Top of Casing Elev. _____

Driller/Method: **Cascade Drilling / Direct Push Probe**

Depth to Water (ft BGS) _____

7.0 ATD

Sampling Method: **Continuous Core**

Start/Finish Date _____

8/27/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	8 Flushmount monument in concrete			0.0			Asphalt debris	1
2	Concrete (0'-2')			0.0			Dry to slightly moist, brown, sandy GRAVEL (GP); fill	2
3	Bentonite Chips (3'-18')	S1		0.0			Moist, brown-dark gray, SAND (SP); fine to medium sand	3
4				0.0				4
5				0.0				5
6				0.0				6
7	▽ 8/27/2014	S2		0.0			Becomes wet at 7' bgs Color grades to black	7
8				0.0				8
9				0.0			Very thinly bedded silt at 8.5' bgs	9
10				0.0				10
11				0.0			Wet, black SAND (SP); fine to medium sand, scattered seashells	11
12		S3		0.0				12
13				0.0				13
14				0.1				14
15				0.0			Wet, dark gray, silty SAND (SM); fine sand	15
16				0.0			Wet, dark gray, very sandy SILT (ML); fine to medium sand	16
17		S4		0.0				17
18				0.0			Wet, black SAND (SP); fine to medium sand	18
19	10/20 Prepacked Sand Filter Pack (19'-24')			0.5				19
20				0.0			Scattered seashells	20
21	2/12 Sand backfill Around Prepack (18'-24')			0.0				21
22		S5		0.0				22
23	0.010 slot Schedule 40 PVC 2 Well Screen (19'-24')			0.0			Wet, dark gray, very silty SAND (SM); fine to medium sand, numerous seashells	23
24	Threaded end cap			0.0				24
25							Bottom of boring at 24' bgs Ecology Well Log BID-645	25

MONITORING WELL - ALEXANDER AVENUE - POT.GPJ November 21, 2014

Sampler Type:

- No Recovery
- Continuous Core

PID - Photoionization Detector

- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: **AET**

Approved by: **JJP**

Figure No. **A - 42**



Monitoring Well Construction Log

Project Number
130097

Well Number
MW-104-15

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities Ground Surface Elev. _____
 Location: 709 Alexander Ave, Tacoma, WA Top of Casing Elev. _____
 Driller/Method: Cascade Drilling / Direct Push Probe Depth to Water (ft BGS) 7.21 ATD
 Sampling Method: Continuous Core Start/Finish Date 10/8/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	8 Flushmount monument in concrete						See boring log MW-104-25 for lithology information	1
2	Concrete (0'-2')							2
3	Bentonite Chips (2'-3')							3
4								4
5	10/20 Prepacked Sand Filter Pack (4'-14')							5
6								6
7	▽ 10/8/2014							7
8	2/12 Sand backfill Around Prepack (3'-14')							8
9								9
10								10
11	0.010 slot Schedule 40 PVC 2 Well Screen (4'-14')							11
12								12
13								13
14	Threaded end cap							14
15							Bottom of boring at 14' bgs Ecology Well Tag BID-762	15
16								16
17								17
18								18
19								19
20								20
21								21
22								22
23								23
24								24
25								25

MONITORING WELL - ALEXANDER AVENUE - POT.GPJ November 21, 2014

Sampler Type:

No Recovery

PID - Photoionization Detector

▼ Static Water Level

▽ Water Level (ATD)

Logged by: JLE

Approved by: JJP

Figure No. A - 43



Monitoring Well Construction Log

Project Number
130097

Well Number
MW-104-25

Sheet
1 of 1

Project Name: **Port of Tacoma - Petroleum Tank Facilities**

Ground Surface Elev. _____

Location: **709 Alexander Ave, Tacoma, WA**

Top of Casing Elev. _____

Driller/Method: **Cascade Drilling / Direct Push Probe**

Depth to Water (ft BGS) _____

6 ATD

Sampling Method: **Continuous Core**

Start/Finish Date _____

10/10/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	8 Flushmount monument in concrete			0.0		Asphalt		1
2	Concrete (0'-2')			0.0		Moist, brown SAND (SP); trace coarse sand, trace gravel, fine to medium sand, no odor	1	
3	Bentonite Chips (2'-18')	S1		0.0			2	
4				0.0			3	
5				0.0			4	
6	▽ 10/10/2014			0.0		Becomes wet at 6 ft bgs	5	
7		S2		0.0			6	
8						Wet, red and black SAND (SW); fine to coarse sand	7	
9							8	
10							9	
11				0.0		Slight petrol odor	10	
12		S3		0.0			11	
13				0.3			12	
14				1.9		Wet, red and black SAND (SP); trace silt, fine to medium sand, slight petrol odor	13	
15				1.6			14	
16				0.0		Wet, brown black clayey SILT (ML); no odor	15	
17		S4		0.0			16	
18	10/20 Prepacked Sand Filter Pack (18'-24')			0.0		Grades to wet, red and black SAND (SW); fine to coarse sand, abundant roots and shell fragments, no petroleum odor	17	
19				0.0			18	
20	2/12 Sand backfill Around Prepack (18'-24')					Wet, red and black SAND (SP); fine to medium sand, trace coarse sand, no odor, 1 inch clay pocket at 21 ft bgs	19	
21							20	
22	0.010 slot Schedule 40 PVC 2 Well Screen (19'-24')	S5				Wet, brown gray, silty SAND (SM); fine to medium sand, no odor	21	
23							22	
24	Threaded end cap					Bottom of Boring at 25 ft bgs Ecology Well Tag BID-763	23	
25	Slough						24	
							25	

MONITORING WELL - ALEXANDER AVENUE - POT.GPJ November 21, 2014

Sampler Type:

- No Recovery
- Continuous Core

PID - Photoionization Detector

- Static Water Level
- Water Level (ATD)

Logged by: **SDM**

Approved by: **JJP**

Figure No. **A - 44**



Monitoring Well Construction Log

Project Number
130097

Well Number
MW-105-15

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities Ground Surface Elev. _____
 Location: 709 Alexander Ave, Tacoma, WA Top of Casing Elev. _____
 Driller/Method: Cascade Drilling / Direct Push Probe Depth to Water (ft BGS) 7.1 ATD
 Sampling Method: Continuous Core Start/Finish Date 8/27/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	8 Flushmount monument in concrete						See boring log MW-105-25 for lithology information	1
2	Concrete (0'-2')							2
3	Bentonite Chips (2'-3')							3
4								4
5	10/20 Prepacked Sand Filter Pack (4'-14')							5
6								6
7	▽ 7/23/2014							7
8	2/12 Sand backfill Around Prepack (3'-14')							8
9								9
10								10
11	0.010 slot Schedule 40 PVC 2 Well Screen (4'-14')							11
12								12
13								13
14	Threaded end cap							14
15							15	
16							16	
17							17	
18							18	
19							19	
20							20	
21							21	
22							22	
23							23	
24							24	
25							25	

Sampler Type: No Recovery PID - Photoionization Detector Logged by: **AET**
 Static Water Level Approved by: **JJP**
 Water Level (ATD) Figure No. **A - 45**

MONITORING WELL - ALEXANDER AVENUE - POT.GPJ November 21, 2014



Monitoring Well Construction Log

Project Number
130097

Well Number
MW-105-25

Sheet
1 of 1

Project Name: **Port of Tacoma - Petroleum Tank Facilities**

Ground Surface Elev. _____

Location: **709 Alexander Ave, Tacoma, WA**

Top of Casing Elev. _____

Driller/Method: **Cascade Drilling / Direct Push Probe**

Depth to Water (ft BGS) _____

6.5 ATD

Sampling Method: **Continuous Core**

Start/Finish Date _____

8/28/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	8 Flushmount monument in concrete			0.0		Asphalt		1
	Concrete (0'-2')			0.0		Moist, brown, sandy GRAVEL (GP); fill		
2						Moist, brown, SAND (SP); fine to medium sand		2
	Bentonite Chips (3'-18')	S1		0.0				
3				0.0		Moist, brown, silty fine sand (SM);		3
4				0.0		Moist, brown SAND (SP); fine to medium sand		4
5				0.0				5
6	▽ 8/28/2014			0.0		Moist, brown, very sandy GRAVEL (GP);		6
				0.0		Wet, dark gray, very silty SAND (SM); fine sand		
7		S2		0.0				7
8				0.0		Wet, black SAND (SP); fine to medium sand		8
9								9
10				0.0		Scattered seashells to 16' bgs		10
11				0.0				11
12		S3						12
13								13
14								14
15				0.0				15
16				0.0		Wet, dark gray SILT (ML); trace clay		16
17		S4		0.0				17
18				0.0		Wet, dark gray, very silty SAND (SM); fine to medium sand		18
19	10/20 Prepacked Sand Filter Pack (19'-24')			0.0		Wet, dark gray SILT (ML);		19
20				0.0		Wet, black SAND (SP); fine to medium sand; trace seashells		20
21	2/12 Sand backfill Around Prepack (18'-24')			0.0				21
22		S5		0.0				22
23	0.010 slot Schedule 40 PVC 2 Well Screen (19'-24')			0.0				23
24	Threaded end cap			0.0				24
25						Bottom of boring at 24' bgs Ecology Well Tag BID-648		25

MONITORING WELL - ALEXANDER AVENUE - POT.GPJ November 21, 2014

Sampler Type:

- No Recovery
- Continuous Core

PID - Photoionization Detector

- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: **AET**

Approved by: **JJP**

Figure No. **A - 46**



Monitoring Well Construction Log

Project Number
130097

Well Number
MW-106-15

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities Ground Surface Elev. _____
 Location: 709 Alexander Ave, Tacoma, WA Top of Casing Elev. _____
 Driller/Method: Cascade Drilling / Direct Push Probe Depth to Water (ft BGS) 6.5 ATD
 Sampling Method: Continuous Core Start/Finish Date 8/27/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	8 Flushmount monument in concrete Concrete (0'-2')						See boring log B-106 for lithology information	1
2	Bentonite Chips (2'-3')							2
3								3
4	10/20 Prepacked Sand Filter Pack (4'-14')							4
5								5
6	▽ 7/16/2014							6
7								7
8	2/12 Sand backfill Around Prepack (3'-14')							8
9								9
10	0.010 slot Schedule 40 PVC 2 Well Screen (4'-14')							10
11								11
12								12
13								13
14	Threaded end cap							14
15							Bottom of boring at 14' bgs Ecology Well Log BID-642	15
16								16
17								17
18								18
19								19
20								20
21								21
22								22
23								23
24								24
25								25

MONITORING WELL - ALEXANDER AVENUE - POT.GPJ November 21, 2014

Sampler Type:

No Recovery

PID - Photoionization Detector

▼ Static Water Level

▽ Water Level (ATD)

Logged by: AET

Approved by: JJP

Figure No. A - 47



Monitoring Well Construction Log

Project Number
130097

Well Number
MW-109-15

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities Ground Surface Elev. _____
 Location: 709 Alexnder Ave, Tacoma, WA Top of Casing Elev. _____
 Driller/Method: Cascade Drilling / Direct Push Probe Depth to Water (ft BGS) 11 ATD
 Sampling Method: Continuous Core Start/Finish Date 8/27/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	8 Flushmount monument in concrete						See boring log B-109 for lithology information	1
2	Concrete (0'-2')							2
3	Bentonite Chips (2'-3')							3
4								4
5	10/20 Prepacked Sand Filter Pack (4'-14')							5
6								6
7	2/12 Sand backfill Around Prepack (3'-14')							7
8								8
9	0.010 slot Schedule 40 PVC 2 Well Screen (4'-14')							9
10								10
11	▽ 7/16/2014							11
12								12
13								13
14	Threaded end cap							14
15							Bottom of boring at 14' bgs Ecology Well Tag BID-641	15
16								16
17								17
18								18
19								19
20								20
21								21
22								22
23								23
24								24
25								25

MONITORING WELL - ALEXANDER AVENUE - POT.GPJ November 21, 2014

Sampler Type:

No Recovery

PID - Photoionization Detector

▼ Static Water Level

▽ Water Level (ATD)

Logged by: AET

Approved by: JJP

Figure No. A - 48



Monitoring Well Construction Log

Project Number
130097

Well Number
MW-110-15

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities Ground Surface Elev. _____
 Location: 709 Alexander Ave, Tacoma, WA Top of Casing Elev. _____
 Driller/Method: Cascade Drilling / Direct Push Probe Depth to Water (ft BGS) 7.1 ATD
 Sampling Method: Continuous Core Start/Finish Date 8/27/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	8 Flushmount monument in concrete Concrete (0'-2')						See boring log B-110 for lithology information	1
2	Bentonite Chips (2'-3')							2
3								3
4	10/20 Prepacked Sand Filter Pack (4'-14')							4
5								5
6								6
7	▽ 7/23/2014							7
8	2/12 Sand backfill Around Prepack (3'-14')							8
9								9
10								10
11	0.010 slot Schedule 40 PVC 2 Well Screen (4'-14')							11
12								12
13								13
14	Threaded end cap							14
15							Bottom of boring at 14' bgs Ecology Well Tag BID-647	15
16								16
17								17
18								18
19								19
20								20
21								21
22								22
23								23
24								24
25								25

MONITORING WELL - ALEXANDER AVENUE - POT.GPJ November 21, 2014

Sampler Type:

No Recovery

PID - Photoionization Detector

▼ Static Water Level

▽ Water Level (ATD)

Logged by: **AET**

Approved by: **JJP**

Figure No. **A - 49**



Monitoring Well Construction Log

Project Number
130097

Well Number
MW-110-25

Sheet
1 of 1

Project Name: Port of Tacoma - Petroleum Tank Facilities Ground Surface Elev. _____
 Location: 709 Alexander Ave, Tacoma, WA Top of Casing Elev. _____
 Driller/Method: Cascade Drilling / Direct Push Probe Depth to Water (ft BGS) 7.1 ATD
 Sampling Method: Continuous Core Start/Finish Date 8/28/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	8 Flushmount monument in concrete						See boring log B-110 for lithology information	1
2	Concrete (0'-2')							2
3	Bentonite Chips (2'-3')							3
4								4
5								5
6								6
7	▽ 7/23/2014							7
8								8
9								9
10								10
11								11
12								12
13								13
14								14
15								15
16								16
17								17
18	10/20 Prepacked Sand Filter Pack (4'-14')							18
19								19
20	2/12 Sand backfill Around Prepack (3'-14')							20
21								21
22	0.010 slot Schedule 40 PVC 2 Well Screen (4'-14')							22
23								23
24	Threaded end cap							24
25							Bottom of Boring at 24' bgs Ecology Well Log BID-650	25

MONITORING WELL - ALEXANDER AVENUE - POT.GPJ November 21, 2014

Sampler Type:

No Recovery

PID - Photoionization Detector

▼ Static Water Level

▽ Water Level (ATD)

Logged by: AET

Approved by: JJP

Figure No. A - 50



Monitoring Well Construction Log

Project Number
130097

Well Number
MW-130-15

Sheet
1 of 1

Project Name: **Port of Tacoma - Petroleum Tank Facilities**

Ground Surface Elev. _____

Location: **709 Alexander Ave, Tacoma, WA**

Top of Casing Elev. _____

Driller/Method: **Cascade Drilling / Direct Push Probe**

Depth to Water (ft BGS) _____

7.5 ATD

Sampling Method: **Continuous Core**

Start/Finish Date _____

10/8/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	8 Flushmount monument in concrete			0		Asphalt		1
2	Concrete (0'-2')			0		Slightly moist, brown, very sandy GRAVEL (GP); fine to medium sand, fine subangular to angular gravel		2
3	Bentonite Chips (2'-3')	S1		0		Moist, brown SAND (SP); fine to medium sand		3
4				0				4
5	10/20 Prepacked Sand Filter Pack (3'-14')			0				5
6				0				6
7				0				7
8	10/8/2014	S2		0		Becomes wet at 7.5 ft bgs		8
9	2/12 Sand backfill Around Prepack (3'-14')			0		Becomes dark gray with numerous seashells, no odor		9
10				0.4		Petroleum odor, 10 ft to 15 ft bgs		10
11				1.4				11
12	0.010 slot Schedule 40 PVC 2 Well Screen (4'-14')	S3		3.9				12
13				0.4				13
14	Threaded end cap			2.6				14
15	Slough			7.5				15
16				11.0				16
17				1.3				17
18				3.4				18
19				3.4				19
20								20
21								21
22								22
23								23
24								24
25								25

Sampler Type:

- No Recovery
- Continuous Core

PID - Photoionization Detector

- Static Water Level
- Water Level (ATD)

Logged by: **JLE**

Approved by: **JJP**

Figure No. **A - 51**

MONITORING WELL - ALEXANDER AVENUE - POT.GPJ November 21, 2014



Monitoring Well Construction Log

Project Number
130097

Well Number
MW-137-25

Sheet
1 of 1

Project Name: **Port of Tacoma - Petroleum Tank Facilities**

Ground Surface Elev. _____

Location: **709 Alexander Ave, Tacoma, WA**

Top of Casing Elev. _____

Driller/Method: **Cascade Drilling / Direct Push Probe**

Depth to Water (ft BGS) _____

11 ATD

Sampling Method: **Continuous Core**

Start/Finish Date _____

10/8/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
1	8 Flushmount monument in concrete			0		Asphalt		1
2	Concrete (0'-2')			0		Slightly moist, slightly silty, sandy GRAVEL (GW); medium sand, fine to coarse subrounded to angular gravel, with cobbles		2
3	Bentonite Chips (2'-18')	S1						3
4								4
5				0		Moist, brown, slightly silty to very silty SAND (SM); fine to medium sand, no odor		5
6								6
7		S2		0		Moist, brown SAND (SP); fine to medium sand, no odor		7
8								8
9								9
10				0				10
11	▽ 10/8/2014			0			Becomes wet, dark gray, with numerous seashells	11
12		S3		0				12
13								13
14				0				14
15				0				15
16				0				16
17		S4		0				17
18				0		Wet, gray SILT (ML); no odor		18
19	10/20 Prepacked Sand Filter Pack (18'-24')			0			Grades to wet, dark gray, very silty SAND (SM); fine to medium sand, no odor	19
20				0.6				20
21				0.8			Wet, dark gray SAND (SP); fine to medium sand, petroleum odor	21
22				1.1				22
23	0.010 slot Schedule 40 PVC 2 Well Screen (19'-24')	S5						23
24	Threaded end cap							24
25	Slough							25
							Bottom of Boring at 15 ft bgs Ecology Well Tag BID-761	25

MONITORING WELL - ALEXANDER AVENUE - POT.GPJ November 21, 2014

Sampler Type:

- No Recovery
- Continuous Core

PID - Photoionization Detector

- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: JLE

Approved by: JJP

Figure No. A - 52

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS	
			GRAPH	LETTER		
COARSE GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS <small>(LITTLE OR NO FINES)</small>		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES	
		GRAVELS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES	
		CLEAN SANDS <small>(LITTLE OR NO FINES)</small>		SW	WELL-GRADED SANDS, GRAVELLY SANDS	
		SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		SP	POORLY-GRADED SANDS, GRAVELLY SAND	
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	CLEAN SANDS <small>(LITTLE OR NO FINES)</small>		SM	SILTY SANDS, SAND - SILT MIXTURES	
		SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		SC	CLAYEY SANDS, SAND - CLAY MIXTURES	
		FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, 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		
SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS		
			CH	INORGANIC CLAYS OF HIGH PLASTICITY		
			OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY		
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

Sampler Symbol Descriptions

	2.4-inch I.D. split barrel
	Standard Penetration Test (SPT)
	Shelby tube
	Piston
	Direct-Push
	Bulk or grab

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

A "P" indicates sampler pushed using the weight of the drill rig.

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS		TYPICAL DESCRIPTIONS
GRAPH	LETTER	
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/Quarry Spalls
	TS	Topsoil/Forest Duff/Sod

Groundwater Contact



Measured groundwater level in exploration, well, or piezometer



Measured free product in well or piezometer

Graphic Log Contact



Distinct contact between soil strata or geologic units



Approximate location of soil strata change within a geologic soil unit

Material Description Contact



Distinct contact between soil strata or geologic units



Approximate location of soil strata change within a geologic soil unit

Laboratory / Field Tests

%F	Percent fines
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PP	Pocket penetrometer
PPM	Parts per million
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen
NT	Not Tested

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

KEY TO EXPLORATION LOGS

Start Drilled 5/21/2014	End 5/21/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27523 -122.4004		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS	
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					Graphic Log
0	24						AC	2 inches asphalt concrete			
							SP-SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)			
				E1			SP	Gray fine to medium sand with trace silt (loose, moist) (fill)			
5	48						SP-SM	Gray fine to medium sand with silt (loose, wet) (Till)			Groundwater observed at approximately 6 feet at the time of drilling
				E2			SM	Gray silty fine to medium sand with occasional organics (shells and wood)			
10	36						ML	Gray silt with occasional fine sand			
				G3							
15											

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-1



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-2
 Sheet 1 of 1

Tacoma: Date: 9/5/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GEIR_GEOTECH_STANDARD

Start Drilled 5/20/2014	End 5/20/2014	Total Depth (ft) 15	Logged By BL/GH	Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27506 -122.39887		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks		
Notes:						

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS	
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					Graphic Log
0		36					AC	2 inches asphalt concrete			
							SP-SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)			
				E1							
				E2			SP-SM	Gray fine to medium sand with silt (medium dense, moist) (fill)			
5		48									
				G3			ML	Gray silt with occasional fine sand and organics (wood) (soft, wet)			Groundwater observed at approximately 7 feet at the time of drilling
				E4			SP	Gray fine to medium sand with trace silt and occasional organics (shells) (loose, moist to wet)			
10		48									
		36									
15											

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-2



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-3
 Sheet 1 of 1

Tacoma: Date: 9/14/14 Path: \\TAC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GDIR_GEO TECH_STANDARD

Start Drilled 5/20/2014	End 5/20/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27574 -122.39941		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0	42						SM			Groundwater observed at approximately 7 feet at the time of drilling
				E1						
	48						SP-SM			
				G2						
5							ML			
				G3						
	48						SM			
				E4						
							ML			
				G5						
10							SM			
							ML			
	36									
							SM			
				G6						
							ML			
15										

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-3



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Tacoma: Date: 9/25/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS.GDT\GEBR_GEOTECH_STANDARD

Start Drilled 5/20/2014	End 5/20/2014	Total Depth (ft) 15	Logged By BL/GH	Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27579 -122.39894		System Datum		Geographic WGS84		Groundwater Date Measured
Notes:						Depth to Water (ft) Elevation (ft) See Remarks

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
0		42						SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)	Groundwater observed at approximately 5.5 feet at the time of drilling
					E1			SP-SM	Gray fine to medium sand with silt (loose, moist) (fill)	
5		48						ML/SM	Interbedded gray silt and gray silty fine sand (loose/soft, wet) (fill)	
					E2			ML	Gray silt with occasional fine sand (loose, wet)	
10		48			G3			SM	Gray silty fine sand (loose, wet)	
					G4			ML	Gray silt with occasional fine sand (soft, wet)	
15		36								

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-4



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Tacoma: Date: 9/5/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402_GEOENGINEERS.GDT\GEIR_GEO TECH_STANDARD

Start Drilled 5/21/2014	End 5/21/2014	Total Depth (ft) 15	Logged By BL/GH	Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27632 -122.39938		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks		
Notes:						

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS	
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					Graphic Log
0	24						AC			3 inches asphalt concrete	
				E1			SP-SM			Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)	
5	12						SP-SM			Gray fine to medium sand with silt (loose, moist) (fill)	
10	48			E2						Grades to wet at 9 feet	Groundwater observed at approximately 9 feet at the time of drilling
				G3			ML			Gray silt with occasional fine sand (very soft, wet)	
15	36						SM			Gray silty fine sand (loose, wet)	

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-5



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-6
 Sheet 1 of 1

Tacoma: Date: 9/5/14 Path: \\TAC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GEBR_GEOTECH_STANDARD

Start Drilled 5/21/2014	End 5/21/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Power Probe 9500D
Latitude Longitude 47.27545 -122.40109		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS	
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					Graphic Log
0		42					AC	2 inches asphalt concrete			
							SP-SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)			
				E1							
							SP-SM	Gray fine to medium sand with silt (medium dense, moist) (fill)			
5		48									
								Grades to wet at 7 feet			Groundwater observed at approximately 7 feet at the time of drilling
				E2							
10		48									
							SM	Gray silty fine to medium sand with occasional organics (shells) (loose, wet)			
							SM/ML	Interbedded silty fine to medium sand and gray silt with occasional sand, with occasional organics (wood and shells) (loose/very soft, wet)			
15		36									

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-6



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-7
 Sheet 1 of 1

Start Drilled 5/27/2014	End 5/27/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27578 -122.40161		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS	
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					Graphic Log
0	48						AC	2 inches asphalt concrete			
							SM	Brown silty fine to medium sand with gravel (loose, moist) (fill)			
							SP-SM	Gray fine to medium sand with silt (medium dense, moist)			
5	48							Becomes dark gray			
								Becomes wet at 8 feet			Groundwater observed at approximately 8 feet at the time of drilling
10	48										
15	36										

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-7



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Tacoma: Date: 9/5/14 Path: \\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GEIR_GEO TECH_STANDARD

Start Drilled 5/21/2014	End 5/21/2014	Total Depth (ft) 20	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Power Probe 9500D
Latitude Longitude 47.27578 -122.40064		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS		
	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing					Water Level	Graphic Log
0		48						AC	6 inches asphalt concrete			
								SP-SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)			
					E1							
5		48						SM	Gray silty fine to medium sand (loose to medium dense, moist)			
					E2							
									Grades to wet			
10		48						ML	Gray silt with fine sand (very stiff, wet)			Groundwater observed at approximately 10 feet at the time of drilling
					E3			SM	Gray silty fine to medium sand (loose, moist)			
								SP-SM	Gray fine to medium sand with silt and occasional organics (shells) (loose, wet)			
								SM	Gray silty fine to medium sand (loose, wet)			
15		48						ML/SM	Gray silt with occasional fine sand with interbedded silty fine to medium sand lenses (very stiff/loose, wet)			
					G4							
20												

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-8



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-9
 Sheet 1 of 1

Tacoma: Date: 9/14/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402_GEOTECH_SAMPLING.GPJ DBT template\LIB template.GEENGINEERS.GDT\GEIR_GEOTECH_STANDARD

Start Drilled 5/22/2014	End 5/22/2014	Total Depth (ft) 20	Logged By BL/GH	Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27651 -122.39978		System Datum		Geographic WGS84		Groundwater Date Measured
Notes:						Depth to Water (ft) Elevation (ft) See Remarks

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS		
	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing					Water Level	Graphic Log
0		48						AC	4 inches asphalt concrete			
								SP-SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)			
					E1							
5		48						SP-SM	Gray fine to medium sand with silt (loose, moist) (fill)			
					E2							
10		48						ML	Gray silt (very soft, wet) (fill)			
					G3			SM	Gray silt fine to medium sand with occasional organics (wood) (loose, wet)			Groundwater observed at approximately 9.5 feet at the time of drilling
					E4			ML	Gray silt with occasional fine sand (very stiff, wet)			
15		48						SM	Gray silty fine to medium sand (loose, wet)			
					G5			ML	Gray silt with occasional fine sand (very stiff, wet)			
								SM/ML	Interbedded gray silty fine sand and gray silt (loose/very stiff, wet)			
20												

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-10



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-11
 Sheet 1 of 1

Tacoma: Date: 9/5/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GDIR_GEO TECH_STANDARD

Start Drilled 5/21/2014	End 5/21/2014	Total Depth (ft) 20	Logged By BL/GH	Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27708 -122.39877		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks		
Notes:						

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS	
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					Graphic Log
0	24						CC	6 inches concrete			
							SP-SM	Brown fine to coarse sand with silt and gravel (dense, moist) (fill)			
				E1							
5	36										
							ML	Brown silt with occasional fine sand (soft, moist) (fill)			
				E2			SP-SM	Gray fine to medium sand with silt (loose, moist) (fill)			
10	48										
							SP	Gray fine to medium sand with trace silt (loose, moist) (fill)			
				E3							
15	48										
							ML	Gray silt with occasional fine sand (very soft, wet)			
							SP-SM	Gray fine to medium sand with silt (loose, wet)			
20											

Groundwater observed at approximately 11 feet at the time of drilling

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-11



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Tacoma: Date: 9/5/14 Path: \\TAC\PROJECTS\0018691402\GINT\018691402\GEO TECH SAMPLES.GPJ DBT template\lib\template.GEOENGINEERS.GDT\GEIR_GEO TECH STANDARD

Start Drilled 5/30/2014	End 5/30/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Cascade Drilling, Inc.	Drilling Method Sonic
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data		Drilling Equipment Geoprobe 8/40LS	
Latitude Longitude 47.27737 -122.39937		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0	60			E1			SM	Brown silty fine to coarse sand with gravel (medium dense, moist)		
5	60			E2			SP-SM	Gray silty fine to medium sand (loose, moist)		
10	60			E3				Becomes wet		
							ML	Gray sandy silt (soft, wet)		
							SM	Gray silty fine to medium sand with organics (shells) (soft, wet)		
15										

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-12



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-13
 Sheet 1 of 1

Tacoma: Date: 9/14/14 Path: \\TAC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GDIR_GEO TECH_STANDARD

Start Drilled 5/30/2014	End 5/30/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Cascade Drilling, Inc.	Drilling Method Sonic
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Geoprobe 8/40LS
Latitude 47.27702 Longitude -122.39966		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft)	
Notes:				See Remarks	

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0	60						CC			4 inches concrete
				E1			SM			Brown silty fine to coarse sand with gravel (medium dense, moist) (fill)
5	60			E2			SP-SM			Gray fine to medium sand with silt (loose, moist) (fill)
10	60			E3			SM			Gray silty fine to medium sand with occasional organics (shells) (loose, moist) (fill)
15										Grades to wet at 11 feet
										Groundwater observed at approximately 10 feet at the time of drilling

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-13



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-14
 Sheet 1 of 1

Tacoma: Date: 9/5/14 Path: \\TAC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GEIR_GEO TECH_STANDARD

Start Drilled 5/30/2014	End 5/30/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Cascade Drilling, Inc.	Drilling Method Sonic
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Geoprobe 8/40LS
Latitude Longitude 47.27686 -122.40009		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS	
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					Graphic Log
0	60						AC	7 inches asphalt concrete			
				E1			SM	Brown silty fine to coarse sand with gravel (medium dense, moist)			
5	60			E2			SP-SM	Gray fine to medium sand with silt (loose, moist)			
10	60			E3			SM	Gray silty sand (soft, wet)			
15											

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-14



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-15
 Sheet 1 of 1

Tacoma: Date: 9/5/14 Path: \\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GEIR_GEO TECH_STANDARD

Drilled	Start 6/2/2014	End 6/2/2014	Total Depth (ft)	20	Logged By BL/GH	Checked By MM	Driller Cascade Drilling, Inc.	Drilling Method	Sonic	
Surface Elevation (ft) Vertical Datum			Undetermined		Hammer Data		Drilling Equipment Geoprobe 8/40LS			
Latitude Longitude		47.2762 -122.40105		System Datum		Geographic WGS84		Groundwater Date Measured		
Notes:								Depth to Water (ft)		Elevation (ft)
								See Remarks		

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0	36						CC SM			4 inches concrete Brown silty fine to coarse sand with gravel (medium dense, moist) (fill)
				E1						
5	60						SP-SM			Gray fine to medium sand with silt and occasional gravel and organics (shells) (loose, moist) (fill)
				E2						
10	60									Grades to wet at 12 feet
				E3						
15	60						SM			Gray silty fine to medium sand with occasional organics (shells, grass) (loose, wet)
20										Groundwater observed at approximately 12 feet at the time of drilling

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-16



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-17
 Sheet 1 of 1

Tacoma: Date: 6/14/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GDIR_GEO TECH_STANDARD

Start Drilled 5/28/2014	End 5/28/2014	Total Depth (ft) 15	Logged By BL/GH	Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum		Undetermined	Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude		47.27745 -122.39808	System Datum		Geographic WGS84	Groundwater Date Measured
Notes:					Depth to Water (ft)	Elevation (ft)
					See Remarks	

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
0		28						AC	3 inches asphalt concrete	
								SM	Brown silty sand with gravel (medium dense, moist)	
					E2			SP-SM	Gray fine to medium sand with silt (loose, moist)	
42										
5					E1				Becomes wet at 7 feet	Groundwater observed at approximately 6.6 feet at the time of drilling
48										
10										
36										
15								ML	Gray silt with sand (soft, wet)	

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-17



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-18
 Sheet 1 of 1

Tacoma: Date: 9/5/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GEIR_GEOTECH_STANDARD

Start Drilled 5/27/2014	End 5/27/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27761 -122.3987		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0	48						AC	5 inches asphalt concrete		
							SM	Brown silty fine to coarse sand with gravel		
				E1			SP-SM	Gray fine to medium sand with silt (loose, moist)		
5	42							Grades to brown		
				E2				Becomes wet at 9 feet		
10	36						SP-SM	Black sand with silt and trace gravel (gravel subangular up to 2 inches in diameter) (loose, wet)		
15										

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-18



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Tacoma: Date: 9/25/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GEIR_GEOTECH_STANDARD

Start Drilled	5/29/2014	End	5/29/2014	Total Depth (ft)	20	Logged By	BL/GH	Checked By	MM	Driller	Cascade Drilling, Inc.	Drilling Method	Sonic
Surface Elevation (ft) Vertical Datum	Undetermined				Hammer Data				Drilling Equipment	Geoprobe 8/40LS			
Latitude	47.27651				System Datum	Geographic WGS84			Groundwater	Depth to Water (ft)	Elevation (ft)		
Longitude	-122.39978								Date Measured	See Remarks			
Notes:													

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0		48					AC			5 inches asphalt concrete
							SM			Brown silty fine to coarse sand with gravel (medium dense, moist) (fill)
				E1						
5		60					SP-SM			Gray fine to medium sand with silt and occasional organics (shells) (loose, moist) (fill)
				E2						Grades to wet at 8 feet
10		96								
							SM			Gray silty fine to medium sand with occasional organics (shells and wood) (loose, wet)
15							SP-SM			Gray fine to medium sand with silt (loose, wet)
20										

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-19



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-20
 Sheet 1 of 1

Tacoma: Date: 9/5/14 Path: \\TAC\PROJECTS\0018691402\GINT\018691402_GEOENGINEERS.GDT\GEBR_GEOTECH_STANDARD

Start Drilled 5/21/2014	End 5/21/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27792 -122.40019		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS	
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					Graphic Log
0		42					AC	2 inches asphalt concrete			
							SP-SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)			
							SP-SM	Gray fine to medium sand with silt (loose, moist) (fill)			
				E1							
5		48									
								Grades to wet at 7 feet			Groundwater observed at approximately 7 feet at the time of drilling
				E2							
10		48									
				E3							
							SM	Gray silty fine to medium sand with occasional organics (shells) (loose, wet)			
							ML	Gray silt (very soft, wet)			
15		36					SM	Gray silty fine to medium sand (loose, wet)			

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-20



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-21
 Sheet 1 of 1

Tacoma: Date: 9/14/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GDIR_GEO TECH_STANDARD

Start Drilled 5/28/2014	End 5/28/2014	Total Depth (ft) 15	Logged By BL/GH	Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27726 -122.40038		System Datum		Geographic WGS84		Groundwater Date Measured
Notes:						Depth to Water (ft) Elevation (ft) See Remarks

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS	
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					Graphic Log
0		42					AC	2 inches asphalt concrete			
							SM	Brown silty sand with gravel			
				E1			SP-SM	Gray fine to medium sand with silt (medium dense, moist)			
48							ML	Gray silt with sand (soft, moist to wet)			
5							SP-SM	Dark gray to black fine to medium sand with silt (loose, wet)			Groundwater observed at approximately 6.5 feet at the time of drilling
				E2			ML/SM	Interbedded gray silt and gray silty sand (loose/soft, wet)			
10											
		48									
15		36									

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-21



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-22
 Sheet 1 of 1

Tacoma: Date: 9/14/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402_GEOENGINEERS.GDT\GEBR_GEOTECH_STANDARD

Start Drilled 5/21/2014	End 5/21/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27682 -122.40075		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS		
	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing					Water Level	Graphic Log
0		42						AC	2 inches asphalt concrete			
								SP-SM	Brown fine to coarse sand with silt and gravel (medium dense, moist) (fill)			
					E1			SP-SM	Brown fine to medium sand with silt (loose, moist) (fill)			
		48			E2							
5								SM	Gray silty fine to medium sand (loose, moist)			
								ML	Gray silt (very soft, wet) (fill)			
								SM	Gray silty fine to medium sand (loose, wet) (fill)			
		48			E3							
10								ML	Gray silt (very soft, wet)			
								SP-SM	Gray fine to medium sand with silt (loose, wet)			
		36							Grades to with occasional organics (shells)			
15												

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-22



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-23
 Sheet 1 of 1

Tacoma: Date: 9/14/14 Path: \\TAC\PROJECTS\0018691402\GINT\018691402_GEOENGINEERS.GDT\GEBR_GEOTECH_STANDARD

Start Drilled 5/20/2014	End 5/20/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27721 -122.39767		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS	
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					Graphic Log
0	30						GP-GM	Brown gravel with sand and silt (dense, moist) (fill)			
							SP-SM	Gray fine to medium sand with silt (medium dense, moist) (fill)			
				E1							
5	42							Grades to wet at 6.5 feet			
				E2							
10	48						SM	Gray silty fine to medium sand (medium dense, wet) (fill)			
15	36						ML	Gray sandy silt (medium stiff, wet)			

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-23



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-24
 Sheet 1 of 1

Tacoma: Date: 9/14/14 Path: \\IT\AC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GEIR_GEO TECH_STANDARD

Start Drilled 5/27/2014	End 5/27/2014	Total Depth (ft) 15	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined			Hammer Data		Drilling Equipment Power Probe 9500D
Latitude Longitude 47.27761 -122.39989		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing				
0		48						AC	2 inches asphalt concrete	
								SM	Brown silty fine to medium sand (very loose, moist)	
					E1			SP-SM	Gray fine to medium sand with silt (loose, moist)	
5		48							Becomes wet at 6.5 feet	
					E2			SP-SM	Black fine to medium sand with silt (loose, wet)	Petroleum odor
10		48								
										Petroleum odor
15		36								

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-24



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-25
 Sheet 1 of 1

Tacoma: Date: 9/14/14 Path: \\TAC\PROJECTS\0018691402\GINT\018691402\GEOENGINEERS\GDT\GEIR_GEOTECH_STANDARD

Start Drilled 5/20/2014	End 5/20/2014	Total Depth (ft) 12	Logged By BL/GH Checked By MM	Driller Holocene Drilling, Inc.	Drilling Method Direct Push
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data		Drilling Equipment Power Probe 9500D	
Latitude Longitude 47.27695 -122.39822		System Datum Geographic WGS84		Groundwater Date Measured Depth to Water (ft) Elevation (ft) See Remarks	
Notes:					

Elevation (feet)	FIELD DATA						Moisture Content (%)	Fines Content (%)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level			
0	36						GP-GM	Brown gravel with silt and sand (medium dense, moist) (fill)	
				E1			SP	Gray fine to medium sand with trace silt (medium dense, moist) (fill)	
5	48						SP-SM	Gray fine to medium sand with silt (medium dense, moist) (fill)	
				E2					
10	48								
				E3					
									4 feet of heave at 12 feet

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-26



Project: PSE Tacoma LNG
 Project Location: Tacoma, Washington
 Project Number: 0186-914-02

Figure A-26
 Sheet 1 of 1

Tacoma: Date: 9/5/14 Path: \\TAC\PROJECTS\0018691402\GINT\018691402_GEO TECH SAMPLES.GPJ DBT template\lib\template.GEOENGINEERS.GDT\GEIR_GEO TECH_STANDARD

Appendix F

Site Stratigraphic Logs

709 and 721 Alexander



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-01
 DATE COMPLETED: May 16, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	GROUND SURFACE	11.91						
	ASPHALT	11.71						
	SP-SAND, with gravel, trace silt, loose, fine to medium grained, well sorted, brown, dry to moist	11.06						
2	SP-SAND, trace silt, loose, fine to medium grained, brown, with red grains and white grains, shell fragments, moist	10.41						0.0
	SP-SAND, with to trace silt, fine grained, well sorted, brown, with red grains and white grains, shell fragments, moist	9.91		1GP	4.0			
4	SP-SAND, trace silt, loose, fine to medium grained, well sorted, brown, some red grains and white grains, shell fragments, moist							0.0
	- wet at 5.5ft BGS							
6								0.0
8				2GP	3.8			
10								0.0
12								0.0
14	- 2" sandy silt, brown at 14.0ft BGS							0.0
	ML-SANDY SILT, brown, wet	-3.09						
16	CL-SILTY CLAY, medium plasticity, brown, moist	-3.59						0.0
18				4GP	4.0			
	SP-SAND, trace silt, trace gravel, fine to medium grained, loose, brown, with red grains and white grains, wet	-6.84						0.0

BACKFILLED WITH BENTONITE CHIPS

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 10/10/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-BH-01
PROJECT NUMBER: 072465-709	DATE COMPLETED: May 16, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: GEOPROBE
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
22								0.0
24								0.0
	CL-CLAY, trace silt, trace fine grained sand, low plasticity, brown, moist, large shell fragments	-12.34						
	END OF BOREHOLE @ 25.0ft BGS	-13.09						
26								
28								
30								
32								
34								
36								
38								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 10/10/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-02
 DATE COMPLETED: May 16, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	GROUND SURFACE	11.66						
	ASPHALT	11.26						
	GP-GRAVEL, coarse grained, with fine sand, brown, dry	11.06						
2	SP-SAND, trace silt, loose, fine to coarse grained, poorly sorted, brown, with red grains and white grains, moist, shell fragments			1GP 1.5-3.5'	4.0			0.0
4	- 0.5' fine gravel size shell fragments at 4.0ft BGS							0.0
6	- wet at 6.0ft BGS		← BACKFILLED WITH BENTONITE CHIPS					0.0
8	- trace medium grained at 8.0ft BGS			6.5-7.5' 2GP	3.0			0.0
10	SP-SAND, trace silt, trace fine subangular gravel, loose, fine grained, well sorted, dark gray, with red grains and white grains, shell fragments, wet	1.96						0.0
12	- shell fragments up to 0.05' wide at 11.0ft BGS			3GP	4.5			0.0
14	- 0.1' silt, with very fine sand at 13.2ft BGS - 0.1' silt, with very fine sand at 13.6ft BGS							0.0
16	- 0.1' silty clay at 14.6ft BGS	-3.14						0.0
18	SP-SAND, trace silt, loose, very fine to fine grained, well sorted, dark gray, with red grains and white grains, wet							0.0
	- 0.3' silty clay, medium plasticity, firm at 16.4ft BGS	-5.34		4GP	4.5			0.0
	CL-SILTY CLAY, firm, low plasticity, gray, moist, wood fragments	-6.94						0.0
	SP-SAND, trace silt, trace fine subangular gravel, loose, fine to coarse grained, poorly sorted, dark gray, with red grains and white grains, shell fragments, wet, coarsening slightly							0.0

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 8/20/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-02
 DATE COMPLETED: May 16, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)	
	with depth								
22		-10.54						0.0	
	CL-CLAY, trace silt, firm, low to medium plasticity, gray, moist	-10.84 -11.14		5GP		4.5			
	ML-SANDY SILT, trace clay, firm, fine grained sand, moist to wet, gray	-12.04						0.0	
24	SP-SAND, trace silt, loose, fine grained, trace medium grained, well sorted, dark gray, with red grains and white grains, fine gravel size shell fragments, wet	-13.34							
	ML-CLAYEY SILT, with fine sand, loose, slight plasticity, gray, moist to wet								
26	END OF BOREHOLE @ 25.0ft BGS								
28									
30									
32									
34									
36									
38									

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 8/20/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-03
 DATE COMPLETED: May 16, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	GROUND SURFACE	11.87						
	ASPHALT	11.47						
	GP-GRAVEL (FILL), with fine to coarse grained sand, medium angular to subangular gravel, loose	11.27						
2	SP-SAND (FILL), trace medium to coarse subrounded gravel, trace silt, fine grained, loose, brown, with red grains and white grains, moist	10.67		(1.5-2.5)			3.1	0.0
4	SP-SAND, trace silt, fine grained, well sorted, loose, brown, with red grains and white grains, fine sand size shell fragments, moist							0.0
	- trace fine subangular to subrounded gravel at 5.0ft BGS							
6	- trace medium grained sand, fine to coarse gravel size shell fragments, wet at 6.0ft BGS			(6-7')			3.3	0.0
8				2GP				0.0
10	SP-SAND, trace silt, trace fine grained subangular gravel, loose, fine grained sand, trace medium grained sand, well sorted, dark gray, with red grains and white grains, sand size shell fragments, wet	2.87						0.0
12	SM-SILTY SAND, very fine grained sand, loose, well sorted, dark gray, trace red grains and white grains, wet	-0.13		3GP			4.0	0.0
14	SP-SAND, trace silt, loose, fine grained, well sorted, dark gray, with red grains and white grains, sand size shell fragments, wet - 0.1' clayey silt, trace fine sand, slight plasticity, wet at 14.2ft BGS	-0.38						0.0
16	SP-SAND, trace silt, trace fine subrounded gravel, loose, very fine to fine grained, well sorted, dark gray, with red grains and white grains, fine to coarse grained sand size shell fragments, wet	-3.13						0.0
18	ML-SANDY SILT, alternating layers of very fine grained silty sand and sandy silt, firm to loose, dark gray, with red grains and white grains, fine grained shell fragments, sliver to 0.05' thick wood fragments, wet	-3.83						0.0
	CL-SILTY CLAY, firm, low to medium plasticity, some small wood fragments, dark gray, moist	-4.83		4GP			4.2	0.0
	SP-SAND, with to trace silt, loose, fine grained, trace medium grained, well sorted, dark gray,	-6.23						0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 10/10/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-BH-03
PROJECT NUMBER: 072465-709	DATE COMPLETED: May 16, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: GEOPROBE
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	very few red grains and white grains, trace shell fragments, wet							
22	SP-SAND, trace silt, loose, fine to coarse grained, poorly sorted, trace subangular fine gravel, dark gray, with red grains and white grains, sand size shell fragments, wet	-9.13		5GP		4.0		0.0
24	CL-SILTY CLAY, firm, low plasticity, gray, moist - fine to medium gravel size shell fragments at 24.7ft BGS	-12.23		(23-24')				0.0
26	END OF BOREHOLE @ 25.0ft BGS	-13.13						
28								
30								
32								
34								
36								
38								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 10/10/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-04
 DATE COMPLETED: May 16, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	GROUND SURFACE	11.01						
	PLANT MATERIAL, grass, roots, fine grained sand	10.81						
2	SP-SAND, trace silt, loose, fine grained, well sorted, brown, with red grains and white grains, moist, scattered 0.02' silt layer, strong petroleum odor, sand size shell fragments - 0.02' silt, with black/dark gray staining at 1.6ft BGS - 0.2' rust red staining at 1.8ft BGS			(1.5-2.5) 1GP		3.8		0.0 2.2 0.0 0.0
4								
6	- grayish, darker staining from 4.5 to 19.0ft BGS		← BACKFILLED WITH BENTONITE CHIPS					0.0 0.0 0.0
8				(6.5-7.5) 2GP		4.0		66 45 0.0
10				(9-10' 3GP		4.0		9.8 6.2
12								
14								
16								
18	ML-CLAYEY SILT, trace fine sand, loose, slight plasticity, gray, wet - 0.5' SP-SAND, with silt, fine to very fine grained, loose, well sorted, gray, wet, with red grains and white grains, shell fragments at	-6.99		4GP		2.8		168

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 8/20/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST. HOLE DESIGNATION: 709-BH-04
 PROJECT NUMBER: 072465-709 DATE COMPLETED: May 16, 2012
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION DRILLING METHOD: GEOPROBE
 LOCATION: 709 ALEXANDER AVENUE SITE FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	19.0ft BGS	-8.99						
22	SM-SILTY SAND, with clay, trace fine subrounded gravel, fine grained, gray, with red grains and white grains, fine to medium grained sand size shell fragments, wet							0.6
		-11.39		5GP		4.0		1.0
	SP-SAND, trace silt, loose, fine grained, trace medium grained, well sorted, dark gray, with red grains and white grains, sand size shell fragments, wet	-12.39		(23-24')				0.0
24	ML-SANDY SILT, with clay, firm to soft, fine grained to very fine grained sand, slight plasticity, gray, with red grains and white grains, moist, fine to coarse sand size shell fragments	-13.99						0.0
26	END OF BOREHOLE @ 25.0ft BGS							
28								
30								
32								
34								
36								
38								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 8/20/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-04B
 DATE COMPLETED: May 16, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	GROUND SURFACE	11.01						
	PLANT MATERIAL, grass, roots, fine grained sand	10.81						
2	SP-SAND, trace silt, loose, fine grained, well sorted, brown, with red grains and white grains, moist, scattered 0.02' silt layer, strong petroleum odor, sand size shell fragments - 0.02' silt, with black/dark gray staining at 1.6ft BGS - 0.2' rust red staining at 1.8ft BGS			(1.5-2.5' 1GP		3.8		0.0 2.2 0.0 0.0
4								
6	- grayish, darker staining from 4.5 to 19.0ft BGS		← BACKFILLED WITH BENTONITE CHIPS					0.0 0.0 0.0
8				(6.5-7.5' 2GP		4.0		66 45 0.0
10				(9-10'				9.8 6.2
12				3GP		4.0		0.0
14								9.8 6.2
16								168
18	ML-CLAYEY SILT, trace fine sand, loose, slight plasticity, gray, wet - 0.5' SP-SAND, with silt, fine to very fine grained, loose, well sorted, gray, wet, with red grains and white grains, shell fragments at	-6.99		4GP		2.8		168

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 10/23/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-04B
 DATE COMPLETED: May 16, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)	
	19.0ft BGS	-8.99							
22	SM-SILTY SAND, with clay, trace fine subrounded gravel, fine grained, gray, with red grains and white grains, fine to medium grained sand size shell fragments, wet							0.6	
	SP-SAND, trace silt, loose, fine grained, trace medium grained, well sorted, dark gray, with red grains and white grains, sand size shell fragments, wet	-11.39			5GP		4.0		1.0
24	ML-SANDY SILT, with clay, firm to soft, fine grained to very fine grained sand, slight plasticity, gray, with red grains and white grains, moist, fine to coarse sand size shell fragments	-12.39			23-24'				0.0
26	END OF BOREHOLE @ 25.0ft BGS	-13.99						0.0	
28									
30									
32									
34									
36									
38									

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 10/23/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-05
 DATE COMPLETED: May 17, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	GROUND SURFACE	10.54						
	GP-SANDY GRAVEL, trace silt, loose, fine to coarse subrounded to subangular gravel, fine to coarse grained sand, brown, moist	9.74	<p style="text-align: center;">BACKFILLED WITH BENTONITE CHIPS</p>					0.0
2	SP-SAND, trace silt, trace fine subrounded gravel, fine grained, well sorted, trace medium grained, brown, with red grains and white grains, moist, sand size shell fragments, dark gray staining, petroleum odor			1GP	3.8			0.0
	- 0.05' silt, dark reddish brown staining at 1.3ft BGS						415	
	- 0.05' silt, dark reddish brown staining at 1.4ft BGS						591	
4	- 0.05' silt, dark reddish brown staining at 1.5ft BGS			(4-5')				
	- 0.05' silt, dark reddish brown staining at 3.8ft BGS						1004	
6	- 0.05' silt, dark reddish brown staining at 4.1ft BGS						2216	
	- 0.03' shell fragments from 4.5 to 14.8ft BGS			(2GP 7-8.5')	3.6		3809	
8	- wet at 6.0ft BGS						145.2	
10				(10-11')			883	
12			3GP	4.0		505		
14						37		
16	SP-SAND, trace silt, loose, very fine to fine grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments	-4.26				29		
	CL-SILTY CLAY, trace fine sand, firm, low plasticity, gray, moist, scattered wood pieces and shell fragments	-5.26				14		
18	SM-SILTY SAND, loose, fine grained, well sorted, dark gray, with red grains and white grains, sand size shell fragments up to 0.1', wet, wood fragments	-7.26	4GP	4.6		2		
						0.0		
						0.0		

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 10/10/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-05
 DATE COMPLETED: May 17, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
		-9.66						0.0
22	ML-SANDY SILT, trace fine subangular gravel, loose, fine grained sand, gray, with red grains and white grains, wet, fine sand size to 0.1' shell fragments	-11.46		5GP		5.0		0.0
	SW-SAND, trace silt, trace fine subangular gravel, fine to coarse grained, poorly sorted, dark gray, with red grains and white grains, sand size shell fragments, wet	-12.66		(23-24')				0.0
24	CL-CLAY, with silt, trace fine sand, firm, low to medium plasticity, gray, moist, large amount of coarse sand size to 0.1' shell fragments	-14.46						0.0
26	- 0.1' SP-SAND, trace silt, trace fine subangular gravel, fine to coarse grained, poorly sorted, dark gray, with red grains and white grains, sand size shell fragments, wet at 24.0ft BGS END OF BOREHOLE @ 25.0ft BGS							
28								
30								
32								
34								
36								
38								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 10/10/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-06
 DATE COMPLETED: May 17, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	GROUND SURFACE	10.75						
	SP-SAND, trace silt, loose, fine to medium grained, brown, with red grains and white grains, moist	9.75						0.0
2	SP-SAND, trace silt, loose, very fine to fine grained, brown, with red grains and white grains, well sorted, sand size shell fragments, moist - dark gray staining, petroleum odor at 2.5ft BGS			1GP		3.8		0.0
				(2.5-4')				1641
4	SP-SAND, trace silt, trace subangular to subrounded fine gravel, loose, fine to medium grained, well sorted, dark gray, with red grains and white grains, moist, petroleum odor, shell fragments - fine grained, trace medium grained at 5.0ft BGS	6.95						1586
6								1114
8								1646
10	- 0.2' sandy silt, very fine grained at 9.0ft BGS - 0.1' silty clay at 9.5ft BGS			(6.5-7.5')		3.6		160
				2GP				14
12								2075
14	- 0.02' clayey silt, wood fragments at 13.0ft BGS - 0.1' clayey silt at 13.9ft BGS - 0.01' clayey silt, shell fragments 0.03' length at 14.1ft BGS - 0.01' clayey silt at 14.2ft BGS	-3.85						155
16	ML-SANDY SILT, loose, very fine grained sand, gray, with red grains and white grains, wet	-4.25						0.0
18	SM-SILTY SAND, loose, fine grained, well sorted, with red grains and white grains, sand size shell fragments	-4.75						0.0
	CL-SILTY CLAY, firm, low plasticity, light gray, moist to wet, 0.01' to 0.03' length wood fragments	-5.85		(10-11')				0.0
	SM-SILTY SAND, loose, fine grained sand, well sorted, gray, with red grains and white grains, sand size shell fragments, 0.01' to 0.07' wide wood fragments, wet	-8.25		3GP		4.2		0.0
				4GP		3.4		0.0

BACKFILLED WITH BENTONITE CHIPS

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 8/20/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-BH-06
PROJECT NUMBER: 072465-709	DATE COMPLETED: May 17, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: GEOPROBE
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
22	SM/ML-SAND AND SILT, very loose, fine sand, gray, with red grains and white grains, sand size shell fragments, scattered 0.05' shell fragments, wood fragments, wet - 0.1x0.1' wood fragment at 21.8ft BGS	-11.45						0.0
24	SP-SAND, trace silt, trace gravel, fine grained, well sorted, gray, with red grains and white grains, fine to coarse grained sand size shell fragments, wet - 0.7' medium grained at 23.7ft BGS	-14.25		5GP	5.0	23-24'		0.0
26	END OF BOREHOLE @ 25.0ft BGS							
28								
30								
32								
34								
36								
38								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 8/20/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-07
 DATE COMPLETED: May 17, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	GROUND SURFACE	10.54						
	ML-SANDY SILT, trace angular fine to coarse gravel, brown, with red grains and white grains, dry to moist, grass and roots	10.14						0.0
2	SP-SAND, trace silt, trace fine subrounded gravel, loose, fine to medium grained, well sorted, gray, with red grains and white grains, moist - trace coarse grained at 1.2ft BGS			1GP		3.9		0.0
4		6.44		(3.75-5')				5755
6	SP-SAND, trace silt, trace fine subrounded to subangular gravel, loose, fine grained, well sorted, dark gray, with red grains and white grains, sand size shell fragments, moist, petroleum odor, staining - wet at 6.0ft BGS - coarse sand size shell fragments at 6.2ft BGS		← BACKFILLED WITH BENTONITE CHIPS					2895
8				(6.25-7.5')				4600
8	- 0.4' silt at 8.2ft BGS - 0.13' silt at 8.8ft BGS - 0.02' silt at 9.4ft BGS			2GP		4.0		1162
10								736
12	- 0.08 silt at 12.0ft BGS - 0.05 clayey silt at 12.7ft BGS			3GP		4.7		518
14	- 0.04' silt, with clay at 13.9ft BGS							29.7
14		-4.16						14
14	CL-SILTY CLAY, firm, low plasticity, light gray, very moist to wet, 0.05x0.04' wood fragments	-4.56						16
16	SM-SILTY SAND, loose, fine grained, well sorted, dark gray, with red grains and white grains, sand size shell fragments, wet, fine gravel size shells			(15-16')				8.7
18				4GP		4.7		6.5
18								0.0
18								0.0

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 8/20/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST. HOLE DESIGNATION: 709-BH-07
 PROJECT NUMBER: 072465-709 DATE COMPLETED: May 17, 2012
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION DRILLING METHOD: GEOPROBE
 LOCATION: 709 ALEXANDER AVENUE SITE FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)	
22	SW-SAND, trace silt, trace fine subrounded to subangular gravel, compact, fine to coarse grained, poorly sorted, dark gray, with red grains and white grains, sand size shell fragments, gravel size shells scattered throughout, wet - 0.02' silt at 23.6ft BGS - 0.03' clayey silt at 23.8ft BGS END OF BOREHOLE @ 25.0ft BGS	-9.46		5GP	23-24'	3.7		0.0	
24		-14.46							0.0
26									0.0
28									0.0
30									
32									
34									
36									
38									

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 8/20/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-08
 DATE COMPLETED: May 18, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	GROUND SURFACE	11.18						
	GP-SANDY GRAVEL, trace silt, loose, angular to subangular fine to coarse gravel, fine grained sand grayish brown, dry	10.88 10.58						0.0
	SP-SAND, with gravel, trace silt, loose, fine grained, well sorted, brown, moist							0.0
2	SP-SAND, trace silt, trace fine subangular gravel, medium grained, well sorted, brown, with red grains and white grains, moist, sand size to fine gravel size shell fragments			1GP	4.0			0.0
4	SP-SAND, trace silt, trace fine subangular gravel, loose, fine grained, well sorted, dark gray, with red grains and white grains, moist, sand size shell fragments, dark gray staining, petroleum odor	7.48		(3.75-4.75)			415	
6	- wet at 6.0ft BGS						1302	
	- seen on core sample from 7.0 to 13.0ft BGS			(6.5-7.5)			2622	
8				2GP	3.1		1840	
10	- scattered shell fragments up to 0.08' in width at 10.0ft BGS						1460	
12	- 0.06' silt at 11.8ft BGS - 0.04' silt at 12.6ft BGS			3GP	4.0		33.4 23.8	
14	- 0.03' silt at 14.1ft BGS - 0.02' silt at 14.2ft BGS						10.4 18.0	
16	SM-SILTY SAND, loose, fine grained, well sorted, dark gray, with red grains and white grains, sand size to medium gravel size shell fragments, wet	-3.82				(16-17)	0.0	
18	CL-SILTY CLAY, firm, low plasticity, light gray, moist to wet, wood fragments scattered in concentrated layers	-6.32	4GP	5.0		0.0		
	SP-SAND, trace silt, compact, very fine to fine grained, well sorted, gray, with red grains and white grains, sand size shell fragments, wet	-7.72				8.5		

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 10/10/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-BH-08
PROJECT NUMBER: 072465-709	DATE COMPLETED: May 18, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: GEOPROBE
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
22	SP-SAND, trace silt, trace fine subangular gravel, fine grained to medium grained sand, well sorted, dark gray, with red grains and white grains, sand size shell fragments, wet - 0.08' silt layer with wood fragments at 21.1ft BGS	-8.82		5GP 23-24'	5.0			0.0
24	ML-CLAYEY SILT, slightly firm, slight plasticity, light gray, wet	-11.72					0.0	
24	SM/ML-SAND AND SILT, loose, fine grained sand, gray, with red grains and white grains, sand size shell fragments, scattered sliver size wood fragments, wet	-12.72					0.0	
26	END OF BOREHOLE @ 25.0ft BGS	-13.82						
28								
30								
32								
34								
36								
38								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 10/10/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-09
 DATE COMPLETED: May 18, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	GROUND SURFACE	10.92						
2	SM-SILTY SAND, loose, fine grained, brown, dry, roots and plant material SP-SAND, trace silt, trace fine subangular gravel, fine to medium grained, brown, with red grains and white grains, moist, occasional silt layer (~0.01' thick)	10.42	<p style="text-align: center;">BACKFILLED WITH BENTONITE CHIPS</p>	1GP	4.1			0.0 0.0 0.0
4	SP-SAND, trace silt, trace fine subangular gravel, loose, fine to medium grained, well sorted, dark gray, with red grains and white grains, moist, sand size shell fragments, some fine to medium gravel size shell fragments, dark gray staining, petroleum odor - wet at 6.0ft BGS	7.32		(3.75-5')			1445	
6				(6.5-7.5')	2GP	3.2		1101 5205 3541 851
8								215.8
10								80.7
12					3GP	3.8		33.4
14								29.5
16	ML-SANDY SILT, loose, very fine grained sand, light gray, with red grains and white grains, wet CL-SILTY CLAY, trace fine sand, firm, low plasticity, very moist to wet, wood fragments scattered in concentrated layers	-4.08 -5.08						6.6
18	SM-SILTY SAND, loose, fine grained, well sorted, dark gray, with red grains and white grains, sand size shell fragments, wet	-6.18			(4GP 17-18')	3.7		0.0 0.0

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 8/20/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST. HOLE DESIGNATION: 709-BH-09
 PROJECT NUMBER: 072465-709 DATE COMPLETED: May 18, 2012
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION DRILLING METHOD: GEOPROBE
 LOCATION: 709 ALEXANDER AVENUE SITE FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE						
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)		
22	SP-SAND, trace silt, loose, fine to medium grained, well sorted, dark gray, with red grains and white grains, sand size shell fragments throughout, wet - 0.07x0.15' wood fragment at 20.9ft BGS - 0.13' fine grained silty sand at 21.9ft BGS	-9.08		5GP	23-24'	4.7		0.0		
24									0.0	
26		END OF BOREHOLE @ 25.0ft BGS	-14.08							0.0
28										0.0
30										
32										
34										
36										
38										

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 8/20/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-10
 DATE COMPLETED: May 18, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	GROUND SURFACE	11.28						
	SM-SILTY SAND, with angular to subrounded fine to coarse gravel, loose, fine to coarse grained, poorly sorted, brown, dry, plant and root material	10.88						0.0
2	GP-SANDY GRAVEL, with silt, loose, fine to coarse angular to subrounded gravel, fine to coarse sand, poorly sorted, light gray, dry	9.88		1GP		3.8		0.0
4	SW-SAND, trace silt, trace fine subangular gravel, loose, fine to coarse grained, poorly sorted, brown, with red grains and white grains and yellow grains and green grains, moist, sand size shell fragments	7.48						0.0
6	SP-SAND, trace silt, trace fine subrounded to subangular gravel, loose, fine grained, well sorted, gray to dark gray, with red grains and white grains, sand size to medium gravel size shell fragments, moist, slight staining, petroleum odor - wet at 6.5ft BGS		← BACKFILLED WITH BENTONITE CHIPS	(4-5)				0.0
8				2GP		3.1		98.9
10	- 0.25' very fine grained silty sand, with 2 sub layers of concentrated wood fragments at 9.4ft BGS - 0.25' clayey silt at 11.5ft BGS				(7.75-8.75)			529
12	- 0.12 clayey silt at 12.4ft BGS - 0.1x0.05' fragment of wood at 12.9ft BGS			3GP		3.2		49.0
14								0.0
16	SP-SAND, trace silt, compact, very fine to fine grained, well sorted, dark gray, with red grains and white grains, wet, fine sand size shell fragments	-3.72						12.3
18	ML-CLAYEY SILT, loose, slight plasticity, light gray, wet - 0.04' wood fragment across core at 16.2ft BGS	-4.72			(16-17)			12.3
	CL-SILTY CLAY, firm, low plasticity, light gray, very moist to wet, wood fragments throughout	-5.12		4GP		3.9		21.8
	SM-SILTY SAND, loose, fine grained, well sorted, dark gray, with red grains and white grains, sand size shell fragments, wet - 0.01' well sorted, fine grained sand at 18.2ft	-6.82						0.0

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 10/10/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-10
 DATE COMPLETED: May 18, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	BGS	-8.72						
22	SM/ML-SAND AND SILT, loose, fine grained sand, well sorted, gray, with red grains and white grains, sand size shell fragments, fine to medium gravel size shell fragments, wet							0.0
		-11.22		5GP		5.0		0.0
24	SW-SAND, trace silt, loose, fine to coarse grained, poorly sorted, dark gray, with red grains and white grains, sand size shell fragments, wet - 0.09' clayey silt at 22.6ft BGS	-11.72		(23-24')				0.0
		-13.72						0.0
26	SP-SAND, trace silt, loose, fine to medium grained, well sorted, dark gray, with red grains and white grains, shell fragments, wet END OF BOREHOLE @ 25.0ft BGS							
28								
30								
32								
34								
36								
38								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 10/10/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-11
 DATE COMPLETED: June 1, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	GROUND SURFACE	11.58						
	SM-SILTY SAND, with fine to medium subangular to subrounded gravel, loose, fine grained, brown, moist	10.98						0.0
	GM-SILTY GRAVEL, with medium to coarse sand, loose, fine to medium subangular to subrounded gravel, brown, moist	10.58						0.0
2	SP-SAND, trace silt, trace fine subrounded gravel, loose, fine grained, well sorted, brown, with red grains and white grains, moist, sand size shell fragments			(1.5-3' 1GP)		3.8		0.0
4								29
6	- dark gray, wet, petroleum odor (gasoline-like), some staining at 5.5ft BGS							62
	- sand to fine gravel size shell fragments at 7.0ft BGS							39
8				2GP		3.8		40
	- 0.15' very fine grained silty sand at 8.9ft BGS							6.2
	- 0.02' clayey silt at 9.5ft BGS							
10	- 0.1' silty very fine grained sand at 9.6ft BGS							2.5
12								0.0
	- 0.08' silt at 12.3ft BGS							0.0
	- 0.07' silt, with clay at 12.7ft BGS			3GP		4.5		0.0
14								0.0
	- 0.08' clayey silt at 14.6ft BGS			(14-15')				0.0
16		-4.42						0.0
	SM-SILTY SAND, loose, very fine grained, well sorted, gray, with red grains and white grains, wet, fine sand size shell fragments	-4.92						0.0
	- 0.02' silty clay at 16.2ft BGS							0.0
	- 0.02' silty clay at 16.4ft BGS			4GP		4.0		0.0
18		-6.32						0.0
	ML-CLAYEY SILT, trace very fine sand, loose, slight plasticity, interbedded layers of silty clay and sandy silt, light gray, very moist to wet, sand size shell fragments, wood fragments							0.0
	SM-SILTY SAND, trace clay, loose, fine grained, well sorted, gray, with red grains and							0.0

BACKFILLED WITH BENTONITE CHIPS

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 10/10/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-11
 DATE COMPLETED: June 1, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	white grains, wet, sand to fine gravel size shell fragments, wood fragments	-8.42						
22	SM/ML-SAND AND SILT, trace clay, very loose, fine grained sand, layers of 'with clay' with slight plasticity, gray, wet, wood fragments sand to medium gravel size shell fragments							0.0
	SP-SAND, trace silt, loose, fine grained, well sorted, dark gray, with red grains and white grains, wet, sand to medium gravel size shell fragments	-10.72		5GP		4.8		0.0
24	- 0.06' diameter clay nodule at 24.2ft BGS			22-24'				0.0
	END OF BOREHOLE @ 25.0ft BGS	-13.42						0.0
26								
28								
30								
32								
34								
36								
38								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 10/10/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE


CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-12
 DATE COMPLETED: October 2, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: K. BURNS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	GROUND SURFACE	11.14						
	ASPHALT AND AGGREGATE							
		9.64						
2	SP-SAND, trace silt, very fine to fine grained, compact, well sorted, dark gray-brown, white grains and red grains throughout, trace sand size and larger shell fragments throughout, dry to moist			1RS				
4								
6								
8	- becoming moist at 8.5ft BGS			2RS		4.0		0.0
10	- wet at 10.0ft BGS			(002)				0.0
12								0.0
14				3RS		3.5		0.0
16				(003)				0.0
18	SM-SILTY SAND, very fine grained, compact, well sorted, dark gray, trace white grains and red grains, trace sand size shell fragments, wet	-5.86		4RS		3.5		0.0
18	SP-SAND, trace to with silt, very fine to fine grained, compact, well sorted, dark gray-brown, white grains and red grains throughout, trace sand size and larger shell fragments throughout, dry to moist - intact shell at 18.5ft BGS	-6.56		(004)				0.0

← BACKFILLED WITH CEMENT/BENTONITE GROUT

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-12
 DATE COMPLETED: October 2, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: K. BURNS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
22			[Hatched Pattern]	5RS		4.0		0.0
24			[Hatched Pattern]	(005)				0.0
26	END OF BOREHOLE @ 25.0ft BGS	-13.86						
28								
30								
32								
34								
36								
38								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS





STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH12/MW18 (BH)
 DATE COMPLETED: June 3, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	GROUND SURFACE	11.22						
2	TOPSOIL, silty sand, loose, fine grained, brown, moist, grass, roots and plant material SP-SAND, trace silt, trace fine to medium subangular to subrounded gravel, loose, fine grained, well sorted, brown, with red grains and white grains, moist, sand size shell fragments	10.82		1GP 2-3'	3.4			0.0
4		6.22						0.0
6	SP-SAND, trace silt, trace fine subrounded gravel, loose, fine grained, well sorted, brownish gray, with red grains and white grains, moist, sand to fine gravel size shell fragments - wet at 5.5ft BGS			2GP 7.5-9'	3.5			0.0
8		0.22						0.0
10	SP-SAND, trace silt, loose, very fine grained, well sorted, brownish gray, with red grains and white grains, wet, sand to fine gravel size shell fragments, wood fragments, minor intervals with silt - 0.05' layer clayey silt at 11.2ft BGS - 0.02' layer wood at 11.3ft BGS - 0.02' layer clayey silt at 12.7ft BGS			3GP	3.1			0.0
12		-4.08		15-16'				0.0
14	CL-SILTY CLAY, loose, low plasticity, seams/layers of silt and trace clay, light gray, very moist, sand size shell fragments, wood fragments							0.0
16		-6.08		4GP	3.9			0.0
18	SM-SILTY SAND, trace clay, loose, fine grained, gray, with red grains and white grains, wet, sand to fine gravel size shell fragments, wood fragments							0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 9/17/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH12/MW18 (BH)
 DATE COMPLETED: June 3, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
		-8.78						
	SP-SAND, trace silt, loose, very fine grained, well sorted, gray, with red grains and white grains, wet, sand size shell fragments - 0.2' layer clayey silt at 21.0ft BGS	-9.78						0.0
22	SP-SAND, trace silt, loose, fine grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments			5GP	22-24'	3.4		0.0
24							0.0	
26	- 0.7' shell fragments up to 0.1x0.07' in high concentration at 25.0ft BGS - 0.35' silty sand at 26.4ft BGS						0.0	
28	ML-SANDY SILT, trace clay, very loose, non plastic, light gray, wet, sand to fine gravel size shell fragments, wood fragments - with clay, slight plasticity at 27.9ft BGS	-15.88		6GP		4.0		0.0
30	SM-SAND, with silt, loose, very fine grained, well sorted, gray, with red grains and white grains, wet, sand to fine gravel size shell fragments	-18.78						
32	ML-SILT, with very fine grained sand, loose, light gray, wet, sand size shell fragments, wood fragments - trace clay at 32.9ft BGS	-20.88		7GP		5.0		0.0
34	CL-CLAY, with silt, trace very fine sand, firm, low plasticity, light gray, very moist, sand size shell fragments, wood fragments	-22.28						
38	SM-SILTY SAND, with clay, loose, very fine grained, light gray, wet, sand size shell fragments, wood fragments - trace clay at 37.8ft BGS	-26.28		8GP		4.8		0.0
	SP-SAND, trace silt, loose, very fine grained, well sorted, gray, with red grains and white grains, wet, sand size shell fragments	-27.08						

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH12/MW18 (BH)
 DATE COMPLETED: June 3, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
42	SM-SILTY SAND, trace clay, loose, fine grained, gray, with red grains and white grains, wet, sand to fine gravel size shell fragments	-29.58						
44	SP-SAND, trace silt, loose, fine grained, well sorted, gray, with red grains and white grains, wet, sand size shell fragments - 0.2' poorly sorted fine to coarse grained sand at 43.2ft BGS - 0.4' silt, with very fine sand at 43.5ft BGS	-31.18		9GP		4.2		0.0
48				10GP		3.1		0.0
50	END OF BOREHOLE @ 50.0ft BGS	-38.78						
52								
54								
56								
58								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ○



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-05/MW16 (BH)
 DATE COMPLETED: June 6, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)	
22									
24									
26	CL-SILTY CLAY, trace very fine sand, soft, low plasticity, light gray, very moist, sand to medium gravel size shell fragments	-13.47							
28	SP-SAND, trace silt, loose, fine grained, well graded, gray, with red grains and white grains, wet, sand size shell fragments	-15.77		6GP		4.8		0.0	
30	SM-SAND, with silt, loose, very fine grained, gray, with red grains and white grains, wet, sand size shell fragments	-17.87							
32	ML-CLAYEY SILT, trace fine sand, loose, slight plasticity, light gray, wet, sand to fine gravel size shell fragments, wood fragments	-18.77							
34	SM-SILTY SAND, loose, fine grained, gray, with red grains and white grains, wet, sand size shell fragments, wood fragments occasionally concentrated in layers	-20.87		7GP		4.8		0.0	
36	- with clay at 36.0ft BGS								
38	- 1.5' cedar log layer, strong odor at 37.0ft BGS			8GP		3.6		108	

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 10/10/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-05/MW16 (BH)
 DATE COMPLETED: June 6, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	SP-SAND, trace silt, loose, fine gravel, well graded, gray to dark gray, with red grains and white grains, wet, sand size shell fragments	-28.47						
42	- 0.01' silty clay at 41.9ft BGS			9GP	4.4			0.0
44								
46								
48	- 1.0' fine to coarse grained, poorly graded at 47.2ft BGS			10GP	4.1			0.0
50								
52								
54	- 0.02' layer silty clay at 50.4ft BGS			11GP	3.0			0.0
56	NO INTACT SAMPLE, SP-SAND MATERIAL RECOVERED	-43.47						
58				12GP	1.5			0.0

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 10/10/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-BH-05/MW16 (BH)
 DATE COMPLETED: June 6, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
62	SP-SAND, trace silt, loose, fine gravel, well graded, gray to dark gray, with red grains and white grains, wet, sand size shell fragments	-48.47		13GP		4.5		0.0
64	- 0.5' silty, very fine grained sand at 64.1ft BGS							
66				14GP		3.0		
68	- REFUSAL at 68.0ft BGS END OF BOREHOLE @ 68.0ft BGS	-56.47						0.0
70								
72								
74								
76								
78								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 10/10/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW06 (BH)
 DATE COMPLETED: May 18, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE	11.79					
	ASPHALT	11.29					
	SP-GRAVELLY SAND, trace silt, compact, medium grained sand, trace fine to coarse sand, fine to coarse angular to subrounded gravel, well sorted, brown, moist	9.89		(1.5-2.5) 1GP		3.7	
2	SP-SAND, trace silt, trace fine subangular to subrounded gravel, loose, medium grained, trace coarse grained sand, well sorted, brown, with red grains and white grains, moist, sand size to fine gravel size shell fragments	6.79		(3.5-4.5)			
4							
	SP-SAND, trace silt, trace fine subangular to subrounded gravel, loose, fine to medium grained, well sorted, brown, with red grains and white grains, moist to wet, sand size shell fragments - wet at 6.5ft BGS	6.79	← BACKFILLED WITH BENTONITE CHIPS	2GP		3.4	
6							
8							
	SP-SAND, trace silt, loose, fine grained, well sorted, gray/dark gray, with red grains and white grains, wet, sand size to medium gravel size shell fragments	0.79		(9.5-10.5)			
10							
12				3GP		4.8	
14	- 0.1' clayey silt at 14.0ft BGS						
16							
	SP-SAND, trace silt, loose, very fine to fine grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments	-4.61					
18	- 0.12' wood at 16.9ft BGS - 0.1' SM very fine sand with silt at 17.1ft BGS - 0.1' clay with silt at 17.2ft BGS	-5.61		4GP		5.0	
	CL-SILTY CLAY, firm, low to medium plasticity, gray, moist, wood fragments 0.03x0.01'	-7.21					
	SM-SILTY SAND, trace fine subrounded						

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ○



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW06 (BH)
 DATE COMPLETED: May 18, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	gravel, loose, fine to medium grained, well sorted, dark gray, with red grains and white grains, wet, wood and shell fragments						
22	SP-SAND, trace silt, trace fine subangular gravel, loose, fine to medium grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments	-9.71 -10.31 -10.91		5GP		3.6	
24	SW-SAND, trace silt, trace fine subangular gravel, loose, fine to very coarse grained, poorly sorted, dark gray, with red grains and white grains, sand size shell fragments	-11.71 -12.41					
	SP-SAND, trace silt, trace fine subangular gravel, loose, fine to medium grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments	-12.91			24.5-25.5		
26	SW-SAND, trace silt, trace fine subangular gravel, loose, fine to very coarse grained, poorly sorted, dark gray, with red grains and white grains, sand size shell fragments	-15.21					
28	SP-SAND, trace silt, trace fine subangular gravel, loose, fine to medium grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments	-16.01		6GP		4.2	
30	SM-SILTY SAND, trace clay, compact, fine grained, well sorted, gray, with red grains and white grains, wet, sand size to medium grained shell fragments, higher quantity than above						
	CL-SILTY CLAY, trace fine sand, firm, low to medium plasticity, light gray, very wet, up to medium gravel size shell fragments						
32	SP-SAND, trace silt, loose, fine grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments			7GP		3.0	
34	SM/ML-SAND AND SILT, compact, very fine grained sand, varying amounts of sand and silt throughout, well sorted, gray, with red grains and white grains, wet, sand size shell fragments, with scattered medium gravel size shell fragments	-21.41					
36	- 0.08' silty clay at 35.7ft BGS - 0.07' silty clay at 36.1ft BGS - becoming very fine grained sand at 36.3ft BGS - 0.25' silt, with clay at 37.0ft BGS			8GP		3.7	
38							

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW06 (BH)
 DATE COMPLETED: May 18, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
42							
44	SM-SILTY SAND, compact, fine grained, well sorted, gray, with red grains and white grains, wet, sand size to medium gravel size shell fragments	-32.01		9GP		3.8	
46	SP-SAND, trace silt, loose, fine grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments	-33.21					
48				10GP		3.0	
50	END OF BOREHOLE @ 50.0ft BGS	-38.21					
52							
54							
56							
58							

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW06-25
 DATE COMPLETED: July 2, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: R. BIEBER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE						
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)		
	GROUND SURFACE TOP OF RISER	11.86 11.58								
2	SEE 709-MW06 (BH) FOR STRATIGRAPHIC INFORMATION (0 TO 15ft BGS)		<p style="text-align: right; margin-right: 20px;">BENTONITE CHIPS</p>							
4										
6										
8										
10										
12										
14										
16		CL-SILTY SANDY CLAY, stiff, low plasticity, gray, moist, shell fragments		-3.14		1RS		3.5		
18		SP-SAND, trace silt, fine grained, compact, gray, wet		-7.14					180	

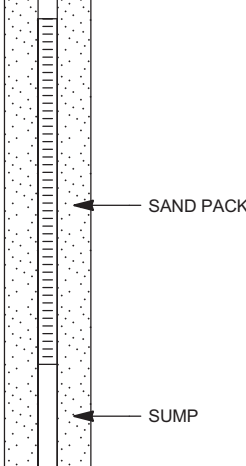
OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 9/24/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-MW06-25
PROJECT NUMBER: 072465-709	DATE COMPLETED: July 2, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: R. BIEBER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
22	SP-SAND, medium grained, well sorted, loose, gray, with some red grains, wet, shell fragments	-8.14	 <p style="text-align: right; margin-right: 50px;">← SAND PACK</p> <p style="text-align: right; margin-right: 50px;">← SUMP</p>	2RS		4.5		380
24								
26	END OF BOREHOLE @ 25.0ft BGS	-13.14						
28								
30								
32								
34								
36								
38								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 9/24/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WELL DETAILS
 Screened interval:
 -8.44 to -13.44ft
 20.30 to 25.30ft BGS
 Length: 5ft
 Material: PVC
 Sand Pack:
 -4.14 to -14.94ft
 16.00 to 26.80ft BGS
 Material: SAND



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW06-50
 DATE COMPLETED: June 25, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE TOP OF RISER	11.79 11.43					
2 4 6 8 10 12 14 16 18	NOT SAMPLED - SEE 709-MW06-50 (BH) FOR STRATIGRAPHIC INFORMATION (0 TO 50ft BGS)		<p style="font-size: small;"> CONCRETE BENTONITE GROUT 2" PVC WELL CASING 6" BOREHOLE </p>				

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
PROJECT NUMBER: 072465-709
CLIENT: OCCIDENTAL CHEMICAL CORPORATION
LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW06-50
DATE COMPLETED: June 25, 2012
DRILLING METHOD: SONIC
FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
22							
24							
26							
28							
30							
32							
34							
36							
38							

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-MW06-50
PROJECT NUMBER: 072465-709	DATE COMPLETED: June 25, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">42</div> <div style="margin-bottom: 10px;">44</div> <div style="margin-bottom: 10px;">46</div> <div style="margin-bottom: 10px;">48</div> <div style="margin-bottom: 10px;">50</div> <div style="margin-bottom: 10px;">52</div> <div style="margin-bottom: 10px;">54</div> <div style="margin-bottom: 10px;">56</div> <div style="margin-bottom: 10px;">58</div> </div>	<p style="text-align: center;">END OF BOREHOLE @ 50.0ft BGS</p>	<p>-38.21</p>	<p style="font-size: small; margin-top: 10px;">WELL DETAILS Screened interval: -32.51 to -37.51ft 44.30 to 49.30ft BGS Length: 5ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: -27.51 to -29.51ft 39.30 to 41.30ft BGS Material: BENTONITE PELLETS Sand Pack: -29.51 to -39.21ft 41.30 to 51.00ft BGS Material: SAND</p>				

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW09-25
 DATE COMPLETED: July 31, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: J. COVEY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE TOP OF RISER	11.76 11.41					
2	NOT SAMPLED - SEE 709-BH-04B FOR STRATIGRAPHIC INFORMATION (0 TO 25ft BGS)		<p style="font-size: small; margin-top: 10px;">CONCRETE</p> <p style="font-size: small; margin-top: 10px;">BENTONITE GROUT</p> <p style="font-size: small; margin-top: 10px;">2" PVC WELL CASING</p> <p style="font-size: small; margin-top: 10px;">8" BOREHOLE</p> <p style="font-size: small; margin-top: 10px;">BENTONITE PELLETS</p> <p style="font-size: small; margin-top: 10px;">6" BOREHOLE</p>				
4							
6							
8							
10							
12							
14							
16							
18							

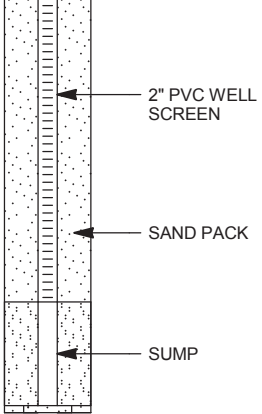
OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST. HOLE DESIGNATION: 709-MW09-25
 PROJECT NUMBER: 072465-709 DATE COMPLETED: July 31, 2012
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION DRILLING METHOD: SONIC
 LOCATION: 709 ALEXANDER AVENUE SITE FIELD PERSONNEL: J. COVEY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
22			 <p style="font-size: small; margin-top: 10px;"> WELL DETAILS Screened interval: -7.64 to -12.64ft 19.40 to 24.40ft BGS Length: 5ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: -1.44 to -5.44ft 13.20 to 17.20ft BGS Material: BENTONITE PELLETS Sand Pack: -5.44 to -14.24ft 17.20 to 26.00ft BGS Material: SAND </p>				
24							
26	END OF BOREHOLE @ 25.0ft BGS NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 17.0FT BGS	-13.24					
28							
30							
32							
34							
36							
38							

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW11-25
 DATE COMPLETED: July 11, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE TOP OF RISER	10.52 10.28					
2 4 6 8 10 12 14 16 18	NOT SAMPLED (0-20ft BGS)		<p style="font-size: small;"> CONCRETE BENTONITE GROUT BENTONITE PELLETS 6" BOREHOLE </p>				

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW11-25
 DATE COMPLETED: July 11, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 20px;">22</div> <div style="margin-bottom: 20px;">24</div> <div style="margin-bottom: 20px;">26</div> <div style="margin-bottom: 20px;">28</div> <div style="margin-bottom: 20px;">30</div> <div style="margin-bottom: 20px;">32</div> <div style="margin-bottom: 20px;">34</div> <div style="margin-bottom: 20px;">36</div> <div style="margin-bottom: 20px;">38</div> </div>	<p>ML-SANDY SILT, few clay, loose, fine sand, slightly plastic, gray, with red grains and white grains, wet, shell fragments</p> <p>SM-SILTY SAND, few clay, loose, fine to medium gray, with red grains and white grains, wet, shell fragments</p> <p>ML-SANDY SILT, with gravel and clay, loose, fine sand, fine to medium angular to subangular gravel, gray, with red grains and white grains, wet, shell fragments up to 1/2" width</p> <p>- cobble at 24.5ft BGS</p> <p>END OF BOREHOLE @ 25.0ft BGS</p> <p>NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 17.0FT BGS</p>	<p>-9.48</p> <p>-9.98</p> <p>-13.48</p> <p>-14.48</p>	<p style="text-align: right;">SAND PACK</p> <p style="text-align: right;">SUMP</p>				
<p>WELL DETAILS</p> <p>Screened interval: -8.78 to -13.78ft 19.30 to 24.30ft BGS</p> <p>Length: 5ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: -4.78 to -6.78ft 15.30 to 17.30ft BGS Material: BENTONITE PELLETS</p> <p>Sand Pack: -6.78 to -15.98ft 17.30 to 26.50ft BGS Material: SAND</p>							

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW15A (BH)
 DATE COMPLETED: May 18, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE	12.03					
	ASPHALT	11.53					
	SP-GRAVELLY SAND, trace silt, compact, medium grained, trace fine to coarse sand, fine to coarse angular to subrounded gravel, well sorted, brown, moist	11.03					
2	SP-SAND, trace silt, trace fine subangular to subrounded gravel, loose, fine grained, well sorted, brown, with red grains and white grains, moist, sand size shell fragments			1GP			
4							
6	SP-SAND, trace silt, trace fine subangular to subrounded gravel, loose, medium grained, well sorted, brownish gray, with red grains and white grains, moist, sand size to fine gravel size shell fragments - wet at 6.5ft BGS - dark gray staining, petroleum odor at 7.5ft BGS	6.53	← BACKFILLED WITH BENTONITE CHIPS	2GP			
8							
10							
12				3GP			
14	- 0.12' fine grained sandy silt at 14.0ft BGS - 0.07' silty clay nodule at 14.2ft BGS						
16	SP-SAND, trace silt, trace fine to medium subangular to subrounded gravel, loose, very fine to fine grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments - 0.08' silty clay at 16.4ft BGS	-3.47					
18	ML-CLAYEY SILT, trace fine sand, compact, slight plasticity, gray, wet, wood fragments	-4.57					
	CL-SILTY CLAY, firm, low plasticity, light gray, moist, wood fragments scattered in concentrated layers	-5.37		4GP			
	SM-SILTY SAND, loose, fine to medium	-6.37					

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW15A (BH)
 DATE COMPLETED: May 18, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	grained, well sorted, dark gray, with red grains and white grains, wet	-7.97					
	SP-SAND, trace silt, trace fine subrounded gravel, loose, medium grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments	-9.07					
22	ML-CLAYEY SILT, trace fine sand, loose, slight plasticity, gray, wet, wood fragments - 0.05x0.1' fragment of wood at 21.7ft BGS	-9.87		5GP			
24	SP-SAND, trace silt, loose, fine to medium grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments - 0.2' SW poorly sorted, fine to coarse grained sand at 23.5ft BGS - 0.15' fine grained sand at 24.0ft BGS	-12.47					
26	CL-SILTY CLAY, firm, low plasticity, light gray, moist, high concentration of fine to medium gravel size shell fragments	-15.47		6GP			
28	SM-SILTY SAND, trace clay, compact, very fine grained sand, well sorted, gray, with red grains and white grains, wet, sand size shell fragments, wood fragments	-16.97					
30	SP-SAND, trace silt, loose, very fine to fine grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments	-19.27		7GP			
32	ML-SILT, with clay, trace very fine grained sand, compact, slight plasticity, gray, with red grains and white grains, wet, sand size to fine gravel size shell fragments, wood fragments	-21.17					
34	SM-SILTY SAND, loose, very fine grained sand, well sorted, gray, with red grains and white grains, wet, sand size shell fragments, wood fragments	-26.67					
36	- 0.15' silty clay at 36.1ft BGS - medium gravel size shell fragments at 36.3ft BGS			8GP			
38	CL-SILTY CLAY, firm, low to medium plasticity, light gray, very moist	-26.67					

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-MW15A (BH)
PROJECT NUMBER: 072465-709	DATE COMPLETED: May 18, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: GEOPROBE
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
42	SP-SAND, trace silt, trace fine to medium subrounded gravel, loose, fine to medium grained, well sorted, with minor intervals of poorly sorted fine to coarse grained sand, dark gray, with red grains and white grains, sand size to medium gravel size shell fragments	-27.97		9GP			
44							
46				10GP			
48							
50	END OF BOREHOLE @ 50.0ft BGS	-37.97					
52							
54							
56							
58							

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-MW15A-50
PROJECT NUMBER: 072465-709	DATE COMPLETED: August 1, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: J. COVEY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE TOP OF RISER	11.44 11.20					
2 4 6 8 10 12 14 16 18	NOT SAMPLED (0 TO 40ft BGS)						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW15A-50
 DATE COMPLETED: August 1, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: J. COVEY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
22 24 26 28 30 32 34 36 38							

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
PROJECT NUMBER: 072465-709
CLIENT: OCCIDENTAL CHEMICAL CORPORATION
LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW15A-50
DATE COMPLETED: August 1, 2012
DRILLING METHOD: SONIC
FIELD PERSONNEL: J. COVEY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
42	SP-SAND, compact, fine grained, well sorted, dark gray, trace red grains and white grains, trace shell fragments, wet	-28.56	<p>BENTONITE CHIPS</p> <p>2" PVC WELL SCREEN</p> <p>SAND PACK</p>	1RS		10.0	
44							
46							
48							
50	END OF BOREHOLE @ 50.0ft BGS	-38.56	<p><u>WELL DETAILS</u> Screened interval: -34.56 to -39.56ft 46.00 to 51.00ft BGS Length: 5ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: -27.26 to -29.76ft 38.70 to 41.20ft BGS Material: BENTONITE Sand Pack: -29.76 to -39.56ft 41.20 to 51.00ft BGS Material: SAND</p>				
52	NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 20.0FT BGS						
54							
56							
58							

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW16-25
 DATE COMPLETED: July 5, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: N. HINSPERGER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE						
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)		
	GROUND SURFACE TOP OF RISER	11.21 10.96								
2	NOT SAMPLED (0-15ft BGS) SEE 709-BH-05 FOR STRATIGRAPHIC INFORMATION (0-15ft BGS)									
4										
6										
8										
10										
12										
14										
16		-3.79								
18		SP-SAND, trace silt, fine grained, well sorted, dark gray, wet				1RS		4.0		0.0

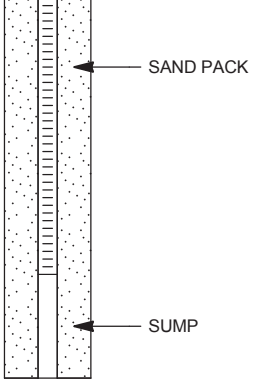
OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-MW16-25
PROJECT NUMBER: 072465-709	DATE COMPLETED: July 5, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: N. HINSPERGER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE						
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)		
22	- small shell fragments at 21.0ft BGS									
	SP-SAND, with silt, fine grained, well sorted, loose, gray, wet, shell fragments	-10.79	 <p style="margin-left: 20px;">SAND PACK</p> <p style="margin-left: 20px;">SUMP</p>	2RS		5.0			0.0	
	SP-SAND, trace silt, fine grained, well sorted, loose, dark brown, moist, small shell fragments	-11.79								
24	END OF BOREHOLE @ 25.0ft BGS	-13.79								
26	NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 15.0FT BGS		<p><u>WELL DETAILS</u></p> <p>Screened interval: -7.79 to -12.79ft 19.00 to 24.00ft BGS</p> <p>Length: 5ft Material: PVC</p> <p>Seal: -2.79 to -4.79ft 14.00 to 16.00ft BGS Material: BENTONITE PELLETS</p> <p>Sand Pack: -4.79 to -14.29ft 16.00 to 25.50ft BGS Material: SAND</p>							
28										
30										
32										
34										
36										
38										

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW16-50
 DATE COMPLETED: July 5, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: N. HINSPERGER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	N' VALUE	FID (ppm)	
	GROUND SURFACE TOP OF RISER	11.08 10.66							
2 4 6 8 10 12 14 16 18	NOT SAMPLED (0-45ft BGS) SEE 709-MW16 (BH) FOR STRATIGRAPHIC INFORMATION (0 TO 45ft BGS)		<p style="margin-left: 20px;">CONCRETE</p> <p style="margin-left: 20px;">8" BOREHOLE</p> <p style="margin-left: 20px;">2" PVC</p>						

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-MW16-50
PROJECT NUMBER: 072465-709	DATE COMPLETED: July 5, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: N. HINSPERGER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">22</div> <div style="margin-bottom: 10px;">24</div> <div style="margin-bottom: 10px;">26</div> <div style="margin-bottom: 10px;">28</div> <div style="margin-bottom: 10px;">30</div> <div style="margin-bottom: 10px;">32</div> <div style="margin-bottom: 10px;">34</div> <div style="margin-bottom: 10px;">36</div> <div style="margin-bottom: 10px;">38</div> </div>								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-MW16-50
PROJECT NUMBER: 072465-709	DATE COMPLETED: July 5, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: N. HINSPERGER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
42								
44								
46	SP-SAND, trace silt, fine grained, well sorted, loose, dark brown, wet, shell fragments	-33.92		1RS		4.0		0.0
48								
50	END OF BOREHOLE @ 50.0ft BGS	-38.92						
52	NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 25.0FT BGS		<p>WELL DETAILS</p> <p>Screened interval: -32.92 to -37.92ft 44.00 to 49.00ft BGS</p> <p>Length: 5ft Material: PVC</p> <p>Seal: -27.92 to -29.92ft 39.00 to 41.00ft BGS Material: BENTONITE PELLETS</p> <p>Sand Pack: -29.92 to -39.42ft 41.00 to 50.50ft BGS Material: SAND</p>					
54								
56								
58								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-MW16-75
PROJECT NUMBER: 072465-709	DATE COMPLETED: July 6, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: N. HINSPERGER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)	
	GROUND SURFACE TOP OF RISER	11.06 10.78							
2 4 6 8 10 12 14 16 18	NOT SAMPLED (0-70ft BGS) SEE 709-MW16 (BH) FOR STRATIGRAPHIC INFORMATION (0 TO 68ft BGS)								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST. HOLE DESIGNATION: 709-MW16-75
 PROJECT NUMBER: 072465-709 DATE COMPLETED: July 6, 2012
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION DRILLING METHOD: SONIC
 LOCATION: 709 ALEXANDER AVENUE SITE FIELD PERSONNEL: N. HINSPERGER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
22			<p>8" BOREHOLE</p> <p>6" BOREHOLE</p> <p>BENTONITE GROUT</p>					
24								
26								
28								
30								
32								
34								
36								
38								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW16-75
 DATE COMPLETED: July 6, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: N. HINSPERGER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
42 44 46 48 50 52 54 56 58								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-MW16-75
PROJECT NUMBER: 072465-709	DATE COMPLETED: July 6, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: N. HINSPERGER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
62								
64								
66								
68								
70	SP-SAND, trace silt, fine grained, well sorted, loose, dark brown, moist	-58.94						
72				1RS		4.0		0.0
74								
76	END OF BOREHOLE @ 75.0ft BGS NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 25.0FT BGS	-63.94						
78								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WELL DETAILS
 Screened interval:
 -57.94 to -62.94ft
 69.00 to 74.00ft BGS
 Length: 5ft
 Material: PVC
 Seal:
 -52.94 to -54.94ft
 64.00 to 66.00ft BGS
 Material: BENTONITE PELLETS
 Sand Pack:
 -54.94 to -64.44ft
 66.00 to 75.50ft BGS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST. HOLE DESIGNATION: 709-MW16-75
PROJECT NUMBER: 072465-709 DATE COMPLETED: July 6, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION DRILLING METHOD: SONIC
LOCATION: 709 ALEXANDER AVENUE SITE FIELD PERSONNEL: N. HINSPERGER

Table with columns: DEPTH ft BGS, STRATIGRAPHIC DESCRIPTION & REMARKS, ELEV. ft, MONITORING WELL, and SAMPLE (NUMBER, INTERVAL, REC (ft), 'N' VALUE, FID (ppm)). Includes depth scale from 82 to 98 ft and 'Material: SAND' entry.

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-MW18-25
PROJECT NUMBER: 072465-709	DATE COMPLETED: July 3, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: R. BIEBER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE						
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)		
	TOP OF RISER GROUND SURFACE	11.42 11.40								
2	NOT SAMPLED (0-15ft BGS) SEE 709-BH12/709-MW18 (BH) FOR STRATIGRAPHIC INFORMATION (0 TO 15ft BGS)		<p style="text-align: right;">BENTONITE CHIPS</p>							
4										
6										
8										
10										
12										
14										
16		-3.60								
18		SM-SILTY SAND, fine grained, loose, well sorted, gray, wet				1RS		3.5		0.0

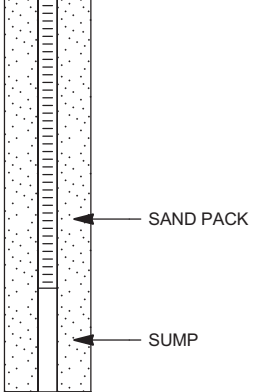
OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 8/24/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-MW18-25
PROJECT NUMBER: 072465-709	DATE COMPLETED: July 3, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: R. BIEBER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)	
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 20px;">22</div> <div style="margin-bottom: 20px;">24</div> <div style="margin-bottom: 20px;">26</div> <div style="margin-bottom: 20px;">28</div> <div style="margin-bottom: 20px;">30</div> <div style="margin-bottom: 20px;">32</div> <div style="margin-bottom: 20px;">34</div> <div style="margin-bottom: 20px;">36</div> <div style="margin-bottom: 20px;">38</div> </div>	<p style="margin-top: 20px;">SP-SAND, medium grained, well sorted, loose, gray, some red grains, wet, sand size shell fragments</p> <hr style="margin: 10px 0;"/> <p style="margin-top: 20px;">END OF BOREHOLE @ 25.0ft BGS</p>	<p style="margin-top: 20px;">-9.60</p> <p style="margin-top: 20px;">-13.60</p>	 <p style="margin-top: 20px;"><u>WELL DETAILS</u> Screened interval: -7.80 to -12.80ft 19.20 to 24.20ft BGS Length: 5ft Diameter: 2in Material: PVC Sand Pack: -5.00 to -14.30ft 16.40 to 25.70ft BGS Material: SAND</p>	<p style="margin-top: 20px;">2RS</p>	<p style="margin-top: 20px;">4.5</p>	<p style="margin-top: 20px;">0.0</p>			

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 8/24/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW18-50
 DATE COMPLETED: July 3, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: R. BIEBER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)	
	GROUND SURFACE TOP OF RISER	11.55 11.35							
2 4 6 8 10 12 14 16 18	NOT SAMPLED (0-40ft BGS) SEE 709-BH12/709-MW18 (BH) FOR STRATIGRAPHIC INFORMATION (0 TO 40ft BGS)								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 8/24/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST. HOLE DESIGNATION: 709-MW18-50
 PROJECT NUMBER: 072465-709 DATE COMPLETED: July 3, 2012
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION DRILLING METHOD: SONIC
 LOCATION: 709 ALEXANDER AVENUE SITE FIELD PERSONNEL: R. BIEBER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
22 24 26 28 30 32 34 36 38								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 8/24/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-MW18-50
PROJECT NUMBER: 072465-709	DATE COMPLETED: July 3, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: R. BIEBER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
42	SW-SAND, trace silt, fine to medium grained, loose, poorly sorted, gray, wet, shell fragments 0.4-0.79"	-28.45	<p style="text-align: right;">BENTONITE PELLETS</p> <p style="text-align: center;">SAND PACK</p> <p style="text-align: center;">SUMP</p> <p>WELL DETAILS Screened interval: -32.65 to -37.65ft 44.20 to 49.20ft BGS Length: 5ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: -27.45 to -29.45ft 39.00 to 41.00ft BGS Material: BENTONITE PELLETS Sand Pack: -29.45 to -37.65ft 41.00 to 49.20ft BGS Material: SAND</p>	1RS		4.0		0.0
44	SP-SAND, medium grained, loose, well graded, gray, wet, shell fragments 1/2x2"	-32.45				4.5		0.0
50	END OF BOREHOLE @ 50.0ft BGS	-38.45						
52								
54								
56								
58								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 8/24/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW20 (BH)
 DATE COMPLETED: June 2, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	GROUND SURFACE	13.46						
	TOPSOIL, sand, with silt, grass, roots and plant material	13.26						
	GM-SANDY GRAVEL, with silt, loose, fine to coarse subangular gravel, fine grained sand, brown, moist, sand to fine gravel size shell fragments	11.96						0.0
2	SP-SAND, trace silt, with fine to medium subrounded to subangular gravel, loose, fine grained, well sorted, grayish brown, moist - 0.4' red brick like material at 2.7ft BGS	10.36		1GP 2-3'	3.1			0.0
4	NO RECOVERY DUE TO RED BRICK LIKE MATERIAL							0.0
6	SP-SAND, with gravel, trace silt, loose, fine grained, well sorted, dark grayish brown, with red grains and white grains, moist, sand size shell fragments - 0.3' heavily oxidized rust colored gravel/brick at 6.2ft BGS - wet at 6.5ft BGS	8.46						0.0
8	SP-SAND, trace silt, trace fine subangular gravel, loose, fine grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments	6.46		2GP 7.5-9'	3.2			0.0
10								0.0
12								0.0
14	- 0.08' silt at 14.0ft BGS - 0.05' silt at 14.3ft BGS - 0.06' silt at 14.5ft BGS							0.0
16	SP-SAND, trace silt, loose, very fine grained, well sorted, gray, with red grains and white grains, wet, sand size shell fragments - 0.08' silt at 15.5ft BGS - 0.05' clayey silt at 15.7ft BGS - 0.05' clayey silt at 15.9ft BGS	-1.54		3GP 15-16'	4.7			0.0
18	- 0.07' silty clay at 16.6ft BGS - 0.12' clayey silt at 16.8ft BGS	-3.64						0.0
	CL-SILTY CLAY, firm, low plasticity, light gray, moist, wood fragments - 0.01' wood at 17.2ft BGS	-4.24		4GP	3.7			0.0
	SM-SILTY SAND, trace clay, loose, fine to medium grained, gray, with red grains and							0.0

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
 WATER FOUND
 CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW20 (BH)
 DATE COMPLETED: June 2, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)	
	white grains, wet, sand to medium gravel size shell fragments, wood fragments								0.0
22	SP-SAND, trace silt, loose, fine grained, well sorted, dark gray, with red grains and white grains, wet, sand to fine gravel size shell fragments	-8.34		5GP				4.1	0.0
	- 0.2' clayey silt at 22.9ft BGS			(22-24')					0.0
24	- 0.5' fine to coarse grained SW-SAND at 23.1ft BGS								0.0
26									
28	- 0.15' silt clay at 27.9ft BGS			6GP				4.0	0.0
	- 0.1' silt, with clay at 28.9ft BGS								
30									
32	- 0.15' silt, with clay at 32.3ft BGS			7GP				4.0	0.0
	- 0.3' clayey silt at 32.9ft BGS								
34	SM-SILTY SAND, loose, very fine grained, gray, with red grains and white grains, wet, sand size shell fragments	-20.54							
36									
38				8GP				4.2	0.0
	ML-CLAYEY SILT, loose, slight plasticity, light gray, wet, increasing clay with depth	-25.54							
		-26.34							

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
 WATER FOUND
 CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW20 (BH)
 DATE COMPLETED: June 2, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)	
	SP-SAND, trace silt, loose, very fine grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments								
42	ML-SANDY SILT, compact, very fine sand, gray, with red grains and white grains, wet, interbedded layers very fine grained silty sand - 0.02' silty clay at 42.5ft BGS	-28.54		9GP		3.5		0.0	
44	SM-SILTY SAND, loose, very fine grained, gray, with red grains and white grains, wet, sand size shell fragments								
46	ML-SANDY SILT, compact, very fine sand, gray, with red grains and white grains, wet, interbedded layers very fine grained silty sand	-32.64		10GP		3.6		0.0	
48	CL-SILTY CLAY, soft, low plasticity, light gray, moist	-34.84							
50	ML-CLAYEY SILT, very loose, slight plasticity, light gray, wet, sand size shell fragments, wood fragments	-36.74							
52	ML-SANDY SILT, compact, very fine sand, gray, with red grains and white grains, wet, interbedded layers very fine grained silty sand, scattered layers of clayey silt	-38.14		11GP		4.6		0.0	
54									
56	ML-SILT, with clay, with very fine sand, loose, slight to low plasticity, occasional layers of silty clay, light gray, wet, wood fragments, sand to fine gravel size shell fragments	-41.54							
58				12GP		4.9		0.0	
	SP-SAND, trace silt, trace fine subrounded gravel, loose, fine grained, well sorted, dark gray, wet, sand to fine gravel size shell	-45.34							

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
 WATER FOUND
 CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW20 (BH)
 DATE COMPLETED: June 2, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
62	fragments - 0.15' silty sand, compact at 61.4ft BGS - 0.5' fine to coarse grained sand, poorly sorted at 61.6ft BGS			13GP	3.5			0.0
64								
66								
68				14GP	3.8			0.0
70								
72								
74				15GP	3.1			0.0
74.5	- 0.01' clayey silt at 74.5ft BGS	-61.24						
75	ML-SILT, with very fine grained sand, compact, gray, wet, wood fragments	-61.54						
75	END OF BOREHOLE @ 75.0ft BGS							
76								
78								

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
 WATER FOUND
 CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW20-75
 DATE COMPLETED: August 3, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: J. COVEY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE TOP OF RISER	13.32 12.92					
2 4 6 8 10 12 14 16 18	NOT SAMPLED (0 TO 65ft BGS)		<p style="font-size: small;"> CONCRETE BENTONITE GROUT 2" PVC WELL CASING 8" BOREHOLE </p>				

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW20-75
 DATE COMPLETED: August 3, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: J. COVEY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
22 24 26 28 30 32 34 36 38							

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW20-75
 DATE COMPLETED: August 3, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: J. COVEY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
42							
44							
46							
48							
50							
52							
54							
56							
58							

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW20-75
 DATE COMPLETED: August 3, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: J. COVEY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
62							
64							
66	SP-SAND, compact, fine grained, well sorted, dark gray, trace red grains and white grains, wet	-51.68	<p style="text-align: center;">BENTONITE CHIPS</p> <p style="text-align: center;">2" PVC WELL SCREEN</p> <p style="text-align: center;">SAND PACK</p>	1RS		10.0	
68							
70	- with silt at 73.5ft BGS						
72	- no silt at 74.6ft BGS						
74	END OF BOREHOLE @ 75.0ft BGS	-61.68					
76	NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 20.0FT BGS						
78							

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WELL DETAILS
 Screened interval:
 -59.06 to -64.06ft
 72.38 to 77.38ft BGS
 Length: 5ft
 Diameter: 2in
 Slot Size: 0.010



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
PROJECT NUMBER: 072465-709
CLIENT: OCCIDENTAL CHEMICAL CORPORATION
LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW20-75
DATE COMPLETED: August 3, 2012
DRILLING METHOD: SONIC
FIELD PERSONNEL: J. COVEY

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
82			Material: PVC Seal: -50.98 to -56.48ft 64.30 to 69.80ft BGS Material: BENTONITE CHIPS Sand Pack: -56.48 to -64.18ft 69.80 to 77.50ft BGS Material: SAND				
84							
86							
88							
90							
92							
94							
96							
98							

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW21 (BH)
 DATE COMPLETED: June 1, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	GROUND SURFACE	11.74						
	GM-SANDY GRAVEL, with silt, loose, fine to coarse angular to subrounded gravel, fine grained sand, brown, moist	10.84						0.0
2	SP-SAND, trace silt, trace fine subangular gravel, loose, fine grained, well sorted, grayish brown, with red grains and white grains, moist, sand size shell fragments			1GP 2.5-3.5'	4.0			0.0
4	- dark gray staining, petroleum odor from 4.0 to 12.0ft BGS							90
6	- wet, 4" slight sheen at 6.0ft BGS							69
8	- positive LNAPL dye test at 7.0ft BGS - sand to fine gravel size shell fragments at 7.3ft BGS			2GP	3.7			75 65
10	- 0.2' very fine grained sandy silt at 9.6ft BGS			9-10'				103
12	- 0.06' diameter clay nodule at 11.3ft BGS - no odor at 12.0ft BGS			3GP	4.7			3 0.0
14		-2.76		14-15'				0.0
16	SP-SAND, trace silt, loose, very fine grained, well sorted, gray, with red grains and white grains, wet, sand to fine gravel size shell fragments - 0.05' wood fragments at 15.8ft BGS	-4.26						0.0
18	ML-CLAYEY SILT, trace very fine sand, loose, slight plasticity, seams of silty clay, light gray, wet, sand size shell fragments, wood fragments SM-SILTY SAND, trace clay, loose, fine grained, well sorted, gray, with red grains and white grains, wet, sand size shell fragments	-5.36		4GP	3.5			0.0 0.0

← BACKFILLED WITH BENTONITE CHIPS

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW21 (BH)
 DATE COMPLETED: June 1, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)	
22	SM/ML-SAND AND SILT, with clay, very loose, fine grained sand, mostly non plastic, few small lenses (<0.05') of higher clay concentration with slight plasticity, well sorted, light gray, with red grains and white grains, wet, sand to fine gravel size shell fragments	-8.76		5GP	22-24'	4.7			0.0
24	SP-SAND, trace silt, loose, fine grained, well sorted, dark gray, with red grains and white grains, wet, sand to fine gravel size shell fragments	-10.56							0.0
28	- 0.2' highly concentrated sand to medium gravel size shell fragments at 27.9ft BGS - 0.1' silty clay, low plasticity, stiff at 28.1ft BGS			6GP		3.6			0.0
30	ML-SILT, with clay, trace very fine sand, compact, small areas of slight plasticity, light gray, with red grains and white grains, wet, sand to medium gravel size shell fragments, wood fragments	-17.96							
32	CL-SILTY CLAY, trace very fine sand, soft, low plasticity, light gray, moist	-20.66 -20.96		7GP		4.8			0.0
34	ML-CLAYEY SILT, trace very fine sand, loose, slight plasticity, light gray, wet, sand size shell fragments	-21.76							
34	CL-SILTY CLAY, trace very fine sand, soft, low plasticity, light gray, moist	-21.76							
36	SP-SAND, trace silt, loose, very fine grained, well sorted, gray, with red grains and white grains, wet, fine sand size shell fragments	-23.26			8GP		4.5		0.0
38	ML-SANDY SILT, trace clay, loose, very fine	-27.86							

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-MW21 (BH)
PROJECT NUMBER: 072465-709	DATE COMPLETED: June 1, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: GEOPROBE
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)	
42	grained sand, well sorted, gray, with red grains and white grains, sand size shell fragments								
44	SP-SAND, trace silt, loose, fine grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments - 0.2' clayey silt at 45.0ft BGS - 0.08' clayey silt at 45.4ft BGS	-32.26		9GP		3.9		0.0	
46									
48	SW-SAND, trace silt, trace fine subangular to subrounded gravel, loose, fine to coarse grained, poorly sorted, dark gray, with red grains and white grains, wet, sand to fine gravel size shell fragments	-35.66		10GP		3.4		0.0	
50	END OF BOREHOLE @ 50.0ft BGS	-38.26							
52									
54									
56									
58									

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW21-15
 DATE COMPLETED: July 11, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE TOP OF RISER	11.75 11.28					
2	NOT SAMPLED (0-5ft BGS) SEE 709-MW21 (BH) FOR STRATIGRAPHIC INFORMATION (0 TO 5ft BGS)		<p style="font-size: small;">CONCRETE BENTONITE GROUT BENTONITE PELLETS SAND PACK SUMP</p>				
6	GP-SANDY COBBLES, trace silt, loose, fine to coarse sand, subangular to rounded cobbles, gray, with red grains and white grains and brown grains, wet, shell fragments, petroleum odor	6.75					
8	GP-SANDY COBBLES, with gravel, loose, fine to coarse sand, fine to coarse angular to rounded gravel, gray, with red grains and white grains, gray and brown cobble/gravel, wet, shell fragments, strong petroleum odor NO RECOVERY (7-10ft BGS)	5.25 4.75					
10	ML-SANDY SILT, few clay, loose, fine sand, slightly plastic, gray to black, with red grains and white grains, wet, shell fragments, strong petroleum odor, LNAPL present	1.75					
14	SM-SILTY SAND, trace fine gravel, loose, fine to coarse grained, gray, with red grains and white grains, wet, shell fragments, strong odor, LNAPL present END OF BOREHOLE @ 15.0ft BGS	-2.25 -3.25					
18							

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 8/24/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-MW21-15
PROJECT NUMBER: 072465-709	DATE COMPLETED: July 11, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
22			Seal: 10.55 to 8.55ft 1.20 to 3.20ft BGS Material: BENTONITE PELLETS Sand Pack: 8.55 to -5.25ft 3.20 to 17.00ft BGS Material: SAND				
24							
26							
28							
30							
32							
34							
36							
38							

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 8/24/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-MW21-25
PROJECT NUMBER: 072465-709	DATE COMPLETED: July 10, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE TOP OF RISER	11.68 11.36					
2 4 6 8 10 12 14 16 18	NOT SAMPLED (0-20ft BGS) SEE 709-MW21 (BH) FOR STRATIGRAPHIC INFORMATION (0 TO 20ft BGS)		<p style="margin-left: 20px;">CONCRETE</p> <p style="margin-left: 20px;">BENTONITE GROUT</p> <p style="margin-left: 20px;">8" BOREHOLE</p> <p style="margin-left: 20px;">BENTONITE PELLETS</p> <p style="margin-left: 20px;">6" BOREHOLE</p>				

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-MW21-25
PROJECT NUMBER: 072465-709	DATE COMPLETED: July 10, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
22	SW-SAND, with silt, loose, fine to coarse grained, poorly sorted, gray, with red grains and white grains, wet, shell fragments, organic matter (wood)	-8.32	<p style="text-align: right;">SAND PACK</p> <p style="text-align: left;">SUMP</p>				
24	SM-SILTY SAND, loose, fine to coarse grained, poorly sorted, gray, with red grains and white grains, wet, shell fragments	-9.82					
24	SM/ML-SILT AND SAND, loose to compact, fine to coarse sand, gray, with red grains and white grains, wet, shell fragments	-11.82					
26	SW-SAND, with silt and clay, loose, fine to coarse grained, poorly sorted, gray, with red grains and white grains, wet, shell fragments	-12.82					
26	END OF BOREHOLE @ 25.0ft BGS	-13.32					
28	NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 15.0FT BGS		<p><u>WELL DETAILS</u></p> <p>Screened interval: -7.52 to -12.52ft 19.20 to 24.20ft BGS</p> <p>Length: 5ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: -2.52 to -4.52ft 14.20 to 16.20ft BGS Material: BENTONITE PELLETS Sand Pack: -4.52 to -14.32ft 16.20 to 26.00ft BGS Material: SAND</p>				
30							
32							
34							
36							
38							

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-709
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW21-50
 DATE COMPLETED: July 10, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE TOP OF RISER	11.66 11.40					
2 4 6 8 10 12 14 16 18	NOT SAMPLED (0-45ft BGS) SEE 709-MW21 (BH) FOR STRATIGRAPHIC INFORMATION (0 TO 45ft BGS)						

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
PROJECT NUMBER: 072465-709
CLIENT: OCCIDENTAL CHEMICAL CORPORATION
LOCATION: 709 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 709-MW21-50
DATE COMPLETED: July 10, 2012
DRILLING METHOD: SONIC
FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
22							
24							
26							
28							
30							
32							
34							
36							
38							


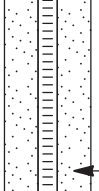

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 709-MW21-50
PROJECT NUMBER: 072465-709	DATE COMPLETED: July 10, 2012
CLIENT: OCCIDENTAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 709 ALEXANDER AVENUE SITE	FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
42							
44							
46	<p>ML-CLAYEY SILT, with sand, few coarse gravel, loose, coarse grained, low plasticity, gray, with white grains and red grains, wet, shell fragments</p> <p>SW-SAND, few silt and gravel, loose, fine to coarse sand, fine to medium grained gravel, loose, poorly sorted, gray, with white grains and red grains, wet, shell fragments</p>	-33.34 -33.84					
48							
50	<p>END OF BOREHOLE @ 50.0ft BGS</p> <p>NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 15.0FT BGS</p>	-38.34					
52							
54							
56							
58							

WELL DETAILS
 Screened interval:
 -32.54 to -37.54ft
 44.20 to 49.20ft BGS
 Length: 5ft
 Diameter: 2in
 Slot Size: 0.010
 Material: PVC
 Seal:
 -27.54 to -29.54ft
 39.20 to 41.20ft BGS
 Material: BENTONITE PELLETS
 Sand Pack:
 -29.54 to -39.34ft
 41.20 to 51.00ft BGS
 Material: SAND

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 072465-709WIN.GPJ CRA_CORP.GDT 11/6/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-01
 DATE COMPLETED: May 30, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE	11.41						
	ASPHALT	11.11						
2	SP-GRAVELLY SAND, trace silt, compact, fine to medium grained, trace coarse to very coarse grained, fine to coarse angular to subangular gravel, well graded, brown, moist	10.31		1GP	4.5			0.0
4	SP-SAND, trace silt, trace fine subrounded to subangular gravel, loose, fine to medium grained, well graded, brown, with red grains and white grains, moist, sand to fine gravel size shell fragments			(3.5-4.5')				0.0
6								0.0
8	- wet at 7.5ft BGS - gray, petroleum odor, staining at 8.3ft BGS			2GP	3.9			27.6
10				(9.5-10.5')				57.7
12	- 0.3' very fine sand at 12.3ft BGS - 0.03' layer clayey silt at 12.7ft BGS - 0.03' layer clayey silt at 13.5ft BGS - 0.04' layer clayey silt at 13.8ft BGS - 0.06' layer clayey silt at 14.5ft BGS			3GP	4.0			>9999
14								>9999
16		-4.59						230
18	SM-SILTY SAND, loose, very fine to fine grained, well sorted, gray, with red grains and white grains, wet, sand size shell fragments, interbedded layers of silty clay throughout	-5.59		4GP	4.0			162
20	CL-SILTY CLAY, firm, low to medium plasticity, gray, moist, wood fragments and scattered shell fragments	-6.79		(19-20')				31.7
22	SM-SILTY SAND, trace fine subrounded to subangular gravel, loose, fine grained, well sorted, dark gray, with red grains and white grains, wet, scattered clay nodules, sand size to fine gravel size shell fragments, wood and plant material fragments	-8.59		5GP	3.8			0.0
24	SW-SAND, trace silt, trace fine subangular gravel, loose, fine to coarse grained, poorly sorted, dark gray, with red grains and white grains, wet, sand size shell fragments	-11.89		(23-24')				0.0
26	CL-SILTY CLAY, trace fine sand, firm, low plasticity, gray, moist, pockets of sand, sand size to medium gravel size shell fragments	-12.49						0.0
28	SM-SAND, with silt, loose, fine grained, well sorted, gray, with red grains and white grains, wet, sand to fine gravel size shell fragments	-13.59						0.0
30	END OF BOREHOLE @ 25.0ft BGS							0.0

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 8/20/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-02
 DATE COMPLETED: May 23, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE	11.31						
	ASPHALT	11.01						
2	SP-GRAVELLY SAND, trace silt, trace clay, compact, fine to coarse angular to subrounded gravel, fine to medium grained, trace very fine grained, trace coarse grained, well graded, brown, moist	10.51		1GP		4.0		0.0
4	SP-SAND, trace silt, trace fine subrounded to subangular gravel, loose, fine to medium grained, well graded, brown, with red grains and white grains, moist, sand size shell fragments			3-4'				0.0
6	- wet, strong petroleum odor and staining at 6.0ft BGS - fine grained sand at 6.5ft BGS		← BACKFILLED WITH BENTONITE CHIPS	2GP		3.5		52.1
8								1447
10	- 0.3' clayey silt with fine sand at 9.1ft BGS			9-10'				3658
12								>9999
14	- 0.15' silty clay at 12.6ft BGS - 0.08' silty clay at 13.6ft BGS - wood fragment at 13.9ft BGS	-2.69		3GP		4.0		320
16	SM-SILTY SAND, trace clay, loose, very fine to fine grained, well sorted, gray, red with grains and white grains, wet, sand to fine gravel size shell fragments	-3.69						263
18	CI-SILTY CLAY, trace fine sand, soft, low plasticity, gray, very moist to moist, scattered shell fragments, pockets of silty sand	-6.49		16.5-17.5' 4GP		5.0		31.7
20	SM-SILTY SAND, trace clay, trace fine subangular gravel, loose, fine grained, well sorted, dark gray, with red grains and white grains, wet, sand to fine gravel size shell fragments	-8.69						12.6
22	- 0.1' silty clay at 19.6ft BGS - 0.2' silty clay at 19.8ft BGS			5GP		5.0		4.1
24	SP-SAND, trace silt, loose, medium grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments - 0.3' of SW-SAND, poorly sorted, fine to coarse grained at 22.0ft BGS	-11.49		23-24'				0.0
26	SM/ML-SAND AND SILT, trace clay, loose, very fine to fine sand, slight plasticity, well sorted, gray, wet - concentrated sand to coarse gravel size shell fragments from 24.1 to 25.0ft BGS	-13.69						0.0
28	END OF BOREHOLE @ 25.0ft BGS							0.0

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 8/20/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH03/MW11 (BH)
 DATE COMPLETED: May 31, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE	11.44						
	ASPHALT	11.14		(0.5-1.5')				9.9
2	SP-GRAVELLY SAND, trace silt, trace clay, compact, fine grained, trace to with very fine to coarse grained, well graded, brown, moist	10.54 10.34		1GP	3.9			0.0
4	TAR-LIKE MATERIAL, very tough/plastic, very dark brown, petroleum-like odor							0.0
6	SP-SAND, trace silt, trace fine subangular to subrounded gravel, loose, fine grained, well graded, brown, with red grains and white grains, moist, sand size shell fragments							9.9
8	- dark gray, staining, petroleum odor at 4.7ft BGS							826
10	- wet at 6.5ft BGS			(2GP 7.5-8.5')	4.0			869
12	- positive LNAPL dye test at 7.0ft BGS							987
14	- sheen on core from 7.5 to 9.5ft BGS							5.9
16	- very fine to fine grained sand at 8.8ft BGS	1.74 1.44						
18	ML-CLAYEY SILT, trace very fine sand, loose, slight plasticity, gray, wet							
20	END OF BOREHOLE @ 10.0ft BGS							
22	NOTE: BOREHOLE TERMINATED DUE TO LNAPL PRESENCE							
24								
26								
28								
30								
32								
34								

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-04
 DATE COMPLETED: May 22, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE	10.97						
	ASPHALT	10.67						
2	SP-GRAVELLY SAND, trace silt, compact, medium grained, fine to coarse angular to subrounded gravel, well graded, brown, moist	10.17						0.0
4	SP-SAND, trace silt, trace fine subrounded gravel, loose, fine grained, trace coarse sand, well graded, brown, with red grains and white grains, moist, sand size shell fragments - 0.51 layer of cement or very well cemented medium sand at 2.0ft BGS	5.97		1GP	4.2			0.0
6	ML-SILT, with medium sand, trace clay, loose, gray, moist to wet, sand size shell fragments, wood fragments, petroleum odor	4.47	← BACKFILLED WITH BENTONITE CHIPS					2586
8	SP-SAND, trace silt, trace fine subrounded gravel, fine grained, well sorted, dark gray, with red grains and white grains, wet, contains sand size shell fragments, petroleum odor and staining			2GP	4.0			2132
10				(3.5-4.5')				5346
12								76.3
14								222
16	CL-SILTY CLAY, trace fine sand, soft, low plasticity, gray, very moist, sand size shell fragments, wood fragments	-4.33		3GP	3.3			52
18	SM-SILTY SAND, trace clay, loose, fine to medium grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments, wood fragments - 0.1 layer of silty clay at 19.0ft BGS	-6.23						40
20	CL-SILTY CLAY, soft, low plasticity, gray, moist, minor layers of silty sand	-8.23						12.5
22	SP-SAND, trace silt, loose, medium grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments	-9.03						0.0
24	ML-CLAYEY SILT, trace sand, loose, slight plasticity, light gray, wet, shell fragments from sand size to medium gravel size, wood fragments - 0.3' concentrated interval of shells at 24.7ft BGS	-12.03		4GP	4.7			0.0
26	END OF BOREHOLE @ 25.0ft BGS	-14.03						0.0
28				5GP	3.8			0.0
				(16-17')				0.0
				(7.5-8.5')				0.0
				(23-24')				0.0

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 8/20/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-05
 DATE COMPLETED: May 31, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE	11.35						
	ASPHALT	11.05						
2	SP-GRAVELLY SAND, trace silt, trace clay, compact, fine grained, trace very fine to coarse grained, fine to coarse angular to subrounded gravel, well graded, brown, moist	10.35	<p style="text-align: center;">← BACKFILLED WITH BENTONITE CHIPS</p>	1GP 2.5-3.5'	4.0		0.0	
4	SP-SAND, trace silt, trace fine subrounded gravel, fine grained, loose, well graded, brown to dark gray, with red grains and white grains, sand size shell fragments, moist			5-6'		0.0		
6	- dark gray staining, strong petroleum odor at 4.0ft BGS - wet at 6.5ft BGS			2GP	3.9	0.0		
8	- free product in liner, bubbly, brown from 6.5 to 7.5ft BGS - sheen on sand, positive LNAPL dye test at 7.5ft BGS					2756		
10	END OF BOREHOLE @ 10.0ft BGS	1.35				5100		
12	NOTE: BOREHOLE TERMINATED DUE TO LNAPL PRESENCE					1711		
14						1500		
16						274		
18								
20								
22								
24								
26								
28								
30								
32								
34								

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ○



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-07
 DATE COMPLETED: May 30, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE	10.80						
	ASPHALT	10.50 10.20						0.0
2	SP-GRAVELLY SAND (FILL), trace silt, compact, fine grained, trace medium to coarse grained, fine to coarse angular to subangular gravel, well graded, brown, moist			1GP		4.1		0.0
4	SP-SAND, trace silt, trace fine subangular gravel, loose, fine grained, well graded, brown, with red grains and white grains, moist, sand size shell fragments			3-4'				0.0
6	- fine grained sand from 0.6 to 3.5ft BGS - strong petroleum odor, staining and sheen from 5.0 to 11.0ft BGS		← BACKFILLED WITH BENTONITE CHIPS	5-6'				>9999
8	- dark gray, wet at 6.0ft BGS - 0.2' layer silt with very fine sand at 6.3ft BGS - 0.08' layer product at 6.5ft BGS - 0.06' layer clayey silt at 8.7ft BGS - 0.1' layer silty clay at 9.6ft BGS			2GP		4.0		1179
10								29.6
12								8.3
14	- 0.1' layer wood fragments at 13.0ft BGS - 0.05' layer silt at 13.8ft BGS			3GP		4.2		10.5
16	ML-SILT, trace to with clay, trace to with very fine sand, loose, no to slight plasticity, gray, some red grains and white grains, sand size shell fragments	-4.70 -5.40		16-17'				6.2
18	- 0.15' layer silty clay at 15.8ft BGS	-6.40		4GP		4.3		0.0
20	CL-SILTY CLAY, soft, low plasticity, gray, moist, wood fragments, sand size shell fragments	-8.00 -9.20						0.0
22	SM-SILTY SAND, trace clay, loose, fine grained, well sorted, dark gray, with red grains and white grains, wet, sand size shell fragments			5GP		3.1		0.0
24	CL-CLAY, with silt, firm, low to medium plasticity, gray, moist, sand to fine gravel size shell fragments	-12.60		23-24'				0.0
26	SW-SAND, trace silt, loose, fine to medium grained, trace coarse grained, poorly sorted, dark gray, with red grains and white grains, wet, sand size shell fragments	-14.20						0.0
28	ML-SANDY SILT, trace clay, compact, very fine grained sand, non plastic, gray, wet, sand to fine gravel size shell fragments							0.0
30	END OF BOREHOLE @ 25.0ft BGS							0.0

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-08
 DATE COMPLETED: May 31, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)	
	GROUND SURFACE	11.30							
	ASPHALT	11.00							
2	SP-GRAVELLY SAND, trace silt, trace clay, compact, fine grained, trace very fine to coarse grained, fine to coarse angular to subangular gravel, well graded, brown, moist	10.10	<p>BACKFILLED WITH BENTONITE CHIPS</p>	1GP 2.5-3.5'		3.7		0.0	
4	SP-SAND, trace silt, loose, fine grained, well graded, brown, with red grains and white grains, moist, sand size shell fragments - dark gray, staining, petroleum odor at 2.0ft BGS - wet, free product on liner, strong sheen on core, positive LNAPL dye test at 6.0ft BGS			4-5'			1279	96.7	
6							281		
8					2GP		4.0		207
10		1.30					17		15
	END OF BOREHOLE @ 10.0ft BGS								
	NOTE: BOREHOLE TERMINATED DUE TO LNAPL PRESENCE								
12									
14									
16									
18									
20									
22									
24									
26									
28									
30									
32									
34									

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 8/20/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH09/MW12 (BH)
 DATE COMPLETED: June 9, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: M. DAVIS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE	11.08						
2	ASPHALT AND CONCRETE DEBRIS		█					
2	SP-SAND, trace silt, trace gravel, fine to medium sand, fine gravel, well sorted, dark gray, moist, shell fragments, petroleum odor	9.38	█	1GP		4.5		467.3
4								
6	- 0.2' SP-GRAVELLY SAND lens at 5.8ft BGS							
8	- wet at 8.0ft BGS			2GP		5.0		989.0
10	- wet at 10.0ft BGS							
12								
14				3GP		5.0		1325.0
15	- DISCONTINUED SAMPLING at 15.0ft BGS	-3.92						
16	END OF BOREHOLE @ 15.0ft BGS							
18								
20								
22								
24								
26								
28								
30								
32								
34								

← BACKFILLED WITH BENTONITE CHIPS

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 10/9/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-10
 DATE COMPLETED: May 31, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE	11.20						
2	ASPHALT	10.90 10.40	<p style="text-align: center;">BACKFILLED WITH BENTONITE CHIPS</p>	1GP				15
4	SP-GRAVELLY SAND, trace silt, trace clay, compact, fine grained, trace very fine to coarse grained, fine to coarse angular to subrounded gravel, well graded, brown, moist - dark gray at 1.1ft BGS			(3-4')	3.5			56
6	SP-SAND, trace silt, trace fine subangular to subrounded gravel, loose, fine grained, well graded, dark brownish gray, with red grains and white grains, moist, sand size shell fragments, petroleum odor, staining - 0.05' silt layer at 4.7ft BGS - wet at 6.0ft BGS - positive LNAPL dye test at 7.0ft BGS			(6-7')				73
8				2GP	4.0			53
10	END OF BOREHOLE @ 10.0ft BGS	1.20						29
12	NOTE: BOREHOLE TERMINATED DUE TO LNAPL PRESENCE							93
14								80
16								9.2
18								
20								
22								
24								
26								
28								
30								
32								
34								

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-11
 DATE COMPLETED: May 21, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE	11.04						
	ASPHALT	10.74						
	SP-GRAVELLY SAND, trace silt, compact, medium grained, trace fine to very coarse grained, well graded, brown, moist	10.34						0.0
2				1GP		4.0		0.0
	SP-SAND, trace silt, trace fine subrounded to subangular gravel, loose, fine grained, well graded, brown, with red grains and white grains, moist, sand size shell fragments			(3-4')				0.0
4	- 0.8' very fine grained sand at 4.2ft BGS							0.0
6	- wet at 6.0ft BGS - gray at 6.5ft BGS							0.0
8				(2GP 7-8')		3.9		0.0
10	- 0.15' very fine grained silty sand at 9.2ft BGS - shell fragments including medium gravel size fragments at 10.0ft BGS							0.0
12				3GP		3.7		0.0
14	- 0.2' very fine silty sand at 14.5ft BGS							0.0
		-3.76						0.0
16	SM-SAND, with silt, loose, very fine grained, well graded, dark gray, with red grains and white grains, wet, sand size shell fragments	-4.36						0.0
	ML-CLAYEY SILT, trace fine sand, loose, slight plasticity, gray, wet, wood fragments scattered in concentrated layers	-5.16		(16-17')				0.0
18	CL-SILTY CLAY, loose to firm, low plasticity, gray, very moist, scattered sand size shell fragments, wood fragments scattered in concentrated layers	-6.26		4GP		4.1		0.0
20	- trace fine sand at 17.1ft BGS	-8.16						0.0
		-8.96						0.0
22	SM-SILTY SAND, trace clay, trace fine subangular gravel, loose, fine grained, well graded, gray, with red grains and white grains, wet, sand to fine gravel size shell fragments, wood fragments			5GP		4.5		0.0
24	ML-CLAYEY SILT, trace fine sand, loose, slight plasticity, gray, wet, fine sand size to medium gravel size shell fragments, wood fragments			(23-24')				0.0
26	SP-SAND, trace silt, loose, medium grained, well graded, dark gray, with red grains and white grains, wet, sand size shell fragments							0.0
28	- 0.02' clayey silt at 22.3ft BGS - 0.2' concentrated medium gravel size shell fragments at 24.1ft BGS - fine gravel size shell fragments at 25.0ft BGS			6GP		4.1		0.0
	CL-SILTY CLAY, trace fine sand, soft, low	-17.86						0.0
		-18.36						0.0

← BACKFILLED WITH BENTONITE CHIPS

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 8/20/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-11
 DATE COMPLETED: May 21, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
32	plasticity, gray, very moist, fine gravel size shell fragments SP-SAND, trace silt, loose, fine grained, well graded, gray, with red grains and white grains, wet, sand size shell fragments	-18.96		7GP		4.1		
34	CL-SILTY CLAY, trace fine sand, soft, low plasticity, gray, very moist to wet, sand size shell fragments, increase in silt content with depth, wood fragments	-22.46						
36	SM-SILTY SAND, trace clay, loose, very fine grained, well graded, gray, wet, sand size shell fragments	-23.96						
38	SM/ML-SAND AND SILT, loose, fine grained sand, gray, with red grains and white grains, well graded, wet, sand size to fine gravel size shell fragments	-28.96		8GP		4.2		
40	SP-SAND, trace silt, loose, fine to medium grained, well graded, gray to dark gray, with red grains and white grains, wet, sand size shell fragments	-28.96		9GP		3.4		
42				10GP		2.8		
44								
46								
48								
50	END OF BOREHOLE @ 50.0ft BGS	-38.96						
52								
54								
56								
58								

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 8/20/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ○



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-11/ MW13 (BH)
 DATE COMPLETED: May 21, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE	11.04						
	ASPHALT	10.74						
	SP-GRAVELLY SAND, trace silt, compact, medium grained, trace fine to very coarse grained, well graded, brown, moist	10.34						0.0
2				1GP		4.0		0.0
	SP-SAND, trace silt, trace fine subrounded to subangular gravel, loose, fine grained, well graded, brown, with red grains and white grains, moist, sand size shell fragments			(3-4')				0.0
4								0.0
	- 0.8' very fine grained sand at 4.2ft BGS							0.0
6								0.0
	- wet at 6.0ft BGS - gray at 6.5ft BGS							0.0
8				(2GP 7-8')		3.9		0.0
	- 0.15' very fine grained silty sand at 9.2ft BGS							0.0
10								0.0
	- shell fragments including medium gravel size fragments at 10.0ft BGS							0.0
12								0.0
14				3GP		3.7		0.0
	- 0.2' very fine silty sand at 14.5ft BGS							0.0
		-3.76						0.0
16		-4.36						0.0
	SM-SAND, with silt, loose, very fine grained, well graded, dark gray, with red grains and white grains, wet, sand size shell fragments	-5.16						0.0
	ML-CLAYEY SILT, trace fine sand, loose, slight plasticity, gray, wet, wood fragments scattered in concentrated layers	-6.26		(16-17')				0.0
18				4GP		4.1		0.0
	CL-SILTY CLAY, loose to firm, low plasticity, gray, very moist, scattered sand size shell fragments, wood fragments scattered in concentrated layers	-8.16						0.0
20		-8.96						0.0
	- trace fine sand at 17.1ft BGS							0.0
22				5GP		4.5		0.0
	SM-SILTY SAND, trace clay, trace fine subangular gravel, loose, fine grained, well graded, gray, with red grains and white grains, wet, sand to fine gravel size shell fragments, wood fragments							0.0
24				(23-24')				0.0
	ML-CLAYEY SILT, trace fine sand, loose, slight plasticity, gray, wet, fine sand size to medium gravel size shell fragments, wood fragments							0.0
26								0.0
	SP-SAND, trace silt, loose, medium grained, well graded, dark gray, with red grains and white grains, wet, sand size shell fragments							0.0
28				6GP		4.1		0.0
	- 0.02' clayey silt at 22.3ft BGS - 0.2' concentrated medium gravel size shell fragments at 24.1ft BGS - fine gravel size shell fragments at 25.0ft BGS							0.0
	CL-SILTY CLAY, trace fine sand, soft, low	-17.86						0.0
		-18.36						0.0

← BACKFILLED WITH BENTONITE CHIPS

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-11/ MW13 (BH)
 DATE COMPLETED: May 21, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
32	plasticity, gray, very moist, fine gravel size shell fragments SP-SAND, trace silt, loose, fine grained, well graded, gray, with red grains and white grains, wet, sand size shell fragments	-18.96		7GP		4.1		
34	CL-SILTY CLAY, trace fine sand, soft, low plasticity, gray, very moist to wet, sand size shell fragments, increase in silt content with depth, wood fragments	-22.46						
36	SM-SILTY SAND, trace clay, loose, very fine grained, well graded, gray, wet, sand size shell fragments	-23.96		8GP		4.2		
38	SM/ML-SAND AND SILT, loose, fine grained sand, gray, with red grains and white grains, well graded, wet, sand size to fine gravel size shell fragments	-28.96						
40	SP-SAND, trace silt, loose, fine to medium grained, well graded, gray to dark gray, with red grains and white grains, wet, sand size shell fragments	-28.96						
42				9GP		3.4		
44								
46								
48								
50	END OF BOREHOLE @ 50.0ft BGS	-38.96		10GP		2.8		
52								
54								
56								
58								

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-12
 DATE COMPLETED: May 23, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE	11.45						
	ASPHALT	11.15						
2	SP-GRAVELLY SAND, trace silt, trace clay, compact, medium grained, trace fine grained, trace coarse grained, fine to coarse angular to subrounded gravel, well graded, brown, moist	10.45		1GP		4.1		0.0 592 160 1792
4	SP-SAND, trace silt, trace fine subrounded to subangular gravel, loose, fine grained, well graded, dark gray, with red grains and white grains, moist, sand size shell fragments, petroleum odor, staining - hair size roots from 2.0 to 3.0ft BGS - sheen at 6.0ft BGS			3.75-4.75				1792
6				5-6'				9360 1462 7550 1170
8				2GP		3.9		306 25.2 8.3 6.2
10								
12				3GP		4.1		0.0 0.0 0.0 0.0
14								
16	CL-SILTY CLAY, soft, low plasticity, gray, very moist to wet, scattered wood fragments and shell fragments - 0.08' very fine silty sand at 15.2ft BGS - 0.25' very fine silty sand at 15.5ft BGS	-3.55						0.0 0.0 0.0 0.0
18	SM-SILTY SAND, loose, fine grained, well graded, gray, with red grains and white grains, wet, wood fragments, sand to fine gravel size shell fragments - with clay, very loose at 20.1ft BGS	-5.45		16-17'				0.0 0.0 0.0 0.0
20				4GP		4.0		0.0 0.0 0.0 0.0
22	CL-SILTY CLAY, soft to firm, low to medium plasticity, gray, moist, wood fragments, occasionally concentrated in layers	-10.45						0.0 0.0 0.0 0.0
24	SP-SAND, trace silt, loose, fine to medium grained, well graded, dark gray, with red grains and white grains, wet, sand size shell fragments	-11.75		23-24'				0.0 0.0 0.0 0.0
26	END OF BOREHOLE @ 25.0ft BGS	-13.55						
28								

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-13
 DATE COMPLETED: May 21, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE	11.31						
	ASPHALT	11.01						
2	SP-GRAVELLY SAND, trace to with silt, loose, medium grained, trace coarse sand, well graded, brown, moist	10.51						0.0
4	SP-SAND, trace silt, trace fine subrounded to subangular gravel, loose, fine to medium grained, well graded, gray to dark gray, with red grains and white grains, moist, sand size shell fragments, petroleum odor, staining			1GP		4.0		507
6	- wet at 6.0ft BGS				(4-5')			384
8					(6-7.5')			1512
10					2GP			919
12	- red gravel size shell fragments at 12.0ft BGS					4.1		>9999
14	- sheen at 13.0ft BGS							4450
16	- 0.1' clayey silt at 14.6ft BGS - 0.1' clayey silt at 14.9ft BGS	-3.69						>9999
18	SP-SAND, trace silt, loose, very fine to fine grained, well graded, dark gray, with red grains and white grains, wet, sand size shell fragments	-4.59			(16-17')			76.0
20	ML-CLAYEY SILT, trace fine sand, loose, gray, wet, sand size shell fragments, wood fragments	-5.54						178
22	CL-SILTY CLAY, firm, low plasticity, gray, very moist, wood fragments	-6.29			4GP			71.9
24	SM-SILTY SAND, loose, fine to medium grained, well graded, gray, with red grains and white grains, sand size to medium gravel size shell fragments	-8.69						103.1
26	SP-SAND, trace silt, loose, very fine to fine grained, well graded, gray, with red grains and white grains, wet, sand size shell fragments	-9.09						0.0
28	ML-CLAYEY SILT, with fine sand, loose to compact, slight plasticity, gray, with red grains and white grains, wet, sand to fine gravel size shell fragments	-11.29			5GP			0.0
30	SP-SAND, trace silt, loose, fine to medium grained, well graded, dark gray, with red grains and white grains, wet, sand size shell fragments	-13.69			(23-24')			0.0
	END OF BOREHOLE @ 25.0ft BGS							

BACKFILLED WITH BENTONITE CHIPS

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 8/20/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-14
 DATE COMPLETED: May 20, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)	
	GROUND SURFACE	10.63							
	ASPHALT	10.43							
2	SP-GRAVELLY SAND, trace silt, loose, medium grained sand, trace coarse sand, well graded, brown to tannish brown, moist	9.63							0.0
	SW-SAND, trace silt, trace fine subrounded gravel, loose, fine to very coarse grained, poorly graded, brown, moist	7.63		(1GP 2-3')		4.5			0.0
4	SP-SAND, trace silt, trace fine subrounded to subangular gravel, loose, fine grained, well graded, brown, with red grains and white grains, moist, sand size shell fragments								0.0
6	- wet at 6.5ft BGS								0.0
8	- 0.3' very fine to fine grained sand at 7.5ft BGS			(2GP 7-8')		3.4			0.0
	- 0.05' clayey silt at 8.4ft BGS								0.0
	- 0.15' clayey silt at 8.7ft BGS								0.0
	- 0.3' very fine sand at 8.9ft BGS								0.0
	- medium gravel size shell fragments from 9.7 to 15.0ft BGS								0.0
12				3GP		3.5			0.0
14									0.0
16	ML-CLAYEY SILT, trace fine sand, loose to compact, slight plasticity, gray, wet, shell fragments and wood fragments	-5.37		(16-17')					0.0
18	SM-SILTY SAND, loose, fine to medium grained, well graded, gray, with red grains and white grains, wet, sand size shell fragments, wood fragments	-7.37		4GP		4.0			0.0
20	CL-SILTY CLAY, trace fine sand, compact, low plasticity, gray, very moist to wet, sand size to medium grained size shell fragments, wood fragments	-8.87							0.0
22	SP-SAND, trace silt, loose, fine grained, well graded, dark gray, with red grains and white grains, wet, sand size to fine gravel size shell fragments	-10.17	5GP		3.4			0.0	
24			(23-24')					0.0	
26	END OF BOREHOLE @ 25.0ft BGS	-14.37						0.0	
28								0.0	

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 8/20/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-15/MW14 (BH)
 DATE COMPLETED: May 22, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE	11.43						
	ASPHALT	11.13						
	SP-GRAVELLY SAND, trace silt, compact, medium grained, trace coarse grained sand, fine to coarse subangular gravel, well graded, tannish brown, moist	10.43						12.5
2	SW-SAND, trace silt, with to trace fine subrounded to subangular gravel, loose, fine to coarse grained, well graded, gray, with red grains and white grains, moist, sand size shell fragments, petroleum odor, dark gray staining	8.93		1GP		5.0		14.6
4	SP-SAND, trace silt, trace fine subangular to subrounded gravel, loose, fine grained, well graded, dark gray, with red grains and white grains, moist, sand size shell fragments, petroleum odor, staining					3.75-4.75		0.0
6						5-6'		34.1
	- wet at 6.5ft BGS							5230
	- 0.15' layer of clayey silt at 7.4ft BGS							3580
8	- red gravel size shell fragments at 7.6ft BGS			2GP		4.5		3612
	- 0.2' layer of very fine grained silty sand at 9.0ft BGS							62.1
10								171
12				3GP		5.0		6.7
	- 0.15' layer of very fine grained silty sand at 12.9ft BGS							4.8
14								28.2
	ML-CLAYEY SILT, trace fine sand, loose, slight plasticity, gray, wet	-3.37						
16	- cobble at 15.2ft BGS							9.2
	SP-SAND, trace silt, loose, fine grained, well graded, dark gray, with red grains and white grains, wet, sand size shell fragments	-4.87						4.8
18	SM-SILTY SAND, trace clay, loose, fine grained, well graded, gray, wet, sand size shell fragments, wood fragments	-5.97		4GP		5.0		0.0
						17.5-18'		0.0

BACKFILLED WITH BENTONITE CHIPS

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS





STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-15/MW14 (BH)
 DATE COMPLETED: May 22, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)	
	ML-SILT, with sand, with clay, loose, fine grained sand, slight plasticity, gray, wet, wood fragments, sand size shell fragments	-9.07							0.0
22	SP-SAND, trace silt, fine to medium grained, well graded, dark gray, wet, sand size to fine gravel size shell fragments	-10.37		5GP	4.0				0.0
24				23-24'					0.0
26	- shell fragments up to 0.1x0.8" in size at 25.5ft BGS								0.0
28	SP-SAND, trace to with silt, loose, very fine grained, well graded, gray, with red grains and white grains, wet, sand size shell fragments	-15.77							
30	SM-SILTY SAND, trace clay, loose, occasional pocket of slight plasticity, well graded, gray, with red grains and white grains, wet, contains sand size shell fragments	-17.57							
38	SP-SAND, trace silt, loose, fine grained, well graded, dark gray, with red grains and white grains, wet, sand size shell fragments	-25.37							
38	ML-CLAYEY SILT, trace fine sand, loose, slight plasticity, gray, wet, sand to medium gravel size shell fragments, wood fragments	-26.17							

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-15/MW14 (BH)
 DATE COMPLETED: May 22, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
42	SP-SAND, trace silt, loose, very fine to fine grained, well graded, dark gray, with red grains and white grains, wet, sand size shell fragments	-28.57						
44								
46	SW-SAND, trace silt, trace fine subangular to subrounded gravel, fine to coarse grained, poorly graded, dark gray, with red grains and white grains, wet, sand size shell fragments	-33.57						
48								
50	- 0.15' layer of dense silt at 49.6ft BGS END OF BOREHOLE @ 50.0ft BGS	-38.57						
52								
54								
56								
58								

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH16/MW15 (BH)
 DATE COMPLETED: May 20, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE	11.42						
	ASPHALT	11.12						
2	SP-SAND, trace silt, trace fine subrounded to subangular gravel, loose, fine grained, well graded, brownish gray, with red grains and white grains, moist, sand size shell fragments			(0.25-1.25)				51.6
4				1GP	4.0			35.6
6	- dark gray, petroleum staining, very strong odor, sheen at 5.0ft BGS - wet at 5.5ft BGS - free product present at 6.0ft BGS							6.6
8								8.2
10	- 0.3' very fine grained silty sand at 9.5ft BGS							8860
12				(6.25-7.25)				>10,000
14				2GP	3.9			3340
16								149
18	- 0.08' layer of silt at 13.0ft BGS							2010
14		-3.08						75.1
16	SM-SILTY SAND, very fine grained, loose, gray, with red grains and white grains, wet, sand size shell fragments	-3.58						61.1
16	CL-SILTY CLAY, firm, low plasticity, light gray, moist, sand size shell fragments	-4.38						65.8
18	SP-SAND, trace silt, loose, very fine grained, well graded, gray, with red grains and white grains, wet, sand size shell fragments	-5.78						13.3
18	ML-CLAYEY SILT, trace very fine sand, loose, slight plasticity, light gray, with some red grains and white grains, wet, sand size shell fragments, wood fragments	-6.28		(17.5-18.5)				15.5
18	CL-SILTY CLAY, firm, low plasticity, light gray, very moist, sand size shell fragments, wood fragments	-6.68		4GP	5.0			20.0
18		-7.48						15.5

BACKFILLED WITH BENTONITE CHIPS

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH16/MW15 (BH)
 DATE COMPLETED: May 20, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)	
		-8.58							
22	SP-SAND, trace silt, loose, fine grained, well graded, gray, with red grains and white grains, wet, sand to fine gravel size shell fragments SM-SILTY SAND, trace fine subrounded gravel, loose, fine grained, gray, with red grains and white grains, sand size shell fragments, wood fragments			5GP		5.0			13.3
24	SP-SAND, trace silt, loose, fine grained, well graded, gray, with red grains and white grains, wet, sand to fine gravel size shell fragments ML-CLAYEY SILT, trace fine sand, loose, slight plasticity, light gray, with red grains and white grains, wet, sand size shell fragments, wood fragments	-11.38		(23-24')					0.0
26	CL-SILTY CLAY, trace very fine sand, firm, low plasticity, light gray, very moist, sand to gravel size shell fragments, wood fragments	-13.58							0.0
28	ML-SANDY SILT, loose, very fine grained sand, gray, with red grains and white grains, wet, sand size shell fragments	-16.18		6GP		4.0			0.0
30	ML-CLAYEY SILT, trace fine sand, loose, slight plasticity, light gray, with red grains and white grains, wet, sand size shell fragments, wood fragments	-16.68							0.0
32	SP-SAND, trace silt, loose, fine grained, well graded, dark gray, with red grains and white grains, wet, sand to fine gravel size shell fragments	-18.58		7GP		3.4			0.0
34									0.0
36	- 0.3' layer of sandy silt at 36.0ft BGS								0.0
38	- 0.4' layer of sandy silt at 37.2ft BGS			8GP		3.4			0.0

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH16/MW15 (BH)
 DATE COMPLETED: May 20, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
42	- 0.2' layer of silty sand at 40.5ft BGS							0.0
44	- 0.4' layer of clayey silt with sand, shell fragments up to 0.12x0.08' at 44.7ft BGS			9GP		4.6		0.0
46	- 0.08' layer of clayey silt at 46.6ft BGS							0.0
48				10GP		4.4		0.0
50	END OF BOREHOLE @ 50.0ft BGS	-38.58						0.0
52								
54								
56								
58								

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE


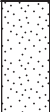


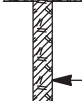

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-17
 DATE COMPLETED: October 1, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: K. BURNS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE	10.74						
	ASPHALT AND AGGREGATE							
2		9.24						
4	SP-SAND, trace silt, very fine to fine grained, compact, well sorted, dark gray-brown, white grains and red grains throughout, trace sand size and larger shell fragments throughout, dry to moist			1HA				1190
6				(001)				4600
8	- moist at 8.5ft BGS			2RS				6400
10	- wet at 10.0ft BGS			(002)				3660
12				3RS				510
14				(003)				1250
16				4RS				890
18	SM-SILTY SAND, very fine grained, well sorted, dark gray, trace white grains and red grains, trace sand size shell fragments, wood fragments, wet - increase in sand content at 17.5ft BGS	-5.76		(004)				332
20	ML-SILT, trace very fine sand, soft, non plastic, slow dilatancy, medium to dark gray, wet	-9.36		5RS				1100
22	SP-SAND, trace to with silt, very fine to fine grained, compact, well sorted, dark gray-brown, white grains and red grains throughout, trace sand size shell fragments throughout, wet - shell lag deposit grading to silt lens at 24.9ft BGS - partial and intact shell fragments throughout from 25.5 to 28.2ft BGS	-11.06		(005)				591
24				6RS				522
26				(006)				
28								
30	- wood fragments at 29.8ft BGS END OF BOREHOLE @ 30.0ft BGS	-19.26						
32	NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 15.0FT BGS							
34								

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-BH-18
 DATE COMPLETED: June 9, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: M. DAVIS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE	11.13					
	ASPHALT DEBRIS	10.13					
2	SP-GRAVELLY SAND, loose, fine to medium sand, fine gravel, well sorted, gray, moist	9.43					
4	SP-SAND, loose, fine to medium grained, well sorted, dark gray, moist, shell fragments			1GP		4.5	
6	- wet at 6.3ft BGS - 0.3' SP-GRAVELLY SAND lens at 6.4ft BGS		← BACKFILLED WITH BENTONITE CHIPS	2GP		5.0	
8							
10							
12	- 0.2' ML lens at 12.7ft BGS			3GP		5.0	
14							
16	SM-SILTY SAND, loose, dark gray, wet - 0.4' ML lens at 16.3ft BGS	-3.87		4GP		5.0	
18							
20	ML-SILT, with sand, loose, low plasticity, gray, wet	-8.87					
22	SP-SAND, trace silt, trace gravel, fine to medium sand, fine gravel, well sorted, dark gray, wet	-10.07		5GP		5.0	
24							
26	END OF BOREHOLE @ 25.0ft BGS	-13.87					
28							
30							
32							
34							

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 10/9/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation
 PROJECT NUMBER: 07843
 CLIENT: Occidental Chemical Corporation
 LOCATION: Alexander Avenue Site
 Tacoma, Washington

HOLE DESIGNATION: 721-GP5
 DATE COMPLETED: June 23, 2004
 DRILLING METHOD: Direct Push
 FIELD PERSONNEL: J. Cornetta

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	SAMPLE				
			NUMBER	INTERVAL	REC (ft)	BLOW COUNTS	PID (ppm)
	GROUND SURFACE	11.60					
2	SP-SAND, medium grained, minor silt		SS1	X			
4			SS2	X			
6			SS3	X			
8		▽		SS4	X		
10				SS4	X		
12		-0.40		SS4	X		66
14		SM-SILTY SAND, fine grained		SS4	X		
16	- transitioning to silt @ 15 ft BGS ML-SILT	-3.40		X			
18	CL/ML-SILTY CLAY	-4.90		X			
20	MLS-SANDY SILT, minor clay content - silt layer from 18.5 to 19.5 ft BGS	-5.40		X			
22	SP-SAND, medium grained, minor silt	-8.40	SS5	X		480	
24	Not Sampled	-9.40		X			
26	SM-SILTY SAND, medium grained, more dry than sand above, hard, decomposition and sulfur odors	-13.40		X			
28			SS6	X			
30	- - wet between 30.0 and 31.5 ft BGS			X			
32			SS7	X			
34	END OF BOREHOLE @ 33.0ft BGS	-21.40		X			

OVERBURDEN LOG 007843_ORIGINAL.GPJ CRA_CORP.GDT 10/6/09

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
 WATER FOUND ▽
 CHEMICAL ANALYSIS ○



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW05 (BH)
 DATE COMPLETED: June 4, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE	11.55						
	ASPHALT	11.25						
2	GM-SILTY GRAVEL, with fine sand, compact, fine to coarse angular to subrounded gravel, brown, moist	10.55		1GP	4.2			0.0
4	SP-SAND, trace silt, trace fine subangular to subrounded gravel, loose, fine to medium grained, well graded, brown, with red grains and white grains, moist, sand size shell fragments							0.0
6	- fine grained, dark gray, wet, petroleum odor, slight staining, slight sheen to 11' at 6.0ft BGS							0.0
8				2GP	3.9			57
10								392
12	- 0.1' layer silt at 11.3ft BGS							313
14	- 0.15' layer silt at 13.0ft BGS			3GP	4.4			18
16	- 1' fine to fine gravel size shell fragments at 14.0ft BGS							16
18	SP-SAND, trace silt, loose, very fine grained, well graded, gray, with red grains and white grains, wet, sand size shell fragments	-3.45 -3.85						9
20	CL-SILTY CLAY, firm, low plasticity, light gray, moist, wood fragments concentrated into layers, layers of very fine grained sandy silt, sand size shell fragments	-6.25		4GP	4.6			3
22	- 0.08' layer sandy silt at 15.5ft BGS							8
24	- 0.2' layer sandy silt at 15.7ft BGS							6
26	- 0.05' layer sandy silt at 16.0ft BGS							0.0
28	- 0.2' layer sandy silt at 16.1ft BGS							0.0
30	SM-SILTY SAND, loose, fine grained, well graded, gray, with red grains and white grains, wet, sand to medium gravel size shell fragments, wood fragments	-8.45 -8.85 -9.15 -9.45 -10.35		5GP	4.7			0.0
32	SP-SAND, trace silt, loose, very fine grained, well graded, gray, with red grains and white grains, wet, sand size shell fragments	-11.25						0.0
34	CL-SILTY CLAY, firm, low plasticity, light gray, moist, wood fragments concentrated into layers, layers of very fine grained sandy silt, sand size shell fragments	-14.95 -15.45 -15.95		6GP	4.9			0.0
36	SM-SILTY SAND, loose, fine grained, well graded, gray, with red grains and white grains, wet, sand to medium gravel size shell fragments, wood fragments	-16.85						0.0
38	SP-SAND, trace silt, loose, fine grained, well graded, dark gray, with red grains and white grains, wet, sand size shell fragments	-18.45 -19.15		7GP	3.1			0.0
40	SW-SAND, trace silt, loose, fine to coarse grained, poorly graded, dark gray, with red grains and white grains, wet, sand size shell							0.0

← BACKFILLED WITH BENTONITE CHIPS

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/25/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW05 (BH)
 DATE COMPLETED: June 4, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
36	fragments ML-CLAYEY SILT, loose, slight plasticity, light gray, wet, sand to medium gravel size shell fragments, wood fragments	-26.75		8GP		4.7		0.0
38	SP-SAND, trace silt, loose, fine grained, well graded, dark gray, with red grains and white grains, wet, sand size shell fragments							
40	ML-SANDY SILT, compact, very fine sand, gray, with red grains and white grains, wet, sand size shell grains, wood fragments			9GP		4.9		0.0
42	SP-SAND, trace silt, loose, fine grained, well graded, dark gray, with red grains and white grains, wet, sand to fine gravel size shell fragments							
44	ML-SILT, trace very fine sand, trace clay, loose, high dilatancy, light gray, wet, sand size shell fragments			10GP		4.2		0.0
46	SP-SAND, trace silt, loose, fine grained, well graded, dark gray, with red grains and white grains, wet, sand to fine gravel size shell fragments							
48	ML-SILT, trace very fine sand, trace clay, loose, high dilatancy, light gray, wet, sand size shell fragments - 0.35' silty clay at 37.6ft BGS			11GP		4.7		0.0
50	SP-SAND, trace silt, loose, fine grained, well graded, dark gray, with red grains and white grains, wet, sand size shell fragments - 0.2' layer medium grained sand at 42.0ft BGS - 0.02' layer silt at 42.9ft BGS							
52	- 0.5' layer SW-SAND, poorly graded, fine to coarse grained at 43.0ft BGS - 0.2' layer very fine grained silty sand at 46.5ft BGS - 0.2' layer silty clay at 47.5ft BGS - 0.8' very fine to fine grained sand at 47.6ft BGS - 0.02' layer silty clay at 49.2ft BGS - 0.04' layer fine to coarse SW-SAND at 51.4ft BGS - 0.12' layer clayey silt at 55.7ft BGS - solvent-like odor at 56.0ft BGS - 0.05' layer wood at 57.0ft BGS - wood fragments at 59.0ft BGS			12GP		3.9		0.0
54	- 0.2' layer silty clay at 47.5ft BGS - 0.8' very fine to fine grained sand at 47.6ft BGS - 0.02' layer silty clay at 49.2ft BGS - 0.04' layer fine to coarse SW-SAND at 51.4ft BGS							
56	- 0.12' layer clayey silt at 55.7ft BGS - solvent-like odor at 56.0ft BGS - 0.05' layer wood at 57.0ft BGS - wood fragments at 59.0ft BGS			13GP		4.1		0.0
58	- 0.05' layer wood at 57.0ft BGS - wood fragments at 59.0ft BGS							
60	- very fine grained sand at 65.0ft BGS			14GP		3.8		0.0
62	- 0.08' layer wood at 68.5ft BGS							
64								
66								
68								

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/25/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 721-MW05 (BH)
PROJECT NUMBER: 072465-721	DATE COMPLETED: June 4, 2012
CLIENT: OCCIDENTIAL CHEMICAL CORPORATION	DRILLING METHOD: GEOPROBE
LOCATION: 721 ALEXANDER AVENUE SITE	FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
72	- 0.25' layer silt at 70.0ft BGS - 0.2' layer silt at 70.3ft BGS			15GP		2.0		0.0
74								
76	END OF BOREHOLE @ 75.0ft BGS	-63.45						
78								
80								
82								
84								
86								
88								
90								
92								
94								
96								
98								
100								
102								
104								

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/25/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW05-75
 DATE COMPLETED: July 15, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE TOP OF RISER	11.41 11.13					
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34	NOT SAMPLED (0-70ft BGS) SEE 721-MW5 (BH) FOR STRATIGRAPHIC INFORMATION (0 TO 70ft BGS)		<p style="margin-left: 100px;">CONCRETE</p> <p style="margin-left: 100px;">8" BOREHOLE</p> <p style="margin-left: 100px;">6" BOREHOLE</p> <p style="margin-left: 100px;">BENTONITE GROUT</p>				

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW05-75
 DATE COMPLETED: July 15, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68							

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation

HOLE DESIGNATION: 721-MW10-50

PROJECT NUMBER: 07843

DATE COMPLETED: June 24, 2004

CLIENT: Occidental Chemical Corporation

DRILLING METHOD: HSA

LOCATION: Alexander Avenue Site

FIELD PERSONNEL: C. Cameron

Tacoma, Washington

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS	PID (ppm)
	GROUND SURFACE TOP OF RISER	10.66 10.06						
2	FILL, fine to medium sand, some gravel and silt, brown to dark brown, dry		CONCRETE	SS1	X	1.1	22	2.1
4			2"Ø PVC Riser	SS2	X	1.0	26	6
6		4.66		SS3	X	0.1	5	8.6
8	SM-fine to medium SAND, some silt, trace gravel, dark brown, moist - dark gray brown with odor from 6.9 to 7.5 ft BGS	2.66	CEMENT/ BENTONITE GROUT	SS4	X	1.5	5	858
10	SP-fine to medium SAND, little silt, dark gray to brown, moist, hydrocarbon odor, sheen on sand			SS5	X	1.5	3	7200
12	- same with some silt and strong hydrocarbon odor from 11.7 to 11.8 ft BGS		8" Ø BOREHOLE	SS6	X	1.7	10	891
14	- ML-SILT lense, wood fragment 13.6 to 13.7 ft BGS			SS7	X	2.0	4	370
16	CL-CLAY, some silt, trace wood fragments, medium brown to gray, low plasticity, soft, wet	-4.24		SS8	X	2.0	2	775
18	SM-fine to medium SAND, some silt, dark gray to brown, moist, hydrocarbon odor	-5.34		SS9	X	2.0	4	640
20	CL-CLAY, some silt, brown to gray, low plasticity, moist	-7.14		SS10	X	2.0	14	280
22	SM-fine to medium SAND, some silt, dark gray to brown, moist, hydrocarbon odor	-7.34		SS11	X	2.0	18	155
24	CL-SILT CLAY, gray/brown, soft, moist	-7.84		SS12	X	2.0	14	116
26	SM-fine to medium SAND, some silt, dark gray to brown, moist, hydrocarbon odor	-8.44		SS13	X	2.0	8	160
28	- silt seam (ML), some medium sand, gray/brown, shell fragments, wet 22.3 to 23.0 ft BGS	-9.64		SS14	X	2.0	5	61
30	- silt seam (ML), some fine sand, brown to gray, wet 24.2 to 24.6 ft BGS	-10.24		SS15	X	1.1	25	10.3
32	- silt seam (ML), some fine sand and shell fragments, brown to gray 25.6 to 26.0 ft BGS			SS16	X	1.1	24	8.1
34	- SP/ML-SAND/SILT, moist 26.3 to 26.9 ft BGS			SS17	X	2.0	15	5.2
	ML-SILT, some fine sand, gray, dense, moist	-22.44		SS18	X	2.0	8	8
	SM-SAND, some silt, fine grained, dark brown,	-23.34						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ∇

OVERBURDEN LOG 007843 ORIGINAL.GPJ CRA_CORP.GDT 10/6/09



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation
 PROJECT NUMBER: 07843
 CLIENT: Occidental Chemical Corporation
 LOCATION: Alexander Avenue Site
 Tacoma, Washington

HOLE DESIGNATION: 721-MW10-50
 DATE COMPLETED: June 24, 2004
 DRILLING METHOD: HSA
 FIELD PERSONNEL: C. Cameron

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS	PID (ppm)	
36	moist - silt seam (ML), some clay, medium gray to brown, wet 35.6 to 35.7 ft BGS - wood fragment								
38	- silt seam (ML) 37.2 to 37.25 ft BGS								
40	ML-SILT, little fine sand, medium gray to brown, moist - same with some clay	-27.44	2" PVC Riser	SS19	1.4	9	6.8		
42	CL-CLAY, medium gray to brown, soft, medium plasticity, moist	-31.34	CEMENT/ BENTONITE GROUT	SS20	1.0	11	6.3		
44	ML-SILT, little fine sand, medium gray to brown, moist	-32.24	BENTONITE	SS21	2.0	3	7.1		
46	SP-fine to medium SAND, trace silt and gravel, dark gray to brown, wet - silt seam (ML), medium brown, moist 46.0 to 46.1 ft BGS	-33.64	8" Ø BOREHOLE	SS22	2.0	1	5.6		
48	SM-fine to medium SAND, some silt, trace gravel, dark gray to brown, moist -ML-SILT seam, some clay medium gray to brown, moist from 48.0 to 48.2 ft BGS	-37.34	SAND PACK	SS23	1.5	22	7		
50	Not Sampled	-39.34	2" PVC SCREEN	SS24	0.4	25	6		
52	END OF BOREHOLE @ 51.5ft BGS	-40.84	2" PVC SUMP	SS25	1.7	21	6		
54			<p>WELL DETAILS Screened interval: -34.34 to -39.34ft NGVD 45.00 to 50.00ft BGS Length: 5ft Diameter: 2in Slot Size: 10 Material: PVC</p>						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
 WATER FOUND ▼

OVERBURDEN LOG 007843_ORIGINAL.GPJ CRA_CORP.GDT 10/6/09



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW10-75 (BH)
 DATE COMPLETED: June 5, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE	10.78						
	ASPHALT	10.48 10.18						0.0
2	GM-SILTY GRAVEL, with fine to coarse sand, compact, fine to coarse subangular to subrounded gravel, brown, moist	9.08 8.68		1GP		3.9		0.0
4	SP-SAND, with fine to medium subangular to subrounded gravel, trace silt, loose, fine grained, well graded, brown, with red grains and white grains, moist - 0.12x0.1' cobble/coarse gravel at 1.4ft BGS							0.0
6	CL-SILTY CLAY, with fine to medium subrounded to subangular gravel, trace fine sand, firm, low plasticity, bluish gray, with brown mottling, tan with brown mottling in lower 0.2' moist	5.08		2GP		3.5		243 301 484
8								512
10	SP-SAND, trace silt, trace fine subrounded to subangular gravel, loose, fine to medium grained, well graded, brown, with red grains and white grains, moist, sand size shell fragments, thin layers of fine to coarse SW-SAND							482
12	- 0.04' layer very fine grained silty sand, with bands of oxidation at 2.9ft BGS			3GP		4.5		119 52.4
14	SP-SAND, trace silt, loose, fine grained, well graded, dark gray, with red grains and white grains, wet, sand size shell fragments, petroleum odor and staining	-4.22 -4.52						17.5
16	- 0.3' slight sheen at 6.3ft BGS - 0.07' layer clayey silt at 12.5ft BGS - 0.09' layer very fine grained silty sand at 14.0ft BGS	-5.72		4GP		4.8		0.0 0.0
18	SM-SILTY SAND, trace clay, loose, very fine grained, gray, with red grains and white grains, wet, sand size shell fragments	-8.42						0.0
20	CL-SILTY CLAY, soft, low plasticity, light gray, very moist, sand size shell fragments							0.0
22	SM-SILTY SAND, trace fine subrounded gravel, trace clay, loose, fine grained, gray to light gray with depth, wet, sand to fine gravel size shell fragments, wood fragments	-11.32		5GP		3.5		0.0
24	SP-SAND, trace silt, loose, fine grained, well graded, dark gray, with red grains and white grains, wet, sand size shell fragments	-14.22						0.0
26	- 0.3' layer fine to coarse grained, poorly graded at 21.9ft BGS			6GP		4.2		0.0
28	SM-SILTY SAND, loose, fine grained, light gray, with red grains and white grains, wet, sand to medium grained shell fragments, wood fragments							0.0
30	SP-SAND, trace silt, loose, fine grained, well graded, gray, with red grains and white grains, wet, sand size shell fragments	-19.82						0.0
32	- 0.1' layer of sandy silt, 0.02' layer of wood at 26.6ft BGS - 0.1' layer sandy silt at 30.8ft BGS			7GP		4.5		0.0
34	SP-SAND, trace silt, loose, very fine grained, well graded, gray, with red grains and white	-23.32						

← BACKFILLED WITH BENTONITE CHIPS

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/25/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW10-75 (BH)
 DATE COMPLETED: June 5, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
36	grains, wet, sand size shell fragments, wood fragments	-24.22						
	- 0.15' layer sandy silt at 31.1ft BGS	-25.22						
	- 0.04' layer sandy silt at 31.6ft BGS	-26.12						
38	- 0.05' layer silt at 31.7ft BGS	-26.92		8GP		3.2		0.0
	- 0.18' layer silt, with very fine sand at 32.8ft BGS							
	- 0.05' layer sandy silt at 33.6ft BGS							
40	CL-SILTY CLAY, soft, low plasticity, light gray, moist							
42	SP-SAND, trace silt, loose, very fine grained, well graded, gray, with red grains and white grains, wet, sand size shell fragments, wood fragments			9GP		4.7		0.0
44	ML-SILT, trace very fine sand, compact, light gray, wet, sand size shell fragments, wood fragments, lenses of very fine grained sand, with red grains and white grains	-32.52						
46		-34.22						
48	SP-SAND, trace silt, loose, very fine grained, well graded, gray, with red grains and white grains, wet, sand size shell fragments, wood fragments	-35.52		10GP		3.6		0.0
50	ML-SILT, trace very fine sand, compact, light gray, wet, sand size shell fragments, wood fragments, with red grains and white grains							
52	- 0.3' layer silty clay, low plasticity at 40.9ft BGS							
	- sand to medium gravel size shell fragments at 42.6ft BGS			11GP		3.4		0.0
54	SP-SAND, trace silt, trace fine subrounded to subangular gravel, loose, fine to medium grained, well graded, dark gray, with red grains and white grains, wet, sand size shell fragments	-44.22						
56		-44.82						
58	SW-SAND, trace silt, trace fine subangular to subrounded gravel, loose, fine to coarse grained, poorly graded, dark gray, with red grains and white grains, wet, sand size shell fragments			12GP		4.8		0.0
	- 0.2' layer silty clay at 46.4ft BGS							
60	SP-SAND, trace silt, trace fine subrounded to subangular gravel, loose, fine to medium grained, well graded, dark gray, with red grains and white grains, wet, sand size shell fragments	-49.22						
62				13GP		4.8		0.0
64	ML-SILT, trace very fine sand, compact, light gray, wet, sand size shell fragments, wood fragments, with red grains and white grains							
66	SP-SAND, trace silt, loose, very fine grained, well graded, gray, with red grains and white grains, wet, sand size shell fragments	-53.82						
68	SM/ML-SAND AND SILT, trace clay, loose, very fine grained sand, gray, with red grains and white grains, wet, sand size shell fragments			14GP		3.8		0.0
	- 0.15' layer silty clay at 62.7ft BGS							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/25/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW10-75 (BH)
 DATE COMPLETED: June 5, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
72	ML-SILTY CLAY, with silt, trace very fine sand, compact, no to slight plasticity, gray to light gray, wet	-59.72						
74	CL-CLAYEY SILT, soft, low plasticity, light gray, moist - 0.4' clayey silt, very loose at 71.8ft BGS			15GP		4.8		0.0
76	END OF BOREHOLE @ 75.0ft BGS	-64.22						
78								
80								
82								
84								
86								
88								
90								
92								
94								
96								
98								
100								
102								
104								

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/25/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW10-75
 DATE COMPLETED: July 17, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE TOP OF RISER	10.69 10.34					
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34	NOT SAMPLED (0-70ft BGS) SEE 721-MW10-75 (BH) FOR STRATIGRAPHIC INFORMATION (0 TO 70ft BGS)		<p style="text-align: right; margin-right: 20px;">CONCRETE</p> <p style="text-align: right; margin-right: 20px;">8" BOREHOLE</p> <p style="text-align: right; margin-right: 20px;">6" BOREHOLE</p> <p style="text-align: right; margin-right: 20px;">BENTONITE GROUT</p>				

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW10-75
 DATE COMPLETED: July 17, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68							

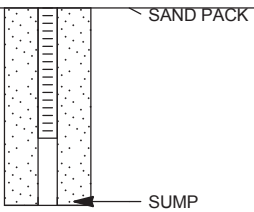
OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST. HOLE DESIGNATION: 721-MW10-75
 PROJECT NUMBER: 072465-721 DATE COMPLETED: July 17, 2012
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION DRILLING METHOD: SONIC
 LOCATION: 721 ALEXANDER AVENUE SITE FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
72 74 76 78 80 82 84 86 88 90 92 94 96 98 100 102 104	CL-SILTY CLAY, trace fine sand, soft, low plasticity, gray, wet END OF BOREHOLE @ 75.0ft BGS NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 20.0FT BGS	-59.31 -64.31	 <p>SAND PACK SUMP</p> <p><u>WELL DETAILS</u> Screened interval: -57.61 to -62.61ft 68.30 to 73.30ft BGS Length: 5ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: -52.61 to -54.61ft 63.30 to 65.30ft BGS Material: BENTONITE PELLETS Sand Pack: -54.61 to -64.31ft 65.30 to 75.00ft BGS Material: SAND</p>	1RS		5.0	

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW11-15
 DATE COMPLETED: July 15, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
	GROUND SURFACE TOP OF RISER	11.38 10.89						
2	NOT SAMPLED (0-5ft BGS) SEE 721-BH-03/MW11 (BH) FOR STRATIGRAPHIC INFORMATION (0 TO 5ft BGS)		<p style="font-size: small;">CONCRETE BENTONITE GROUT BENTONITE PELLETS</p> <p style="text-align: center;">SAND PACK</p> <p style="text-align: center;">SUMP</p> <p>WELL DETAILS Screened interval: 6.48 to -3.52ft 4.90 to 14.90ft BGS Length: 10ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: 10.48 to 8.48ft 0.90 to 2.90ft BGS Material: BENTONITE PELLETS Sand Pack: 8.48 to -5.37ft 2.90 to 16.75ft BGS Material: SAND</p>	1RS				
4		6.38						
6	GW-GRAVEL, with cobbles, trace sand, loose to very loose, fine to coarse round to angular gravel, multicolored, wet, LNAPL observed	4.88			2RS		5.0	
8	SM-SILTY SAND, trace gravel, loose, fine to medium sand, fine gravel, gray, wet, LNAPL observed	1.88						
10	SM-SILTY SAND, trace clay, loose, fine to medium gray, with red and white grains, wet, LNAPL observed, shell fragments	1.38						
12	NO RECOVERY (10-15ft BGS)			3RS		5.0		
14								
16	END OF BOREHOLE @ 15.0ft BGS	-3.62						
18								
20								
22								
24								
26								
28								
30								
32								
34								

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 8/24/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW11-25
 DATE COMPLETED: July 14, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE TOP OF RISER	11.37 11.12					
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34	<p>NOT SAMPLED (0-20ft BGS) SEE 721-BH-03/MW11 (BH) FOR STRATIGRAPHIC INFORMATION (0 TO 10ft BGS)</p> <p>SM/SC-CLAY/SAND MIX, with silt and gravel, loose, fine to medium sand, coarse rounded to subangular gravel, low plasticity, wet, slight petroleum odor - trace gravel, fine to medium angular to subangular gravel, slight petroleum odor at 22.0ft BGS</p> <p>ML-SANDY SILT, with clay, loose, fine sand, gray, wet, slight petroleum odor</p> <p>SM-SAND, with silt, loose, fine to medium sand, gray, with red grains and white grains, trace shell fragments, slight petroleum odor</p> <p>END OF BOREHOLE @ 25.0ft BGS</p> <p>NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 17.0FT BGS</p>	<p style="text-align: center;">-8.63</p> <p style="text-align: center;">-12.13 -12.38</p> <p style="text-align: center;">-13.63</p>	<p style="text-align: right;">CONCRETE</p> <p style="text-align: right;">BENTONITE GROUT</p> <p style="text-align: right;">8" BOREHOLE</p> <p style="text-align: right;">BENTONITE PELLETS</p> <p style="text-align: right;">6" BOREHOLE SAND PACK</p> <p style="text-align: right;">SUMP</p>	1RS	5.0		

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WELL DETAILS
 Screened interval:
 -7.53 to -12.53ft
 18.90 to 23.90ft BGS
 Length: 5ft
 Diameter: 2in
 Slot Size: 0.010
 Material: PVC
 Seal:
 -3.53 to -5.53ft
 14.90 to 16.90ft BGS
 Material: BENTONITE PELLETS
 Sand Pack:
 -5.53 to -14.13ft
 16.90 to 25.50ft BGS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 721-MW11-25
PROJECT NUMBER: 072465-721	DATE COMPLETED: July 14, 2012
CLIENT: OCCIDENTIAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 721 ALEXANDER AVENUE SITE	FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68			Material: SAND				

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 721-MW11-50
PROJECT NUMBER: 072465-721	DATE COMPLETED: July 14, 2012
CLIENT: OCCIDENTIAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 721 ALEXANDER AVENUE SITE	FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE TOP OF RISER	11.36 11.08					
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34	NOT SAMPLED (0-45ft BGS) SEE 721-BH-03/MW-11 (BH) FOR STRATIGRAPHIC INFORMATION (0 TO 10ft BGS)		<p style="font-size: small;"> CONCRETE 8" BOREHOLE BENTONITE GROUT 6" BOREHOLE </p>				

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 721-MW11-50
PROJECT NUMBER: 072465-721	DATE COMPLETED: July 14, 2012
CLIENT: OCCIDENTIAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 721 ALEXANDER AVENUE SITE	FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
36			<p style="margin-top: 10px;">WELL DETAILS Screened interval: -32.54 to -37.54ft 43.90 to 48.90ft BGS Length: 5ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: -27.54 to -29.54ft 38.90 to 40.90ft BGS Material: BENTONITE PELLETS Sand Pack: -29.54 to -39.14ft 40.90 to 50.50ft BGS Material: SAND</p>					
38								
40								
42								
44								
46	SM-SAND, with silt, trace clay, loose, fine to medium grained, with red grains and white grains and brown grains, wet, clay in clumps NO RECOVERY (46-50ft BGS)	-33.64 -34.64			1RS		1.0	
48								
50	END OF BOREHOLE @ 50.0ft BGS	-38.64						
52	NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 20.0FT BGS							
54								
56								
58								
60								
62								
64								
66								
68								

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

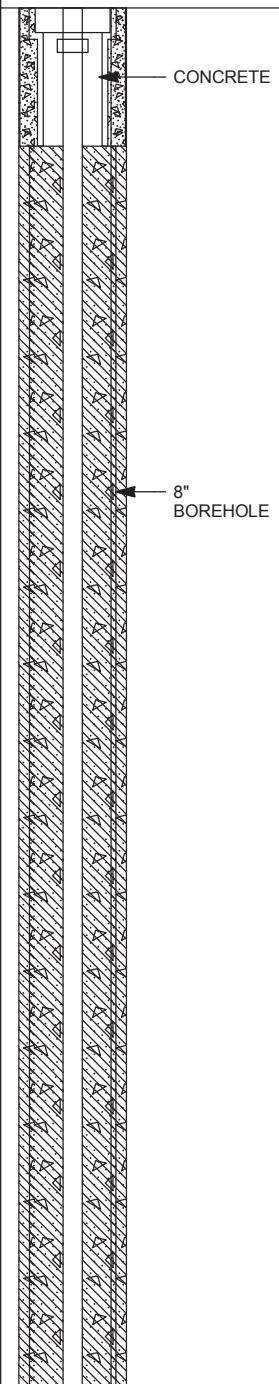
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 007843
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW11-75
 DATE COMPLETED: July 13, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	GROUND SURFACE TOP OF CASING	11.36 11.09						
2	NOT SAMPLED (0 TO 10ft BGS) SEE 721-BH-03/MW11 (BH) FOR STRATIGRAPHIC INFORMATION (0 TO 10ft BGS)							
10	SP-SAND, trace silt, loose, fine to medium grained, gray, with red grains and white grains, wet, shell fragments, petroleum odor	1.36						4.18
12	SM-SAND, trace silt and clay, loose, fine to medium grained, low plasticity, gray, with red grains and white grains, wet, shell fragments, petroleum odor	0.36						0.45
14	SM-SILTY SAND, trace clay, loose, fine to medium grained, slight plasticity, gray, with red grains and white grains, wet, shell fragments, petroleum odor	-1.14		1RS -001		5.0		
16	SM-SILTY SAND, with gravel, loose, fine to medium sand, fine gravel, gray, with red grains and white grains, wet, shell fragments, petroleum odor	-2.64						137
18	CL-SILTY CLAY, trace sand, loose, medium plasticity, gray, wet, appears organic in nature, wood fragments present, petroleum odor - with fine sand at 16.3ft BGS	-5.64		2RS		5.0		3.4
18	ML-SANDY CLAYEY SILT, loose, low plasticity, gray, wet - trace fine gravel at 17.5ft BGS	-7.64						0.0
	- silty clay at 18.8ft BGS							
	SP-SAND, trace gravel and silt, loose, fine to coarse sand, fine gravel, gray, with red grains and white grains, wet, shell fragments							

OVERBURDEN LOG 007843WIN WMU-FID.GPJ, CRA_CORP.GDT 11/16/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 007843
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW11-75
 DATE COMPLETED: July 13, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
	CL-SILTY CLAY, with sand, loose, fine grained, low plasticity, gray, with white grains, wet, lots of fine gravel size shell fragments and other organic matter - very loose at 21.5ft BGS	-8.64						9.55
22	SP-SAND, trace silt, loose, fine to medium grained, gray, with white grains and red grains, wet, shell fragments	-10.64	6" BOREHOLE	3RS	5.0			0.0
24	- volatile odor at 25.0ft BGS			-002				23
26								0.0
28				4RS	5.0			80
30	SP-SAND, with silt, loose, fine to medium grained, gray, with red grains and white grains, wet, shell fragments, volatile odor	-17.14						46
32	ML-SANDY SILT, trace clay, compact, fine sand, gray, wet, some shell fragments, slight odor	-18.89						
32	ML-SILT, with clay, trace sand, compact, slight plasticity, gray, wet, slight odor	-20.14						153
34	ML-CLAYEY SILT, compact, low plasticity, gray, wet, slight odor - trace fine sand at 34.0ft BGS - dense at 35.0ft BGS	-21.14	BENTONITE GROUT	5RS	5.0			138
36	ML-CLAYEY SILT, with sand, compact, slightly plastic, gray, wet, slight odor	-24.14						185
38	SP-SAND, trace clay and silt, loose, fine to medium grained, gray, with red grains and white grains, wet, shell fragments	-27.14		6RS	5.0			68

OVERBURDEN LOG 007843WIN WMU-FID.GPJ, CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 007843
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW11-75
 DATE COMPLETED: July 13, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
								20
42								31.92
		-31.64		7RS	5.0			
44	SC-CLAYEY SAND, loose, fine to medium grained, low plasticity, gray, with red grains and white grains, wet, shell fragments, clay nodules	-32.14						163
	SW-SAND, loose, fine to coarse grained, gray, with red grains and white grains and brown grains, wet, shell fragments							45
46								
48				8RS	5.0			86
	SM-SAND, with silt and clay, loose, fine to medium grained, gray, with red grains and white grains, wet, shell fragments	-37.64						
50	SW-SAND, trace silt, loose, fine to coarse grained, gray, with red grains and white grains and brown grains, wet, shell fragments - neutral pH (7.5) at 51.0ft BGS	-38.64						111
52				9RS	5.0			2411
54	SM-SILTY SAND, loose, fine to medium grained, slight plasticity, gray, with red grains and white grains, wet, shell fragments	-42.64						8600
56								10200
58				10RS	5.0			8500

OVERBURDEN LOG 007843WIN WMU-FID.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 007843
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION
 LOCATION: ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW11-75
 DATE COMPLETED: July 13, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)	
62	- negative DNAPL dye test at 60.0ft BGS - with silt at 60.5ft BGS								12000
64	- negative DNAPL dye test at 64.0ft BGS			11RS	5.0				2800
66				-003					8900
68				12RS	5.0				6700
70	SP-SAND, trace silt, loose, fine to medium grained, gray, with red grains and white grains, wet, shell fragments - neutral pH (7.5) at 71.0ft BGS	-58.64	2" PVC WELL SCREEN						3100
72	SM-SAND, with silt, loose, fine to medium grained, gray, with red grains and white grains, wet, shell fragments - negative DNAPL dye test at 72.0ft BGS	-60.14		13RS	5.0				17000
74	- silty sand at 74.0ft BGS - with silt at 74.5ft BGS								8500
76	END OF BOREHOLE @ 75.0ft BGS NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 20.0ft BGS	-63.64	SUMP	-004					6900
78									

OVERBURDEN LOG 007843WIN WMU-FID.GPJ, CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

WELL DETAILS
 Screened interval:
 -57.54 to -62.54ft
 68.90 to 73.90ft BGS
 Length: 5ft
 Diameter: 2in
 Slot Size: 0.010
 Material: PVC
 Seal:
 -52.54 to -54.54ft
 63.90 to 65.90ft BGS
 Material: BENTONITE PELLETS
 Sand Pack:



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST. HOLE DESIGNATION: 721-MW11-75
 PROJECT NUMBER: 007843 DATE COMPLETED: July 13, 2012
 CLIENT: OCCIDENTAL CHEMICAL CORPORATION DRILLING METHOD: SONIC
 LOCATION: ALEXANDER AVENUE SITE FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	FID (ppm)
82 84 86 88 90 92 94 96 98			-54.54 to -64.14ft 65.90 to 75.50ft BGS Material: SAND					

OVERBURDEN LOG 007843WIN.WMU-FID.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS





STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 721-MW12-15
PROJECT NUMBER: 072465-721	DATE COMPLETED: July 1, 2012
CLIENT: OCCIDENTIAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 721 ALEXANDER AVENUE SITE	FIELD PERSONNEL: N. HINSPERGER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE TOP OF RISER	11.07 10.77						
2	ASPHALT NOT SAMPLED (0.5-5ft BGS)	10.57	<p style="text-align: center;">BENTONITE CHIPS</p> <p style="text-align: center;">SAND PACK</p> <p style="text-align: center;">SUMP</p>	1RS		0.0		
6	SP-SAND, trace silt, fine grained, well graded, loose, dark brown to black, moist, shell fragments, strong odor	6.07		2RS		2.0		1385
10	- wet at 10.0ft BGS - increase in shell fragments at 11.0ft BGS			3RS		5.0		352
14	- rootlets, strong odor at 13.0ft BGS							
16	END OF BOREHOLE @ 15.0ft BGS	-3.93						

WELL DETAILS
 Screened interval:
 6.47 to -3.53ft
 4.60 to 14.60ft BGS
 Length: 10ft
 Material: PVC
 Sand Pack:
 8.07 to -5.03ft
 3.00 to 16.10ft BGS
 Material: SAND

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW12-25
 DATE COMPLETED: July 1, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: N. HINSPERGER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE TOP OF RISER	11.02 10.69						
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34	ASPHALT NOT SAMPLED (0-18.6ft BGS) SEE 721-MW12-15 FOR STRATIGRAPHIC INFORMATION (0 TO 15ft BGS)	10.52	<p style="font-size: small;"> CONCRETE BENTONITE GROUT 8" BOREHOLE BENTONITE CHIPS 6" BOREHOLE SAND PACK SUMP </p>					
	SP-SAND, trace silt, fine grained, well graded, loose, dark gray, wet, trace shell fragments	-7.58						
	- rootlets, wood debris, moist at 22.0ft BGS							
	NOT SAMPLED	-12.58						
	END OF BOREHOLE @ 25.1ft BGS	-14.08						
	NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 17.0FT BGS							
			<p style="font-size: x-small;">WELL DETAILS</p> <p style="font-size: x-small;">Screened interval: -7.58 to -12.58ft 18.60 to 23.60ft BGS</p> <p style="font-size: x-small;">Length: 5ft Material: PVC</p> <p style="font-size: x-small;">Sand Pack: -5.58 to -14.08ft 16.60 to 25.10ft BGS Material: SAND</p>	1RS	5.0			1.9

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW12-50
 DATE COMPLETED: July 1, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: N. HINSPERGER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
	GROUND SURFACE TOP OF RISER	11.02 10.77						
2	ASPHALT ASPHALT DEBRIS	10.52 10.02	<p style="text-align: center;">BENTONITE GROUT CONCRETE</p> <p style="text-align: center;">8" BOREHOLE</p> <p style="text-align: center;">6" BOREHOLE</p>	1RS	5.0			636
4	SP-SAND, trace silt, fine grained, well graded,, loose, dark gray to black, moist, strong petroleum odor - rootlets at 2.5ft BGS - small cobble at 3.0ft BGS - shell fragments at 5.0ft BGS			2RS	1.0			9999
6				3RS	4.0			603
8								
10	- trace coarse angular gravel, very strong petroleum odor at 10.0ft BGS							
12	- increase in shell fragments at 13.0ft BGS							
14								
16	SM-SILTY SAND, trace clay, fine grained, well graded, loose, gray, wet, shell fragments	-4.98 -5.58 -5.98		4RS	3.0			28
18	ML-CLAYEY SILT, trace fine sand, medium plasticity, soft, gray, wet							
20	SP-SAND, trace silt, fine grained, well graded, dark gray, moist, shell fragments	-8.98						
22	SP-SAND, trace silt, fine to medium grained, loose, dark gray, some red grains, wet, shell fragments			5RS	5.0			10.2
24								
26	SP-SAND, trace silt, fine grained, well graded, loose, dark gray, some red grains, wet, shell fragments	-13.98						
28				6RS	4.0			7.2
30	CL-SILTY CLAY, trace fine sand, low plasticity, soft, gray, wet	-17.98						
32								
34	SP-SAND, trace silt, fine grained, well graded,	-22.98		7RS	4.0			8.1

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 721-MW12-50
PROJECT NUMBER: 072465-721	DATE COMPLETED: July 1, 2012
CLIENT: OCCIDENTIAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 721 ALEXANDER AVENUE SITE	FIELD PERSONNEL: N. HINSPERGER

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
36	loose, dark gray, some red grains, wet, sand size shell fragments	-23.98	<p style="font-size: small;">WELL DETAILS Screened interval: -32.48 to -37.48ft 43.50 to 48.50ft BGS Length: 5ft Material: PVC Sand Pack: -29.48 to -39.48ft 40.50 to 50.50ft BGS Material: SAND</p>	8RS	3.0			12.7
38	SP-SAND, trace silt, fine grained, well graded, loose, dark gray, wet							
40	SM-SILTY SAND, fine rained, compact, dark gray, wet, shell fragments	-27.98		9RS	4.0			11.8
42	SP-SAND, trace silt, fine grained, loose, dark gray, wet, sand size shell fragments	-28.98						
44								
46	SP-SAND, fine to medium grained, well graded, loose, dark gray, some red grains, wet	-33.98	10RS	5.0			15.7	
48								
50	END OF BOREHOLE @ 50.0ft BGS	-38.98						
52	NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 20.0FT BGS							
54								
56								
58								
60								
62								
64								
66								
68								

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST. HOLE DESIGNATION: 721-MW13-15
 PROJECT NUMBER: 072465-721 DATE COMPLETED: June 29, 2012
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION DRILLING METHOD: SONIC
 LOCATION: 721 ALEXANDER AVENUE SITE FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
	GROUND SURFACE TOP OF RISER	11.06 10.67						
2	NOT SAMPLED (0-5ft BGS)		<p style="font-size: small;">CONCRETE BENTONITE GROUT BENTONITE PELLETS</p> <p style="text-align: center;">SAND PACK</p> <p style="text-align: center;">SUMP</p> <p>WELL DETAILS Screened interval: 6.46 to -3.54ft 4.60 to 14.60ft BGS Length: 10ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: 10.46 to 8.46ft 0.60 to 2.60ft BGS Material: BENTONITE PELLETS Sand Pack: 8.46 to -5.44ft 2.60 to 16.50ft BGS Material: SAND</p>					
4								
6	SM-SILTY SAND, few clay, trace gravel, fine grained, well graded, loose, gray, with red grains and white grains, moist, shell fragments	6.06 5.56						
8	SP-SAND, few silt, trace gravel, fine to medium grained, come coarse grained, fine angular to subangular gravel, loose, well graded, gray, with red grains and white grains, moist, shell fragments	2.56		1RS				
10	- grading to finer grained sand at 8.0ft BGS	1.06						
12	NO RECOVERY (8-10ft BGS)							
14	SP-SAND, with silt, trace gravel, very fine to medium grained, come coarse grained, fine angular to subangular gravel, loose, well graded, gray, with red grains and white grains, moist, shell fragments			2RS				
16	- 0.25' silty sand seam at 12.5ft BGS							
18	END OF BOREHOLE @ 15.0ft BGS	-3.94						
20								
22								
24								
26								
28								
30								
32								
34								

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/5/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW13-25
 DATE COMPLETED: June 29, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE TOP OF RISER	10.99 10.56					
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34	NOT SAMPLED (0-20ft BGS) SEE 721-MW13-15 FOR STRATIGRAPHIC INFORMATION (5 TO 15ft BGS)						
	SP-SAND, trace silt and gravel, fine to medium grained, loose, well graded, gray, with red grains and white grains, shell fragments	-9.01	SAND PACK	1RS			
	- silt sand seam at 24.8ft BGS SC-CLAYEY SAND, trace silt and gravel, fine to coarse grained, loose, well graded, gray, with red grains and white grains, larger shell fragments up to 1/2" across END OF BOREHOLE @ 25.0ft BGS	-13.51 -14.01	SUMP				
			WELL DETAILS Screened interval: -7.61 to -12.61ft 18.60 to 23.60ft BGS Length: 5ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: -2.61 to -4.61ft 13.60 to 15.60ft BGS Material: BENTONITE PELLETS Sand Pack: -4.61 to -14.51ft 15.60 to 25.50ft BGS				

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 8/24/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 721-MW13-25
PROJECT NUMBER: 072465-721	DATE COMPLETED: June 29, 2012
CLIENT: OCCIDENTIAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 721 ALEXANDER AVENUE SITE	FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68			Material: SAND				

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 8/24/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 721-MW13-50
PROJECT NUMBER: 072465-721	DATE COMPLETED: June 29, 2012
CLIENT: OCCIDENTIAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 721 ALEXANDER AVENUE SITE	FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE TOP OF RISER	10.94 10.40					
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34	NOT SAMPLED (0-45ft BGS) SEE 721-MW13-25 FOR STRATIGRAPHIC INFORMATION (0 TO 25ft BGS)						

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 8/24/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 721-MW13-50
PROJECT NUMBER: 072465-721	DATE COMPLETED: June 29, 2012
CLIENT: OCCIDENTIAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 721 ALEXANDER AVENUE SITE	FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
36			<p style="margin-top: 10px;">WELL DETAILS Screened interval: -32.66 to -37.66ft 43.60 to 48.60ft BGS Length: 5ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: -27.66 to -29.66ft 38.60 to 40.60ft BGS Material: BENTONITE PELLETS Sand Pack: -29.66 to -39.56ft 40.60 to 50.50ft BGS Material: SAND</p>				
38							
40							
42							
44							
46	SP-SAND, trace silt, fine to medium grained, loose, with red grains and white grains, moist, small shell fragments	-34.06					
48	- 1/4' silty sand, with clay and silt (found in clumps) at 48.0ft BGS				1RS		
50	END OF BOREHOLE @ 50.0ft BGS	-39.06					
52							
54							
56							
58							
60							
62							
64							
66							
68							

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 8/24/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 721-MW14-15
PROJECT NUMBER: 072465-721	DATE COMPLETED: June 26, 2012
CLIENT: OCCIDENTIAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 721 ALEXANDER AVENUE SITE	FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	
	GROUND SURFACE TOP OF RISER	11.34 10.83						
2	NOT SAMPLED (0-5ft BGS)		<p style="font-size: small;"> CONCRETE BENTONITE GROUT BENTONITE PELLETS SAND PACK SUMP </p>					
4								
6	SP-SAND, with silt, trace fine grained angular gravel, medium grained, well graded, loose, dark gray, with intermixed grains of varying colors, shell fragments and organic matter	6.34			1RS			
8								
10	- small amounts of strong petroleum odor at 10.0ft BGS				2RS			
12								
14								
16	END OF BOREHOLE @ 15.0ft BGS	-3.66						
18								
20								
22								
24								
26								
28								
30								
32								
34								

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/5/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WELL DETAILS
 Screened interval:
 6.64 to -3.36ft
 4.70 to 14.70ft BGS
 Length: 10ft
 Diameter: 2in
 Slot Size: 0.010
 Material: PVC
 Seal:
 10.64 to 8.64ft
 0.70 to 2.70ft BGS
 Material: BENTONITE PELLETS
 Sand Pack:
 8.64 to -5.16ft
 2.70 to 16.50ft BGS
 Material: SAND



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW14-25
 DATE COMPLETED: June 26, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE TOP OF RISER	11.33 10.97					
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34	<p>NOT SAMPLED (0-20ft BGS) SEE 721-MW14-15 FOR STRATIGRAPHIC INFORMATION (5 TO 15ft BGS)</p> <p>SP-SAND, with silt, trace clay, fine to medium grained, well graded, loose, gray, wet, shell fragments</p> <p>SM-SILTY SAND, with clay (in clumps), fine to medium grained, well graded, loose, dark gray, wet, shell fragments</p> <p>SP-SAND, with silt, trace clay, fine to medium grained, well graded, loose, gray, wet, shell fragments, some organic matter</p> <p>SP-SAND, with silt and clay (in clumps), fine to medium grained, well graded, loose, dark gray, wet, lots of shell fragments</p> <p>END OF BOREHOLE @ 25.0ft BGS</p> <p>NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 16.5FT BGS</p>	<p>-8.67</p> <p>-9.97</p> <p>-11.17</p> <p>-12.37</p> <p>-13.67</p>	<p>CONCRETE</p> <p>BENTONITE GROUT</p> <p>8" BOREHOLE</p> <p>BENTONITE PELLETS</p> <p>6" BOREHOLE SAND PACK</p> <p>SUMP</p> <p>WELL DETAILS Screened interval: -7.37 to -12.37ft 18.70 to 23.70ft BGS Length: 5ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: -3.37 to -5.37ft 14.70 to 16.70ft BGS Material: BENTONITE PELLETS Sand Pack: -5.37 to -14.17ft 16.70 to 25.50ft BGS</p>	1RS			

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 721-MW14-25
PROJECT NUMBER: 072465-721	DATE COMPLETED: June 26, 2012
CLIENT: OCCIDENTIAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 721 ALEXANDER AVENUE SITE	FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68			Material: SAND				

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW14-50
 DATE COMPLETED: June 27, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE TOP OF RISER	11.30 10.95					
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34	NOT SAMPLED (0-45ft BGS) SEE 721-MW14-25 FOR STRATIGRAPHIC INFORMATION (0 TO 25ft BGS)		<p style="font-size: small;"> CONCRETE 8" BOREHOLE BENTONITE GROUT 6" BOREHOLE </p>				

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 721-MW14-50
PROJECT NUMBER: 072465-721	DATE COMPLETED: June 27, 2012
CLIENT: OCCIDENTIAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 721 ALEXANDER AVENUE SITE	FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
36							
38							
40			BENTONITE PELLETS				
42							
44			SAND PACK				
46	SP-SAND, with silt and clay (found in clumps), fine grained, loose, well graded, dark gray, with red grains and white grains and black grains, wet	-33.70					
48	NO RECOVERY (46-50ft BGS)	-34.70		1RS			
50	END OF BOREHOLE @ 50.0ft BGS	-38.70	SUMP				
52	NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 20.0FT BGS		<p><u>WELL DETAILS</u> Screened interval: -32.40 to -37.40ft 43.70 to 48.70ft BGS Length: 5ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: -27.40 to -29.40ft 38.70 to 40.70ft BGS Material: BENTONITE PELLETS Sand Pack: -29.40 to -39.70ft 40.70 to 51.00ft BGS Material: SAND</p>				
54							
56							
58							
60							
62							
64							
66							
68							

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW15-15
 DATE COMPLETED: June 27, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE TOP OF RISER	11.20 10.78					
2	NOT SAMPLED (0-5ft BGS)		<p style="font-size: small;"> CONCRETE BENTONITE GROUT BENTONITE PELLETS SAND PACK SUMP </p>				
4							
6	SW-GRAVELLY SAND, trace silt, medium grained to granular sand, fine to coarse angular to rounded gravel, trace cobble, poorly graded, loose, gray, with red grains and white grains intermixed, wet, shell fragments, strong petroleum odor, LNAPL	6.20					
8	SP-SAND, trace silt and gravel, fine to medium grained sand, fine to medium angular to subangular gravel, well graded, loose, gray, with red grains and white grains, wet, shell fragments, strong petroleum odor, LNAPL	4.20		1RS		3.0	
10	NO RECOVERY (8-10ft BGS)	3.20					
12	SP-SAND, trace silt and gravel, fine to medium grained sand, fine angular to subangular gravel, well graded, loose, gray, with red grains and white grains, wet, shell fragments	1.20					
14	SP-SAND, with clay and silt (in clumps), fine to medium grained, low to non plastic, well graded, dark gray, with white grains and red grains, wet, strong petroleum odor, shell fragments	-1.80	2RS		5.0		
16	END OF BOREHOLE @ 15.0ft BGS	-3.80					
18							
20							
22							
24							
26							
28							
30							
32							
34							

WELL DETAILS
 Screened interval:
 6.30 to -3.70ft
 4.90 to 14.90ft BGS
 Length: 10ft
 Diameter: 2in
 Slot Size: 0.010
 Material: PVC
 Seal:
 10.30 to 8.30ft
 0.90 to 2.90ft BGS
 Material: BENTONITE PELLETS
 Sand Pack:
 8.30 to -5.80ft
 2.90 to 17.00ft BGS
 Material: SAND

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/17/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW15-25
 DATE COMPLETED: June 28, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	GROUND SURFACE TOP OF RISER	11.23 10.96					
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34	<p>NOT SAMPLED (0-20ft BGS) SEE 721-MW15-15 FOR STRATIGRAPHIC INFORMATION (5 TO 15ft BGS)</p> <hr/> <p>SP-SILTY SAND, trace gravel, loose, fine to medium grained, well sorted, gray, with red grains and white grains, wet, shell fragments and organics, slight petroleum odor</p> <hr/> <p>ML-CLAYEY SILT, with sand, loose, fine to medium sand, non plastic, gray, with red grains and white grains, wet, shell fragments, slight odor</p> <hr/> <p>SP-SAND, with silt, trace angular to subangular gravel, fine to medium sand, well sorted, gray, with red grains and white grains, wet, shell fragments, slight petroleum odor</p> <p>END OF BOREHOLE @ 25.0ft BGS</p> <p>NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 16.9FT BGS</p>	<p style="text-align: center;">-8.77</p> <p style="text-align: center;">-10.77 -11.27</p> <p style="text-align: center;">-13.77</p>	<p style="text-align: right;">CONCRETE</p> <p style="text-align: right;">BENTONITE GROUT</p> <p style="text-align: right;">8" BOREHOLE</p> <p style="text-align: right;">BENTONITE PELLETS</p> <p style="text-align: right;">6" BOREHOLE</p> <p style="text-align: right;">SAND PACK</p> <p style="text-align: right;">SUMP</p> <p>WELL DETAILS Screened interval: -7.67 to -12.67ft 18.90 to 23.90ft BGS Length: 5ft Diameter: 2in Slot Size: 0.010 Material: PVC Seal: -3.67 to -5.67ft 14.90 to 16.90ft BGS Material: BENTONITE PELLETS Sand Pack: -5.67 to -14.27ft 16.90 to 25.50ft BGS</p>	1RS			

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 721-MW15-25
PROJECT NUMBER: 072465-721	DATE COMPLETED: June 28, 2012
CLIENT: OCCIDENTIAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 721 ALEXANDER AVENUE SITE	FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68			Material: SAND				

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 721-MW15-50
PROJECT NUMBER: 072465-721	DATE COMPLETED: June 28, 2012
CLIENT: OCCIDENTIAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 721 ALEXANDER AVENUE SITE	FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
	TOP OF CASING GROUND SURFACE TOP OF RISER	11.31 11.30 10.92					
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 20px;">2</div> <div style="margin-bottom: 20px;">4</div> <div style="margin-bottom: 20px;">6</div> <div style="margin-bottom: 20px;">8</div> <div style="margin-bottom: 20px;">10</div> <div style="margin-bottom: 20px;">12</div> <div style="margin-bottom: 20px;">14</div> </div>	NOT SAMPLED - SEE 721-MW15 (BH) FOR STRATIGRAPHIC INFORMATION (0 TO 50ft BGS)						

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW15-50
 DATE COMPLETED: June 28, 2012
 DRILLING METHOD: SONIC
 FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
16							
18							
20							
22							
24							
26							
28							

OVERBURDEN LOG 072465-721\WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 721-MW15-50
PROJECT NUMBER: 072465-721	DATE COMPLETED: June 28, 2012
CLIENT: OCCIDENTIAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 721 ALEXANDER AVENUE SITE	FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 20px;">32</div> <div style="margin-bottom: 20px;">34</div> <div style="margin-bottom: 20px;">36</div> <div style="margin-bottom: 20px;">38</div> <div style="margin-bottom: 20px;">40</div> <div style="margin-bottom: 20px;">42</div> <div style="margin-bottom: 20px;">44</div> </div>			<p style="text-align: right; margin-right: 50px;">BENTONITE PELLETS</p> <p style="text-align: right; margin-right: 50px;">SAND PACK</p>				

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 721-MW15-50
PROJECT NUMBER: 072465-721	DATE COMPLETED: June 28, 2012
CLIENT: OCCIDENTIAL CHEMICAL CORPORATION	DRILLING METHOD: SONIC
LOCATION: 721 ALEXANDER AVENUE SITE	FIELD PERSONNEL: T. HABBERFIELD

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	'N' VALUE
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 20px;">46</div> <div style="margin-bottom: 20px;">48</div> <div style="margin-bottom: 20px;">50</div> <div style="margin-bottom: 20px;">52</div> <div style="margin-bottom: 20px;">54</div> <div style="margin-bottom: 20px;">56</div> <div style="margin-bottom: 20px;">58</div> </div>	<p>END OF BOREHOLE @ 50.0ft BGS</p> <p>NOTE: ISOLATION CASING USED DURING ADVANCEMENT TO 25.0FT BGS</p>	<p>-38.70</p>	<p style="text-align: right; margin-right: 20px;">SUMP</p>				

WELL DETAILS
 Screened interval:
 -32.60 to -37.60ft
 43.90 to 48.90ft BGS
 Length: 5ft
 Diameter: 2in
 Slot Size: 0.010
 Material: PVC
 Seal:
 -27.60 to -29.60ft
 38.90 to 40.90ft BGS
 Material: BENTONITE PELLETS
 Sand Pack:
 -29.60 to -39.20ft
 40.90 to 50.50ft BGS
 Material: SAND

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 11/6/12



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.	HOLE DESIGNATION: 721-MW16 (BH)
PROJECT NUMBER: 072465-721	DATE COMPLETED: June 6, 2012
CLIENT: OCCIDENTIAL CHEMICAL CORPORATION	DRILLING METHOD: GEOPROBE
LOCATION: 721 ALEXANDER AVENUE SITE	FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 5px;">2</div> <div style="margin-bottom: 5px;">4</div> <div style="margin-bottom: 5px;">6</div> <div style="margin-bottom: 5px;">8</div> <div style="margin-bottom: 5px;">10</div> <div style="margin-bottom: 5px;">12</div> <div style="margin-bottom: 5px;">14</div> <div style="margin-bottom: 5px;">16</div> <div style="margin-bottom: 5px;">18</div> <div style="margin-bottom: 5px;">20</div> <div style="margin-bottom: 5px;">22</div> <div style="margin-bottom: 5px;">24</div> </div>	<p>SEE BH-5 FOR STRATIGRAPHIC DETAIL FROM 0-25FT BGS</p>		<p style="margin-left: 20px;">← BACKFILLED WITH BENTONITE CHIPS</p>					
26	CL-SILTY CLAY, trace very fine sand, soft, low plasticity, light gray, very moist, sand to medium gravel size shell fragments	25.00						
28	SP-SAND, trace silt, loose, fine grained, well graded, gray, with red grains and white grains, wet, sand size shell fragments	27.30		6GP		4.8		0.0
30	SM-SAND, with silt, loose, very fine grained, gray, with red grains and white grains, wet, sand size shell fragments	29.40						
32	ML-CLAYEY SILT, trace fine sand, loose, slight plasticity, light gray, wet, sand to fine gravel size shell fragments, wood fragments	30.30						
34	SM-SILTY SAND, loose, fine grained, gray, with red grains and white grains, wet, sand size shell fragments, wood fragments occasionally	32.40		7GP		4.8		0.0

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/25/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: COMPREHENSIVE SUPPLEMENTAL INVEST.
 PROJECT NUMBER: 072465-721
 CLIENT: OCCIDENTIAL CHEMICAL CORPORATION
 LOCATION: 721 ALEXANDER AVENUE SITE

HOLE DESIGNATION: 721-MW16 (BH)
 DATE COMPLETED: June 6, 2012
 DRILLING METHOD: GEOPROBE
 FIELD PERSONNEL: N. EVANS

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
36	concentrated in layers - with clay at 36.0ft BGS - 1.5' cedar log layer, strong odor at 37.0ft BGS			8GP		3.6		108
40	SP-SAND, trace silt, loose, fine gravel, well graded, gray to dark gray, with red grains and white grains, wet, sand size shell fragments - 0.01' silty clay at 41.9ft BGS	40.00		9GP		4.4		0.0
48	- 1.0' fine to coarse grained, poorly graded at 47.2ft BGS			10GP		4.1		0.0
50	- 0.02' layer silty clay at 50.4ft BGS			11GP		3.0		0.0
55	NO INTACT SAMPLE, SP-SAND MATERIAL RECOVERED	55.00		12GP		1.5		0.0
60	SP-SAND, trace silt, loose, fine gravel, well graded, gray to dark gray, with red grains and white grains, wet, sand size shell fragments	60.00		13GP		4.5		0.0
64	- 0.5' silty, very fine grained sand at 64.1ft BGS			14GP		3.0		0.0
68	- REFUSAL at 68.0ft BGS END OF BOREHOLE @ 68.0ft BGS	68.00						0.0

OVERBURDEN LOG 072465-721WIN.GPJ CRA_CORP.GDT 9/25/12

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation
 PROJECT NUMBER: 07843
 CLIENT: Occidental Chemical Corporation
 LOCATION: Alexander Avenue Site
 Tacoma, Washington

HOLE DESIGNATION: 721-MW5-15
 DATE COMPLETED: June 28, 2004
 DRILLING METHOD: HSA
 FIELD PERSONNEL: C. Cameron

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS		
	GROUND SURFACE TOP OF RISER	11.48 10.94							
2	0-16.5' BGS - See Log from 721-MW5-50 for Stratigraphy	-5.02	<p><u>WELL DETAILS</u> Screened interval: 1.48 to -3.52ft NGVD 10.00 to 15.00ft BGS Length: 5ft Diameter: 2in Slot Size: 10 Material: PVC</p>						
4									
6									
8									
10									
12									
14									
16									
18				END OF BOREHOLE @ 16.5ft BGS					
20									
22									
24									
26									
28									
30									
32									
34									

OVERBURDEN LOG 007843_ORIGINAL.GPJ CRA_CORP.GDT 10/6/09

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation

HOLE DESIGNATION: 721-MW5-25

PROJECT NUMBER: 07843

DATE COMPLETED: June 28, 2004

CLIENT: Occidental Chemical Corporation

DRILLING METHOD: HSA

LOCATION: Alexander Avenue Site
Tacoma, Washington

FIELD PERSONNEL: C. Cameron

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS
	GROUND SURFACE TOP OF RISER	11.47 10.82					
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34	OVERBURDEN (not sampled) (see Overburden stratigraphy for well 721-MW5-50)		<p>WELL DETAILS Screened interval: -8.53 to -13.53ft NGVD 20.00 to 25.00ft BGS Length: 5ft Diameter: 2in Slot Size: 10 Material: PVC</p>				
	END OF BOREHOLE @ 26.5ft BGS	-15.03					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 007843_ORIGINAL.GPJ CRA_CORP.GDT 10/6/09



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation

HOLE DESIGNATION: 721-MW5-50

PROJECT NUMBER: 07843

DATE COMPLETED: June 28, 2004

CLIENT: Occidental Chemical Corporation

DRILLING METHOD: HSA

LOCATION: Alexander Avenue Site

FIELD PERSONNEL: J. Williams

Tacoma, Washington

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS	PID (ppm)
	GROUND SURFACE TOP OF RISER	11.39 11.02						
2	FILL, sand, fine grained, subangular GRAVEL, brown and gray, dry SP-fine to medium SAND, dark brown, dry	11.09	CONCRETE	SS1	X	1.5	30	0
4	GP/SP-fine to medium SAND and subangular to subrounded GRAVEL, trace silt, dark brown and gray, dry	7.29 6.49	2"Ø PVC RISER	SS2 * SS3 *	X X	1.9 1.4	32 14	0 0
6	SP-fine to medium SAND, dark brown, dry SP-SAND, fine grained, black with some red grains, wet, chemical odor (NATIVE)	5.39	CEMENT/ BENTONITE GROUT	SS4 *	X	1.6	7	63.1
8				SS5	X	1.7	7	286
10				SS6	X	2.0	8	23.1
12	- silt lense (ML), dark gray, wet 11.5 to 11.7 ft BGS - silt lense (ML), dark gray, wet 12.5 to 12.55 ft BGS		8"Ø BOREHOLE	SS7	X	2.0	9	4
14	- shell fragments 13.8 to 14.0 ft BGS - some silt @ 14.4 ft BGS			SS8	X	1.5	7	6.7
16	- silt lense (ML), little clay, soft, dark gray, wet 16.0 to 16.9 ft BGS			SS9 *	X	2.0	7	0
18	- silt lense (ML), dark gray, wet 17.9 to 18.0 ft BGS			SS10	X	2.0	2	0
20				SS11	X	1.7	6	0
22	ML-SILT, trace fine sand and clay, dark gray, soft, wet - sand lense (SP), fine to medium grained, black, dry 21.3 to 21.4 ft BGS	-9.21 -10.51 -10.81		SS12	X	2.0	23	1.9
24	SP-fine to medium SAND, black, wet ML-SILT, trace clay, dark gray, wet			SS13 *	X	2.0	3	0
26	SM-SAND, some silt and shell fragments, fine grained, dark gray, wet	-13.71		SS14	X	2.0	12	0
28	SP-SAND, fine grained, black with some red grains, wet SM-SAND, some silt and shell fragments, fine grained, dark gray, wet	-16.31 -16.61		SS15	X	2.0	21	0
30	SP-SAND, fine grained, black with some red grains, wet	-18.01 -18.61		SS16	X	2.0	4	0
32	SM-SAND, some silt and shell fragments, fine grained, dark gray, wet ML-SILT, trace fine sand and clay, dark gray, soft, wet	-19.61 -22.01		SS17	X	2.0	9	0
34	SP-SAND, little to some silt, fine grained, black with some red grains, wet				X			

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WATER FOUND ∇

CHEMICAL ANALYSIS ○

OVERBURDEN LOG 007843 ORIGINAL.GPJ CRA_CORP.GDT 10/6/09



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation

HOLE DESIGNATION: 721-MW5-50

PROJECT NUMBER: 07843

DATE COMPLETED: June 28, 2004

CLIENT: Occidental Chemical Corporation

DRILLING METHOD: HSA

LOCATION: Alexander Avenue Site

FIELD PERSONNEL: J. Williams

Tacoma, Washington

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS	PID (ppm)	
36	- some shell fragments from 34.0 to 34.5 ft BGS			SS18	X	2.0	5	0	
				SS19	X	2.0	11	0	
38				SS20	X	2.0	27	0	
40				SS21	X	2.0	35	0	
42	- silt seam (ML), dark gray, wet 41.3 to 41.4 ft BGS			SS22	X	2.0	33	0	
	SM-SAND, some silt and shell fragments, fine grained, dark gray, wet	-30.81							
	SP-fine to medium SAND, black with some red grains, wet	-32.61							
44	SM-SAND, some silt and shell fragments, fine grained, dark gray, wet	-33.61							
46	SP-medium SAND, black with some red grains, wet								
48	- with trace subangular gravel and shell fragments from 46.0 to 48.0 ft BGS								
	- silt seam (ML), little clay, dark gray to buff, wet 48.5 to 48.55 ft BGS								
50	- silt seam (ML), little clay, dark gray to buff, wet 49.1 to 49.15 ft BGS	-38.61							
	END OF BOREHOLE @ 50.0ft BGS								
52	* - Sample collected by Port of Tacoma for chemical analysis.								
54	*h - Sample collected by Port of Tacoma and held for analysis.								
56									
58									
60									
62									
64									
66									
68									

WELL DETAILS
 Screened interval:
 -32.61 to -37.61ft NGVD
 44.00 to 49.00ft BGS
 Length: 5ft
 Diameter: 2in
 Slot Size: 10
 Material: PVC

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
 WATER FOUND ▽
 CHEMICAL ANALYSIS ○

OVERBURDEN LOG 007843_ORIGINAL.GPJ CRA_CORP.GDT 10/6/09



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation
PROJECT NUMBER: 07843
CLIENT: Occidental Chemical Corporation
LOCATION: Alexander Avenue Site
Tacoma, Washington

HOLE DESIGNATION: 721-MW6-15
DATE COMPLETED: July 1, 2004
DRILLING METHOD: HSA
FIELD PERSONNEL: C. Cameron

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS
	GROUND SURFACE TOP OF RISER	11.30 10.87					
0-16.5'	BGS - See Log from 721-MW6-50 for Stratigraphy		<p>WELL DETAILS Screened interval: 1.30 to -3.70ft NGVD 10.00 to 15.00ft BGS Length: 5ft Diameter: 2in Slot Size: 10 Material: PVC</p>				
16.5'	END OF BOREHOLE @ 16.5ft BGS	-5.20					

OVERBURDEN LOG 007843_ORIGINAL.GPJ CRA_CORP.GDT 10/6/09

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation
 PROJECT NUMBER: 07843
 CLIENT: Occidental Chemical Corporation
 LOCATION: Alexander Avenue Site
 Tacoma, Washington

HOLE DESIGNATION: 721-MW6-25
 DATE COMPLETED: July 1, 2004
 DRILLING METHOD: HSA
 FIELD PERSONNEL: C. Cameron

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS
	GROUND SURFACE TOP OF RISER	11.27 10.38					
0-26.5'	BGS - See Log from 721-MW6-50 for Stratigraphy		<p>CONCRETE 2" PVC RISER CEMENT/BENTONITE GROUT 8" BOREHOLE BENTONITE SAND PACK 2" PVC SCREEN 2" PVC SUMP</p> <p>WELL DETAILS Screened interval: -8.73 to -13.73ft NGVD 20.00 to 25.00ft BGS Length: 5ft Diameter: 2in Slot Size: 10 Material: PVC</p>				
26.5'	END OF BOREHOLE @ 26.5ft BGS	-15.23					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 007843_ORIGINAL.GPJ CRA_CORP.GDT 10/6/09



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation
 PROJECT NUMBER: 07843
 CLIENT: Occidental Chemical Corporation
 LOCATION: Alexander Avenue Site
 Tacoma, Washington

HOLE DESIGNATION: 721-MW6-50
 DATE COMPLETED: July 1, 2004
 DRILLING METHOD: HSA
 FIELD PERSONNEL: C. Cameron/J. Williams

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS	PID (ppm)
	GROUND SURFACE TOP OF RISER	11.18 10.59						
2	FILL, fine to medium sand, some gravel, dark brown, dry - same with some silt and little gravel - strong odor from 0.8 to 2.0 ft BGS		CONCRETE	SS1	X	1.9	25	67
4			2"Ø PVC RISER	SS2	X	1.7	28	220
6		5.18		SS3	X	1.5	12	72
8	SP-SAND, trace silt, fine grained, black, moist - silt seam, trace clay, dark gray, moist 6.5 to 6.7 ft BGS - wet		CEMENT/ BENTONITE GROUT	SS4	X	1.7	6	1016
10				SS5	X	1.4	6	1880
12			8"Ø BOREHOLE	SS6	X	0.7	6	89.4
14	- same with some silt and shell fragments 13.0 to 13.5 ft BGS - minor silt and shell fragments from 14.0 to 15.9 ft BGS			SS7	X	2.0	4	20.2
16	- silt seam, little fine sand, dark brown, wet 15.9 to 16.0 ft BGS			SS8	X	1.7	4	34.7
18	ML-SILT, some clay, dark gray, soft, wet	-5.32		SS9	X	2.0	4	9.3
20	SM-SAND, some silt, fine grained, black, wet	-6.32		SS10	X	2.0	1	8.8
22	- silt seam, little fine sand, dark gray, wet 19.6 to 20.0 ft BGS - silt seam, little fine sand, dark gray, wet, @ 20.7 to 20.8 ft BGS			SS11	X	1.7	17	50.5
24	- silt seam, little fine sand, dark gray, wet 22.3 to 22.5 ft BGS - silt seam, little fine sand, dark gray, wet 23.7 to 23.9 ft BGS			SS12	X	1.9	7	0
26	ML-SILT, little clay and fine sand, trace shell fragments, dark gray, firm, wet	-13.02		SS13	X	2.0	1	0
28	SP-fine to medium SAND, black with some red grains, wet	-14.82 -15.32		SS14	X	2.0	5	5.5
30	ML-SILT, some fine sand and shell fragments, dark gray, soft, wet	-16.52		SS15	X	2.0	7	.7
32	SP-fine to medium SAND, trace shell fragments, black, wet - same with some silt and shell fragments from 28.4 to 29.2 ft BGS - silt seam, little clay, firm, dark gray, wet 29.7 to 30.0 ft BGS	-19.32		SS16	X	2.0	7	1.2
34	ML-SILT, trace clay, dark gray, firm, moist SM-SAND, some silt and shell fragments, fine grained, dark gray, firm, moist - silt seam, trace clay, dark gray, soft, wet 34.0 to 34.3 ft BGS	-20.82		SS17	X	1.2	6	17
				SS18	X	1.7	11	7

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
 WATER FOUND ∇

OVERBURDEN LOG 007843 ORIGINAL.GPJ CRA_CORP.GDT 10/6/09



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation
 PROJECT NUMBER: 07843
 CLIENT: Occidental Chemical Corporation
 LOCATION: Alexander Avenue Site
 Tacoma, Washington

HOLE DESIGNATION: 721-MW6-50
 DATE COMPLETED: July 1, 2004
 DRILLING METHOD: HSA
 FIELD PERSONNEL: C. Cameron/J. Williams

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS	PID (ppm)	
36	- shells present from 35.0 to 36.0 ft BGS								
38	- sand grades to medium grained @ 37.7 ft BGS			SS19	2.0	8	7		
40	- silt seam, some clay, gray, soft, wet 37.9 to 38.0 ft BGS		BENTONITE	SS20	2.0	24	25		
42	- silt seam, gray, wet 38.9 to 39.1 ft BGS		2"Ø PVC RISER	SS21	1.5	17	7		
44	- sand becomes dark brown @ 39.1 ft BGS		SAND PACK	SS22	1.5	19	9		
46			8"Ø BOREHOLE	SS23	0.9	21	0		
48	- silt seam, gray, wet 47.8 to 47.9 ft BGS		2"Ø PVC SCREEN	SS24	1.1	16	0		
50	Not Sampled	-38.82	2"Ø PVC SUMP	SS25	0.1	15	0		
52	END OF BOREHOLE @ 51.5ft BGS	-40.32	<p>WELL DETAILS Screened interval: -33.82 to -38.82ft NGVD 45.00 to 50.00ft BGS Length: 5ft Diameter: 2in Slot Size: 10 Material: PVC</p>						
54									
56									
58									
60									
62									
64									
66									
68									

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
 WATER FOUND ▼

OVERBURDEN LOG 007843_ORIGINAL.GPJ CRA_CORP.GDT 10/6/09



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation
 PROJECT NUMBER: 07843
 CLIENT: Occidental Chemical Corporation
 LOCATION: Alexander Avenue Site
 Tacoma, Washington

HOLE DESIGNATION: 721-MW7-15
 DATE COMPLETED: June 30, 2004
 DRILLING METHOD: HSA
 FIELD PERSONNEL: C. Cameron

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS	PID (ppm)
	GROUND SURFACE TOP OF RISER	11.19 10.72						
2	FILL, fine to medium sand, some silt, trace gravel, brown, dry		<p style="font-size: small; margin-top: 10px;">WELL DETAILS Screened interval: 1.19 to -3.81ft NGVD 10.00 to 15.00ft BGS Length: 5ft Diameter: 2in Slot Size: 10 Material: PVC</p>	SS1	X	1.5	24	90
4	- same with some gravel and silt			SS2	X	1.6	35	50
6	- becoming moist			SS3	X	1.1	15	17
8		3.19		SS4	X	1.4	10	22
10	SP-fine to medium SAND, trace silt, dark brown, wet, strong hydrocarbon odor			SS5	X	1.5	9	600
12	- silt seam (ML) 10.5 to 10.6 ft BGS			SS6	X	2.0	6	10
14				SS7	X	1.9	9	4
16	- silt seam (ML) 14.9 to 15.1 ft BGS	-3.91		SS8	X	2.0	27	10
16	ML-SILT, some clay, little sand, gray, medium plasticity, wet	-4.81						
16	Not Sampled	-5.31						
16	END OF BOREHOLE @ 16.5ft BGS							
18								
20								
22								
24								
26								
28								
30								
32								
34								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
 WATER FOUND ▼

OVERBURDEN LOG 007843_ORIGINAL.GPJ CRA_CORP.GDT 10/6/09



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation
 PROJECT NUMBER: 07843
 CLIENT: Occidental Chemical Corporation
 LOCATION: Alexander Avenue Site
 Tacoma, Washington

HOLE DESIGNATION: 721-MW8-15
 DATE COMPLETED: June 30, 2004
 DRILLING METHOD: HSA
 FIELD PERSONNEL: C. Cameron

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS	PID (ppm)
	GROUND SURFACE TOP OF RISER	11.02 10.50						
2	FILL, sand and gravel, trace silt, brown, dry - same with shell fragments			SS1	X	1.9	25	350
4	- becoming moist			SS2	X	2.0	31	77
6				SS3	X	1.5	9	25
8	SP-fine to medium SAND, trace silt, dark gray to black, moist (NATIVE) - becoming wet	3.52		SS4	X	1.5	6	250
10	- silt seam (ML) 10.8 to 10.9 ft BGS			SS5	X	2.0	6	1514
12	- silt seam (ML), dark brown, moist 13.0 to 13.1 ft BGS			SS6	X	1.5	5	1900
14				SS7	X	2.0	9	1200
16	ML-SILT, trace clay and shell fragments, gray, moist Not Sampled	-3.98 -4.98 -5.48		SS8	X	2.0	28	38
18	END OF BOREHOLE @ 16.5ft BGS							
20								
22								
24								
26								
28								
30								
32								
34								

WELL DETAILS

Screened interval:
 1.02 to -3.98ft NGVD
 10.00 to 15.00ft BGS
 Length: 5ft
 Diameter: 2in
 Slot Size: 10
 Material: PVC

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
 WATER FOUND ∇

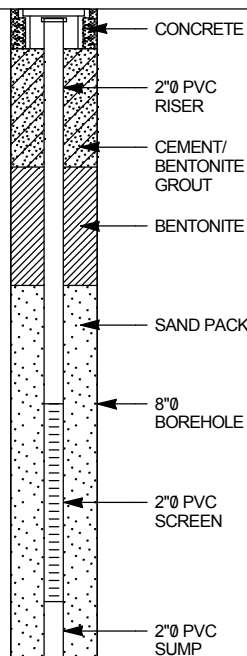
OVERBURDEN LOG 007843_ORIGINAL.GPJ CRA_CORP.GDT 10/6/09



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation
 PROJECT NUMBER: 07843
 CLIENT: Occidental Chemical Corporation
 LOCATION: Alexander Avenue Site
 Tacoma, Washington

HOLE DESIGNATION: 721-MW9-15
 DATE COMPLETED: June 30, 2004
 DRILLING METHOD: HSA
 FIELD PERSONNEL: C. Cameron

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS
	GROUND SURFACE TOP OF RISER	11.37 10.77					
2	0-16.5' BGS - See Log from 721-MW9-50 for Stratigraphy		 <p style="margin-top: 10px;"><u>WELL DETAILS</u> Screened interval: 1.37 to -3.63ft NGVD 10.00 to 15.00ft BGS Length: 5ft Diameter: 2in Slot Size: 10 Material: PVC</p>				
4							
6							
8							
10							
12							
14							
16							
18							
20							
22							
24							
26							
28							
30							
32							
34							
	END OF BOREHOLE @ 16.5ft BGS	-5.13					

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

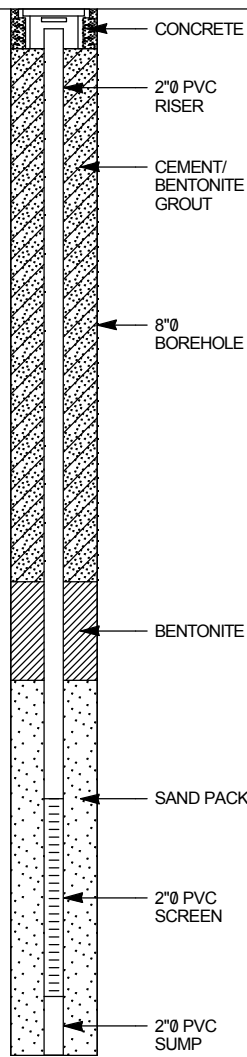
OVERBURDEN LOG 007843_ORIGINAL.GPJ CRA_CORP.GDT 10/6/09



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation
PROJECT NUMBER: 07843
CLIENT: Occidental Chemical Corporation
LOCATION: Alexander Avenue Site
Tacoma, Washington

HOLE DESIGNATION: 721-MW9-25
DATE COMPLETED: June 29, 2004
DRILLING METHOD: HSA
FIELD PERSONNEL: C. Cameron

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE					
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS		
	GROUND SURFACE TOP OF RISER	11.40 10.49							
0-26.5'	0-26.5' BGS - See Log from 721-MW9-50 for Stratigraphy		 <p>CONCRETE 2" PVC RISER CEMENT/ BENTONITE GROUT 8" BOREHOLE BENTONITE SAND PACK 2" PVC SCREEN 2" PVC SUMP</p>						
	END OF BOREHOLE @ 26.5ft BGS	-15.10	<p><u>WELL DETAILS</u> Screened interval: -8.60 to -13.60ft NGVD 20.00 to 25.00ft BGS Length: 5ft Diameter: 2in Slot Size: 10 Material: PVC</p>						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 007843_ORIGINAL.GPJ CRA_CORP.GDT 10/6/09



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation
 PROJECT NUMBER: 07843
 CLIENT: Occidental Chemical Corporation
 LOCATION: Alexander Avenue Site
 Tacoma, Washington

HOLE DESIGNATION: 721-MW9-50
 DATE COMPLETED: June 29, 2004
 DRILLING METHOD: HSA
 FIELD PERSONNEL: J. Williams/C. Cameron

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS	PID (ppm)
	GROUND SURFACE TOP OF RISER	11.40 10.94						
2	FILL, medium to coarse sand and angular to rounded GRAVEL, little silt, brown, dry SP-fine to medium SAND, little gravel, dark brown, dry	10.60		SS1	X	1.7	28	0
4	SP-fine to medium SAND, trace silt, dark brown, dry - slag fragment @ 4.0 to 4.1 ft BGS	8.70 7.40		SS2	X	1.5	36	0
6	SM-fine to medium SAND, some silt and subrounded gravel, brown, dry	5.40		SS3*	O	0.9	9	0
8	SP-SAND, trace silt, fine grained, black with some red grains, moist (NATIVE) - wet, chemical odor			SS4	X	0.9	9	0
10				SS5*	O	1.5	4	773
12				SS6	X	1.6	8	1721
14	- silt seam (ML) 13.1 to 13.15 ft BGS - silt seam (ML) 13.6 to 13.65 ft BGS			SS7*	O	1.9	8	823
16	- silt seam (ML) 15.95 to 16.0 ft BGS - silt seam (ML) 16.2 to 16.3 ft BGS			SS8	X	2.0	5	842
18	SM-SAND and SILT, trace clay, fine grained, dark gray, wet CL-CLAY, some silt, dark gray, soft, low plasticity, wet	-4.90 -5.60 -6.10 -6.60 -7.30		SS9	X	1.9	7	0
20	SP-fine to medium SAND, trace silt, black with some red grains, wet CL-CLAY, some silt, dark gray, soft, medium plasticity, wet			SS10	X	2.0	8	0
22	SP-fine to medium SAND, little silt, trace shell fragments, black with some red grains, wet - with some silt 20.0 to 20.5 ft BGS			SS11	X	1.4	15	0
24	- becoming medium to coarse grained, trace silt - silt seam (ML), some clay, soft, dark gray, wet 23.2 to 23.4 ft BGS	-12.90		SS12	X	2.0	8	1.5
26	SM-fine to medium SAND, some silt and shell fragments, dark gray, wet			SS13	X	2.0	2	0
28	SP-fine to medium SAND, black with some red grains, wet - silt seam (ML), dark gray, wet 28.5 to 28.6 ft BGS	-16.00		SS14	X	1.8	9	0
30	- silt seam (ML), dark gray, wet 29.3 to 29.4 ft BGS			SS15	X	1.7	25	0
32	- silt seam (ML), dark gray, soft, some clay, wet 30.0 to 30.3 ft BGS - silt seam (ML), dark gray, little fine sand, wet 31.4 to 31.45 ft BGS			SS16	X	1.7	21	0
34	- with some silt from 34.3 to 36.0 ft BGS			SS17	X	1.4	25	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
 WATER FOUND ∇
 CHEMICAL ANALYSIS ○

OVERBURDEN LOG 007843 ORIGINAL.GPJ CRA_CORP.GDT 10/6/09

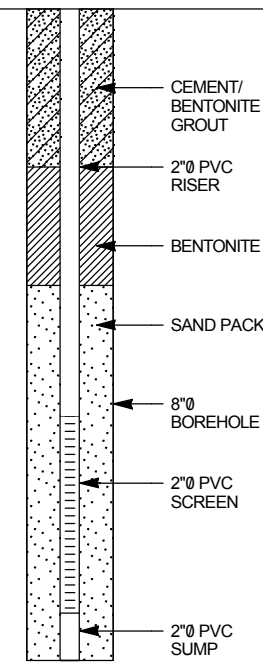


STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation
 PROJECT NUMBER: 07843
 CLIENT: Occidental Chemical Corporation
 LOCATION: Alexander Avenue Site
 Tacoma, Washington

HOLE DESIGNATION: 721-MW9-50
 DATE COMPLETED: June 29, 2004
 DRILLING METHOD: HSA
 FIELD PERSONNEL: J. Williams/C. Cameron

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS	PID (ppm)
36				SS18		1.8	23	0
	ML-SILT, some fine sand, dark gray, wet	-25.50		SS19		2.0	11	0
38				SS20		1.9	4	0
	ML-SILT, some clay, dark gray, wet, firm	-27.80		SS21		1.7	10	0
40				SS22		1.8	21	0
	SP-SAND, little silt, fine grained, black, wet	-29.60		SS23		1.8	15	0
42	ML-SILT, some fine sand, black, wet	-30.00		SS24		2.0	8	0
	SP-SAND, fine grained, black, wet	-31.30		SS25		1.8	4	0
44	- little to some silt @ 43.9 ft BGS							
46								
	ML-SILT, trace clay, dark gray, wet	-36.00						
48	SM-SAND, some silt, fine grained, dark gray, wet	-36.60						
	ML-SILT, little clay, dark gray, moist	-37.80						
50	SP-SAND, trace silt, fine grained, black, wet	-38.40						
	Not Sampled	-38.60						
52	END OF BOREHOLE @ 51.5ft BGS	-40.10						
54	* - Sample collected by Port of Tacoma for chemical analysis.							
56								
58								
60								
62								
64								
66								
68								



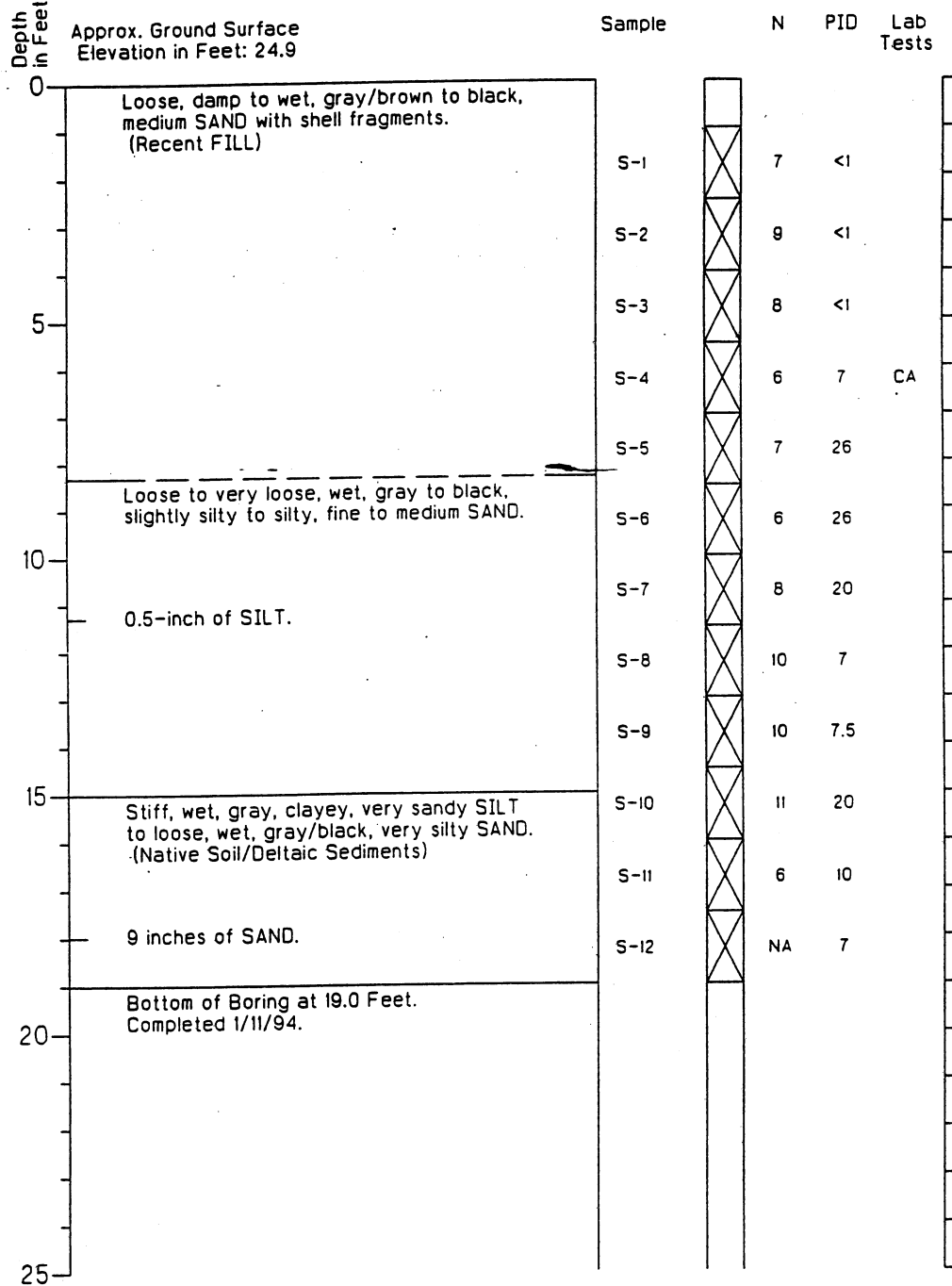
WELL DETAILS
 Screened interval:
 -33.90 to -38.90ft NGVD
 45.30 to 50.30ft BGS
 Length: 5ft
 Diameter: 2in
 Slot Size: 10
 Material: PVC

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
 WATER FOUND ▽
 CHEMICAL ANALYSIS ○

OVERBURDEN LOG 007843_ORIGINAL.GPJ CRA_CORP.GDT 10/6/09

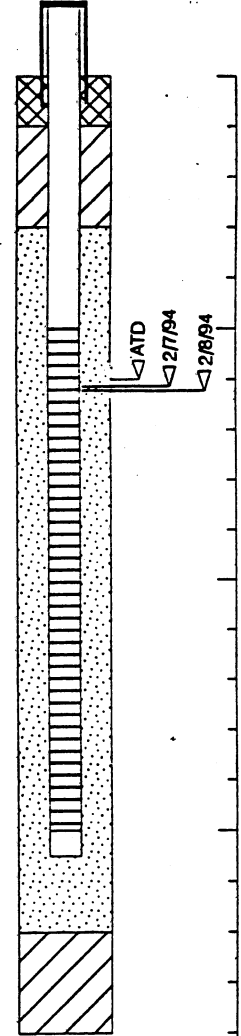
Boring Log and Construction Data for Monitoring Well MW-1

Geologic Log



Monitoring Well Design

Casing Stickup in Feet: 2.8
Top of PVC in Feet 27.7



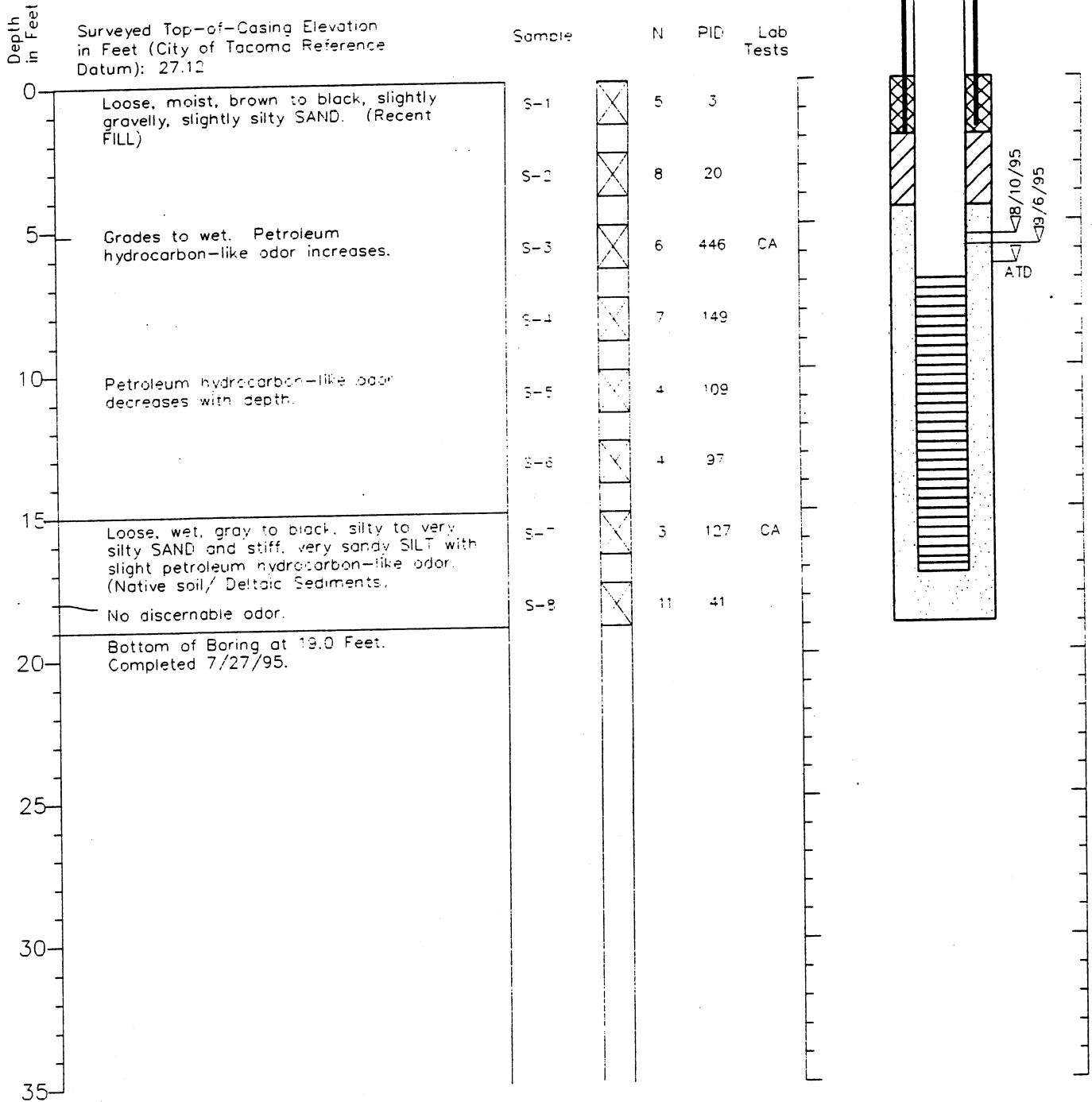
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
4. Reference Elevation Datum - Port of Tacoma (mean lower low water)
High Tide - 2/7/94
Low Tide - 2/8/94

Boring Log and Construction Data for Monitoring Well MW-10

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 3.0



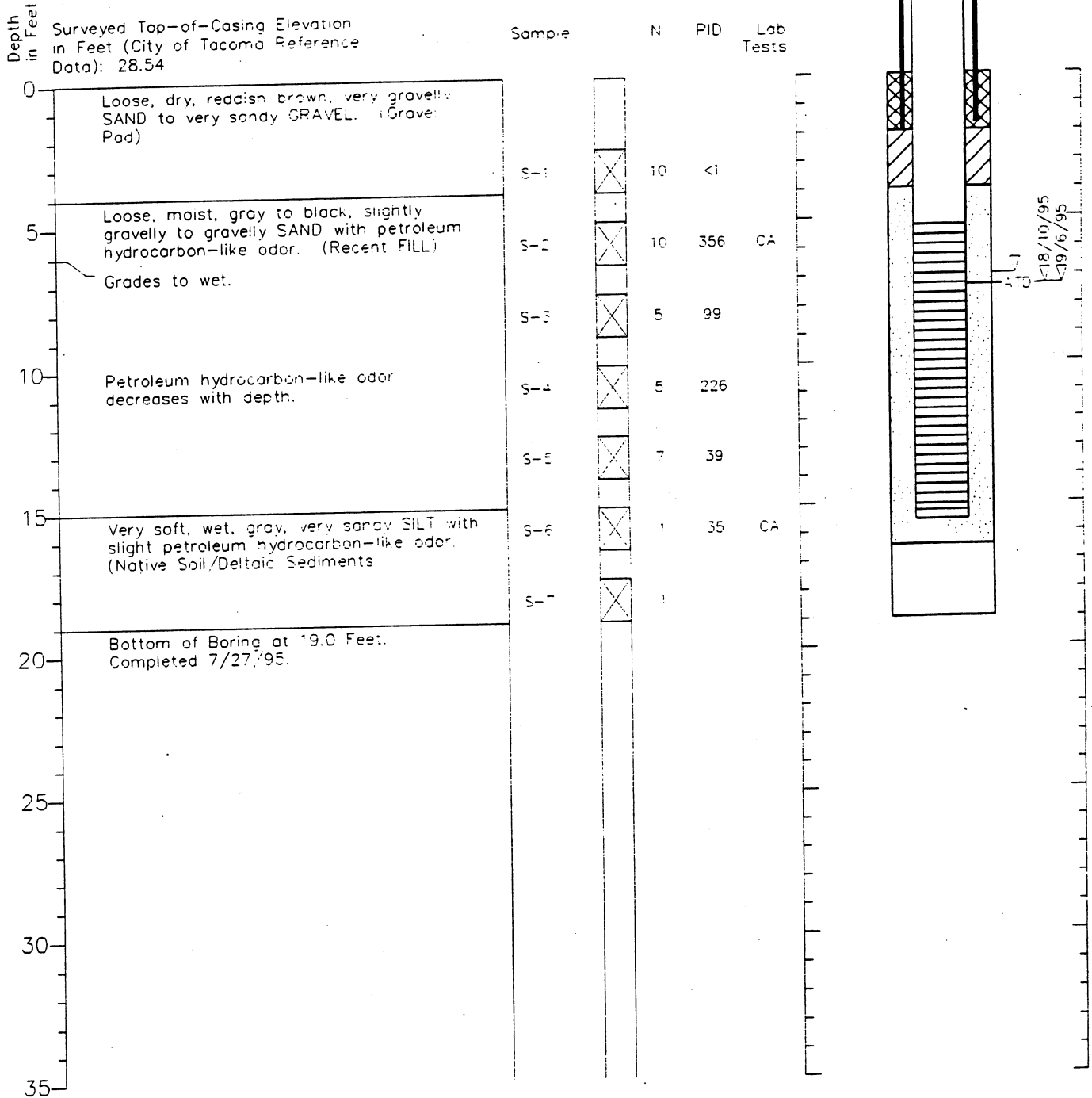
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

Boring Log and Construction Data for Monitoring Well MW-11

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 3.0



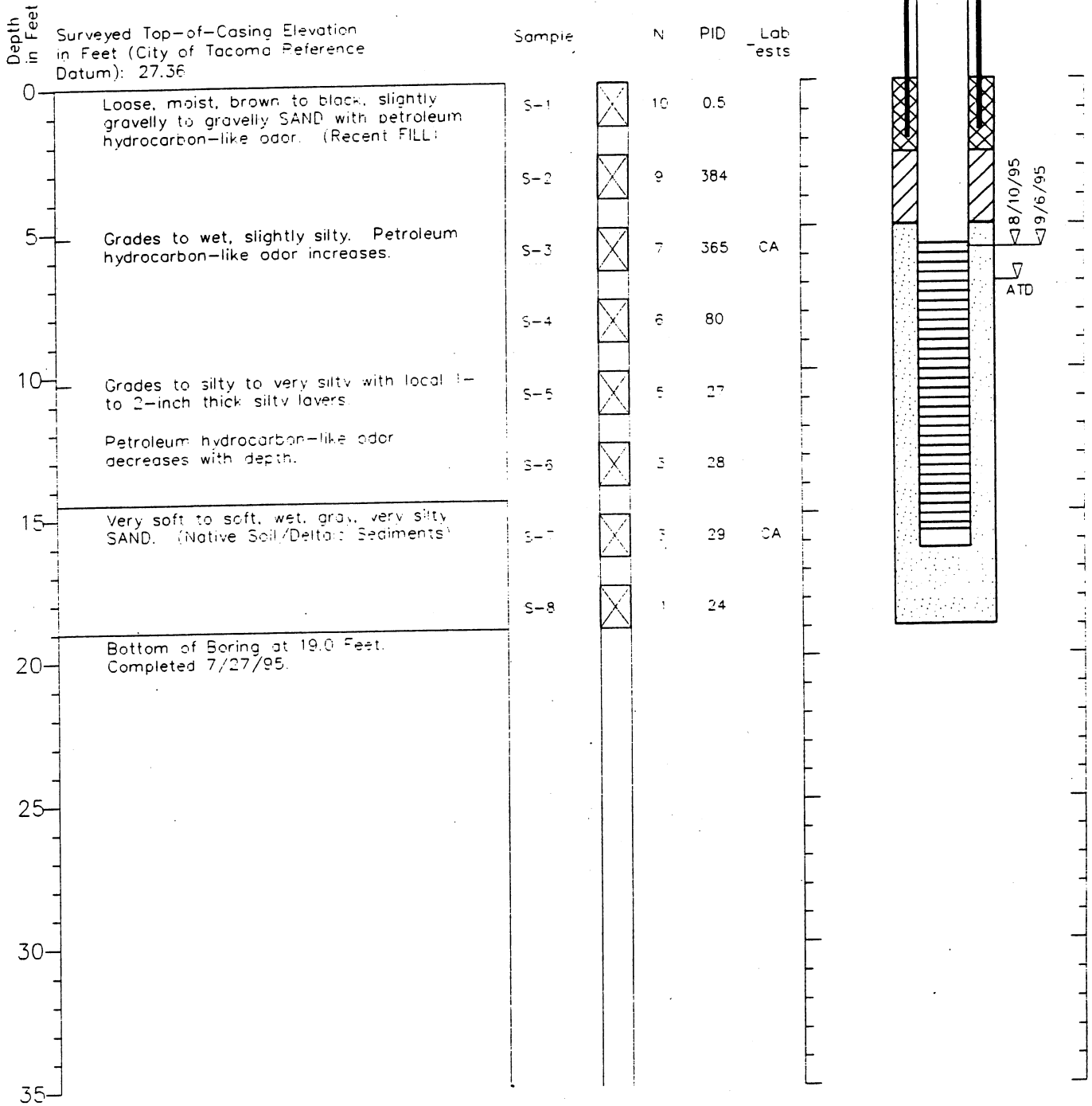
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

Boring Log and Construction Data for Monitoring Well MW-12

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 3.0



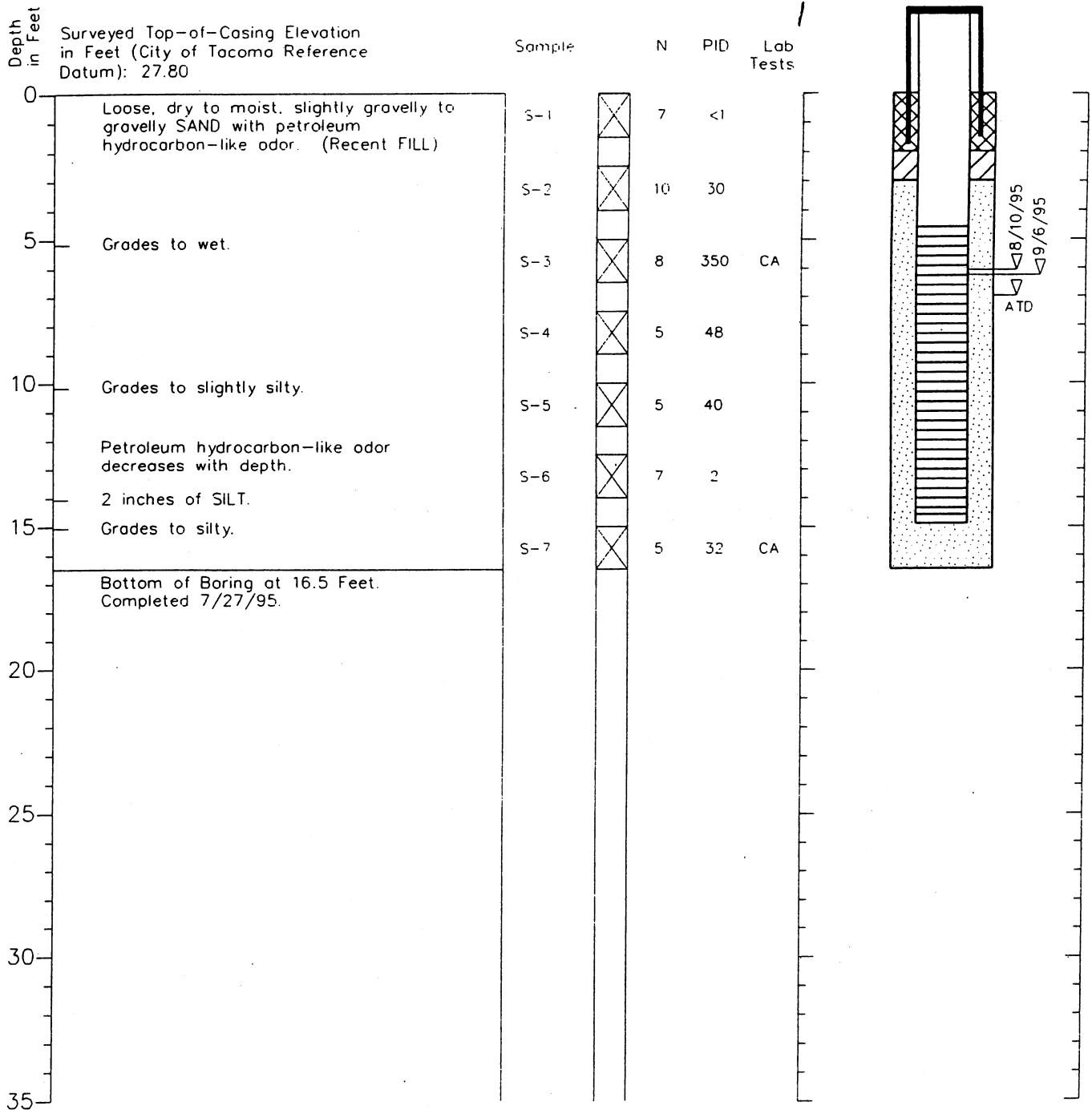
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

Boring Log and Construction Data for Monitoring Well MW-13

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 3.0



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.



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J-3712-10 7/95

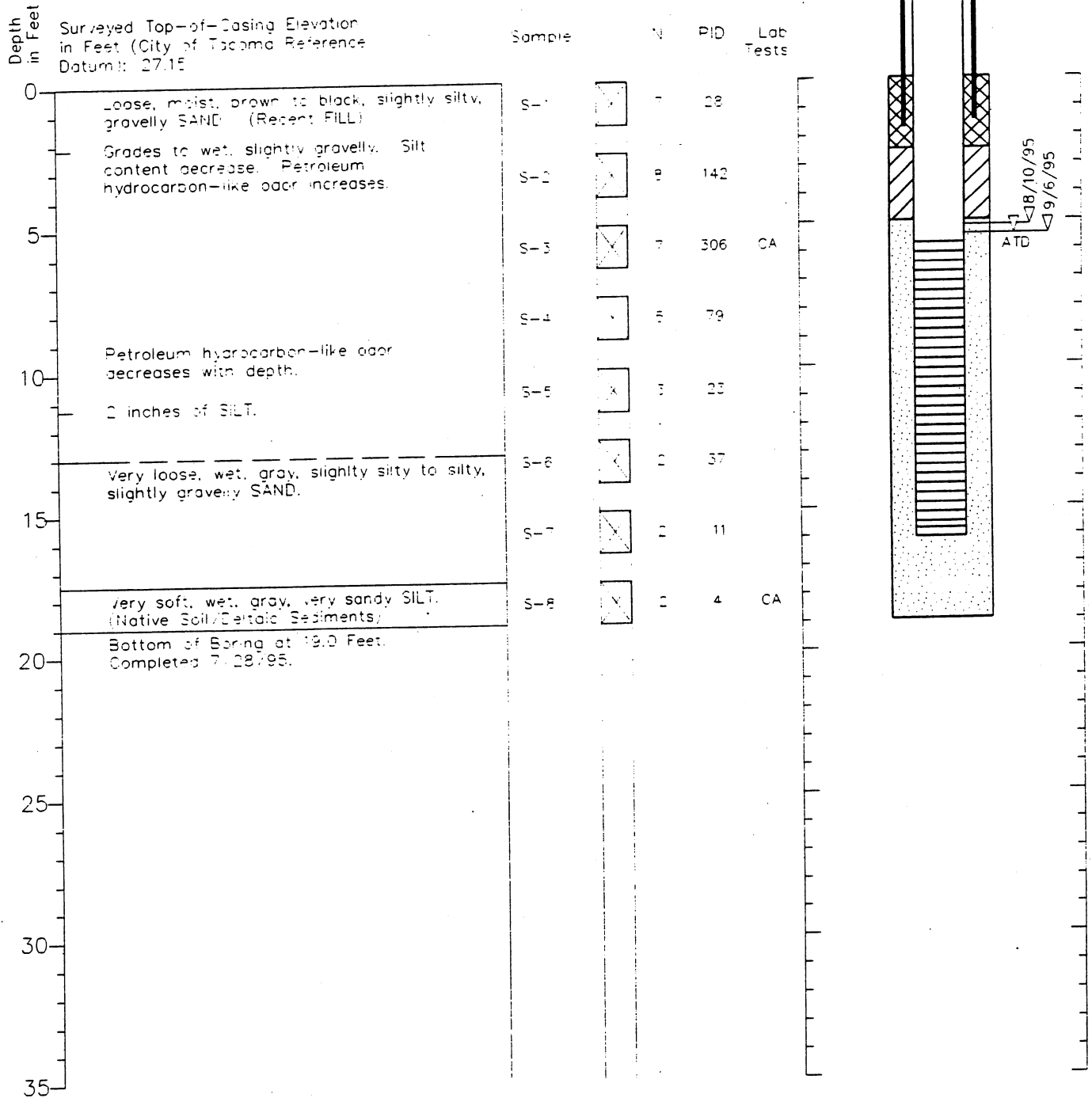
Figure A-6

Boring Log and Construction Data for Monitoring Well MW-14

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 3.0



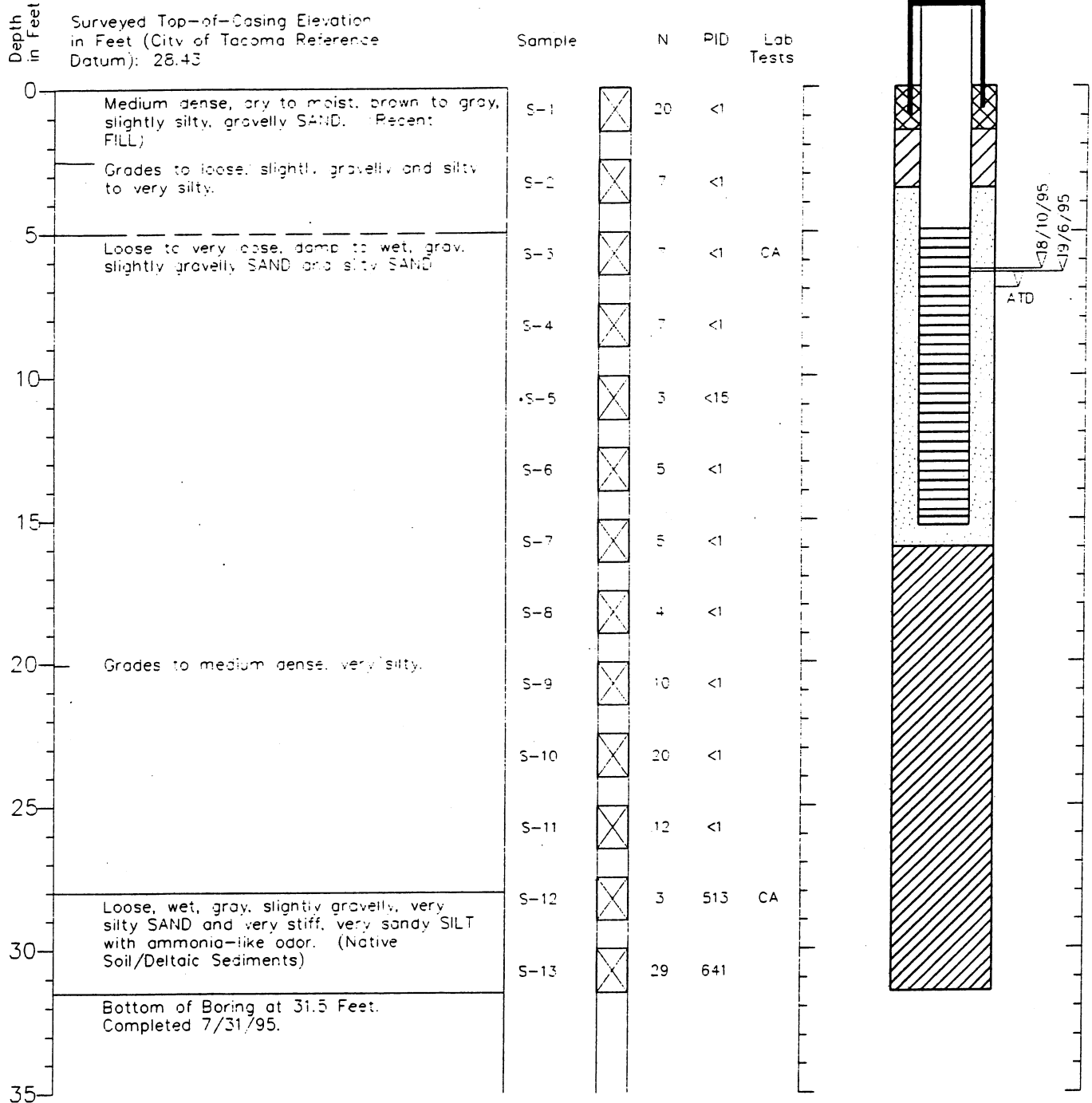
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

Boring Log and Construction Data for Monitoring Well MW-15

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 3.0



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.



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J-3712-09 7/95

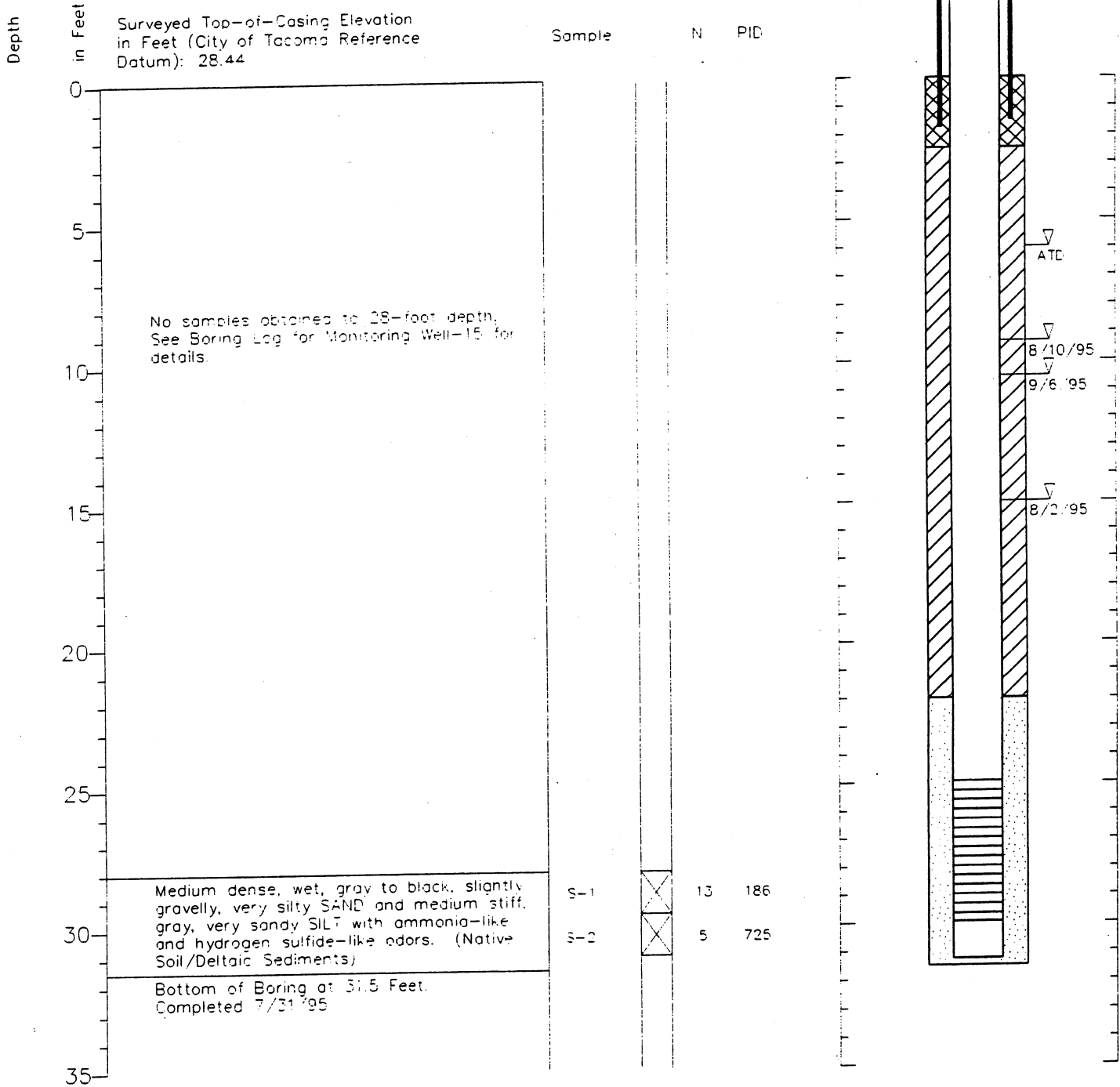
Figure A-8

Boring Log and Construction Data for Monitoring Well MW-15A

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 3.0



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.



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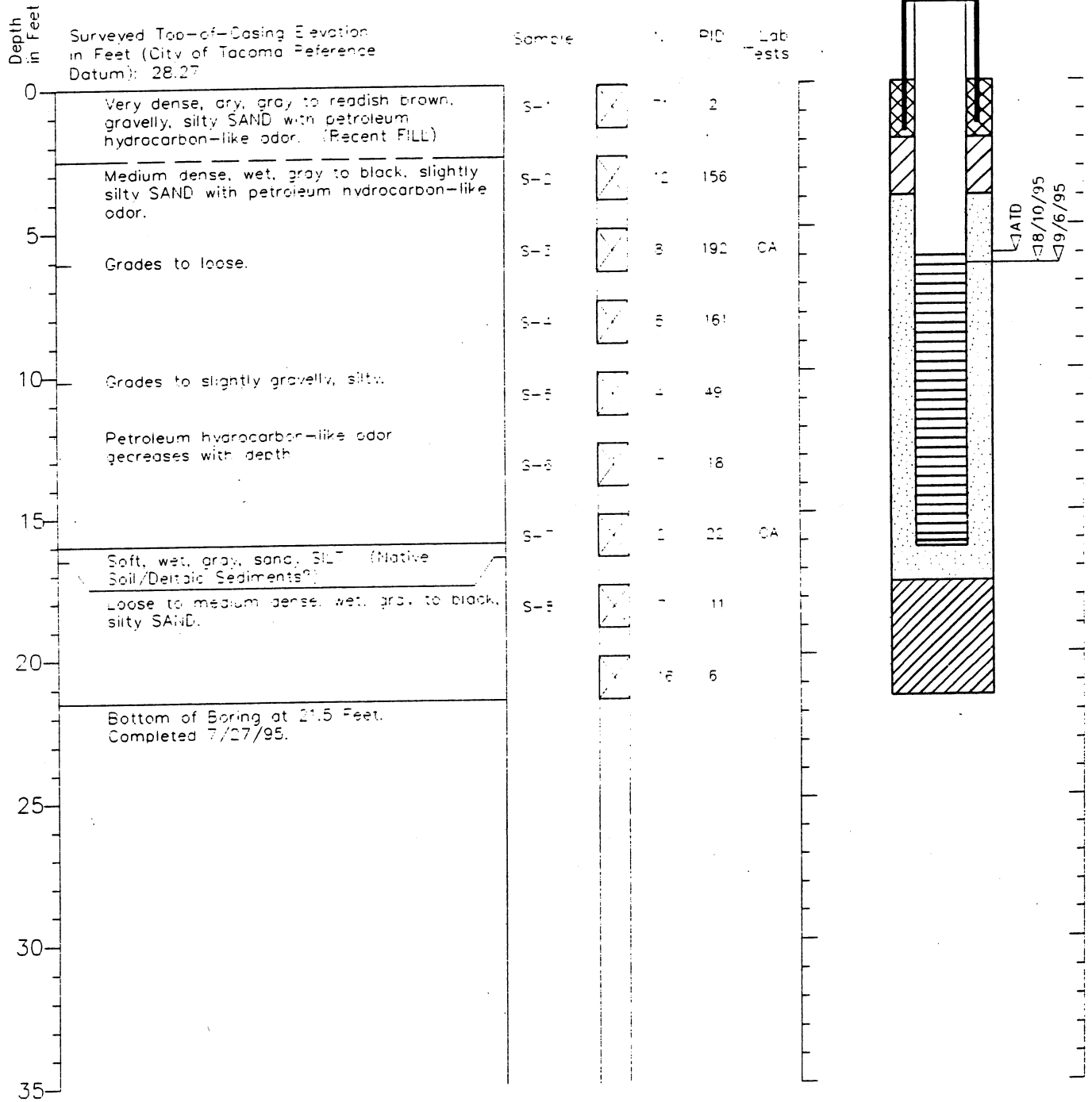
Figure A-9

Boring Log and Construction Data for Monitoring Well MW-16

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 3.0



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.



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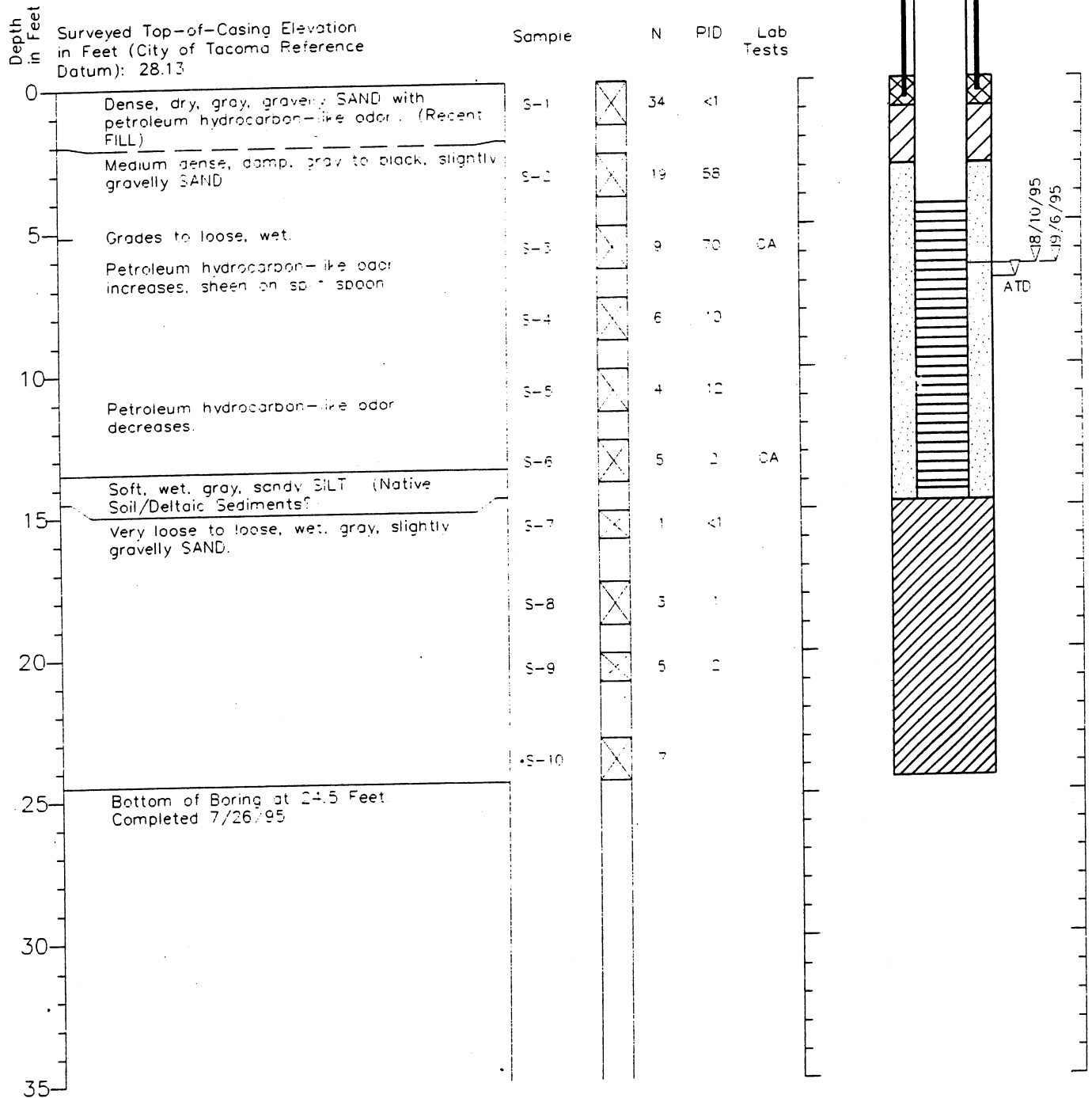
Figure A-10

Boring Log and Construction Data for Monitoring Well MW-17

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 3.0



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time



HARTCROWSER

J-3712-09 7/95

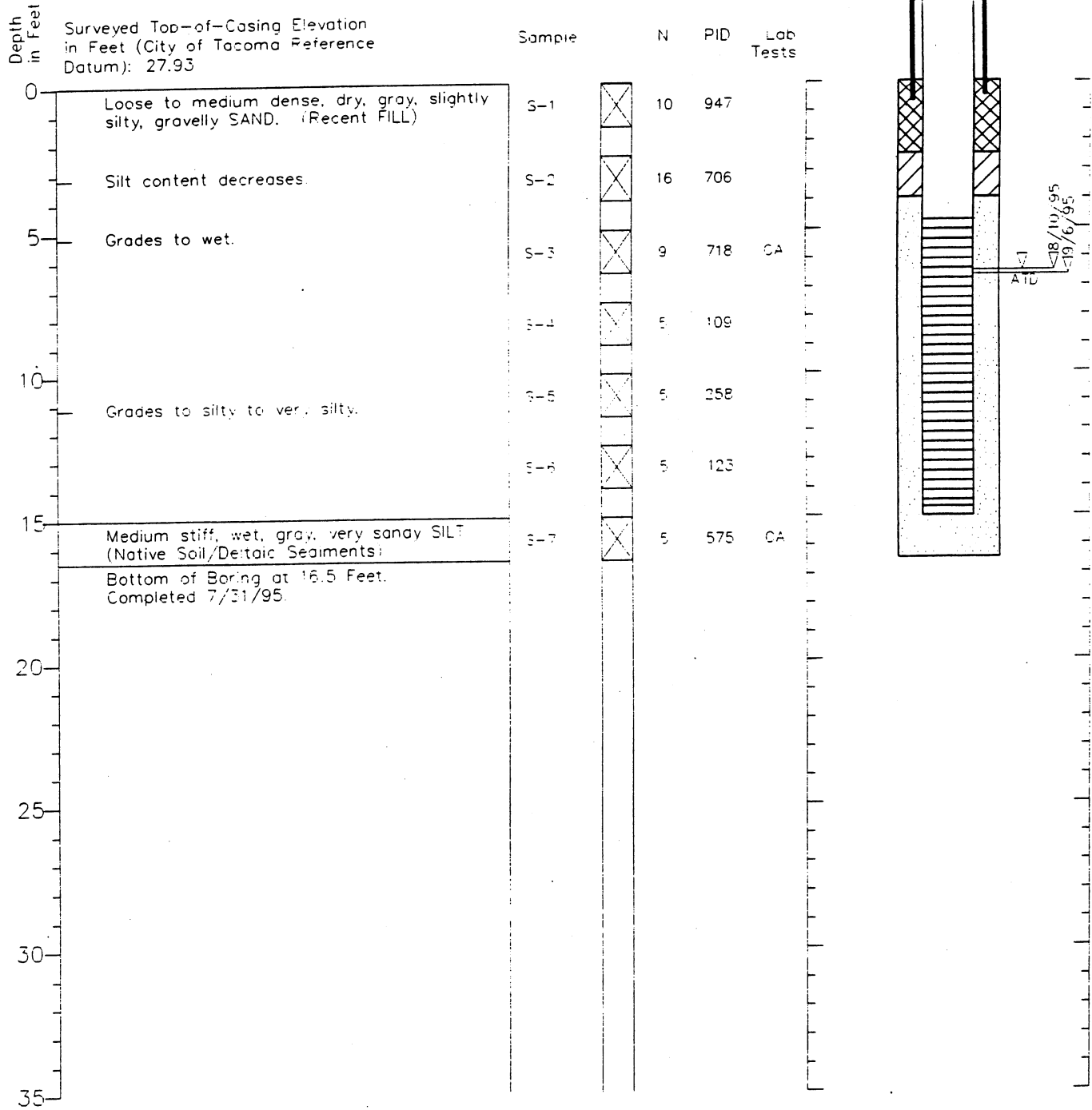
Figure A-11

Boring Log and Construction Data for Monitoring Well MW-18

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 3.0



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.



HARTCROWSER

J-3712-09 7/95

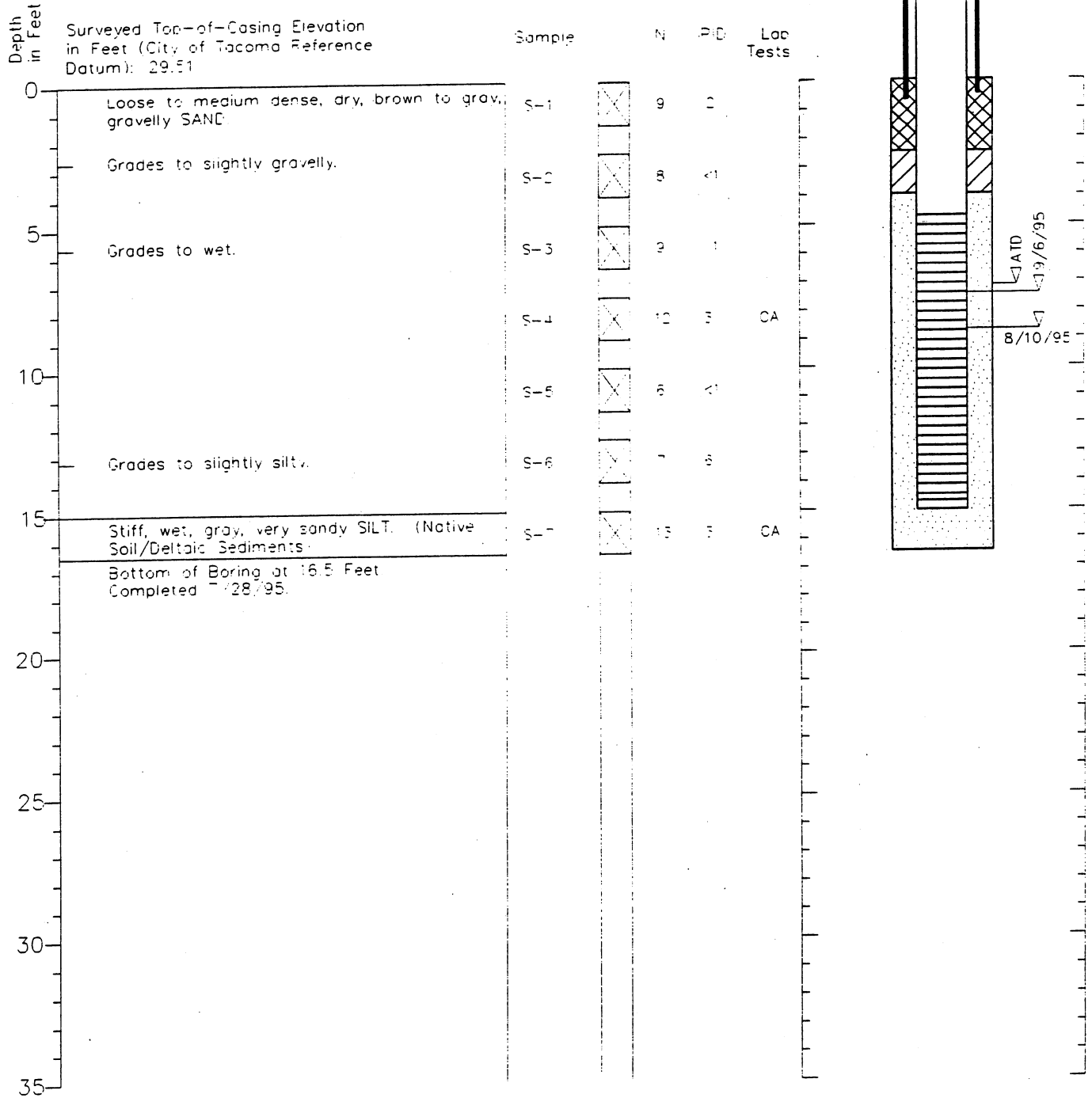
Figure A-12

Boring Log and Construction Data for Monitoring Well MW-19

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 3.0



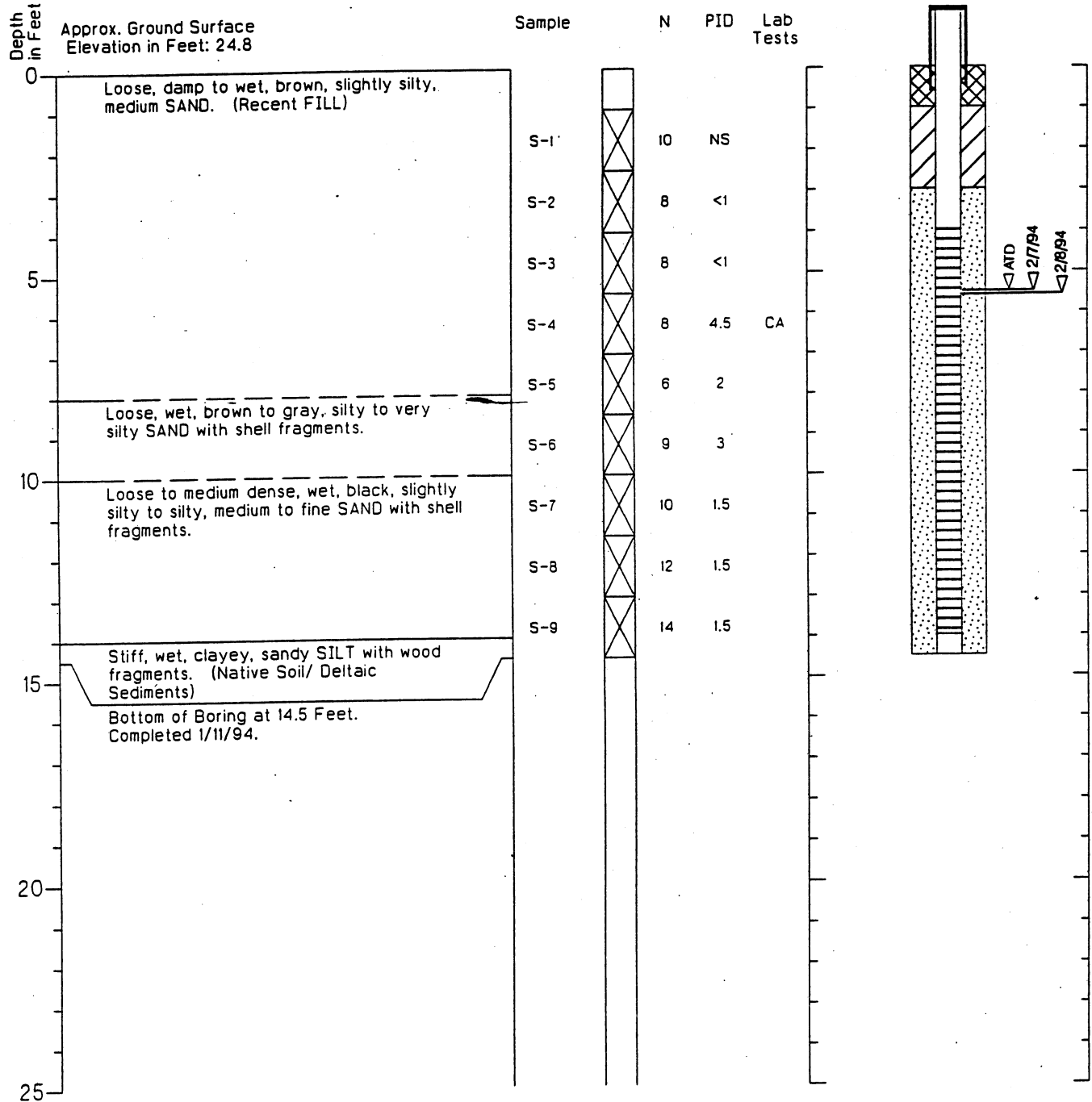
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

Boring Log and Construction Data for Monitoring Well MW-2

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 2.8
Top of PVC in Feet 27.6



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
4. Reference Elevation Datum - Port of Tacoma (mean lower low water)
High Tide - 2/7/94
Low Tide - 2/8/94



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation
 PROJECT NUMBER: 07843
 CLIENT: Occidental Chemical Corporation
 LOCATION: Alexander Avenue Site
 Tacoma, Washington

HOLE DESIGNATION: MW20-15
 DATE COMPLETED: June 30, 2004
 DRILLING METHOD: HSA
 FIELD PERSONNEL: C. Cameron/J. Williams

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS
	GROUND SURFACE TOP OF RISER	13.36					
		12.55					
2	0-16.5' BGS - See Log from MW20-50 for Stratigraphy						
4							
6							
8							
10							
12							
14							
16							
18							
20							
22							
24							
26				-3.14			
28	END OF BOREHOLE @ 16.5ft BGS						
30							
32							
34							
				WELL DETAILS Screened interval: 3.36 to -1.64ft NGVD 10.00 to 15.00ft BGS Length: 5ft Diameter: 2in Slot Size: 10 Material: PVC			

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG 007843_ORIGINAL.GPJ CRA_CORP.GDT 10/6/09



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation
PROJECT NUMBER: 07843
CLIENT: Occidental Chemical Corporation
LOCATION: Alexander Avenue Site
Tacoma, Washington

HOLE DESIGNATION: MW20-25
DATE COMPLETED: July 2, 2004
DRILLING METHOD: HSA
FIELD PERSONNEL: C. Cameron/J. Williams

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS
	GROUND SURFACE TOP OF RISER	13.53 13.22					
0-26.5'	BGS - See Log from MW20-50 for Stratigraphy		<p>WELL DETAILS Screened interval: -6.47 to -11.47ft NGVD 20.00 to 25.00ft BGS Length: 5ft Diameter: 2in Slot Size: 10 Material: PVC</p>				
26.5'	END OF BOREHOLE @ 26.5ft BGS	-12.97					

OVERBURDEN LOG 007843_ORIGINAL.GPJ CRA_CORP.GDT 10/6/09

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation
 PROJECT NUMBER: 07843
 CLIENT: Occidental Chemical Corporation
 LOCATION: Alexander Avenue Site
 Tacoma, Washington

HOLE DESIGNATION: MW20-50
 DATE COMPLETED: July 2, 2004
 DRILLING METHOD: HSA
 FIELD PERSONNEL: J. Williams/C. Cameron

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS	PID (ppm)
	GROUND SURFACE TOP OF RISER	13.21 12.93						
2	FILL, sand, trace silt, trace gravel, fine to medium grained, medium brown, dry			SS1	X	1.0	25	0
4	- becoming moist below 4 ft BGS			SS2	X	0.6	19	0
6	- with brick fragments below 6 ft BGS			SS3	X	1.0	14	0
8	- with glass fragments, dark brown below 8 ft BGS			SS4	X	1.0	4	0
10	- becoming wet below 10 ft BGS			SS5	X	1.4	4	0
12	- silt seam, soft, medium brown, wet from 10.9 to 11.0 ft BGS			SS6	X	1.7	7	0
14	SP-SAND, fine to medium grained, dark brown, wet (NATIVE)	1.21		SS7	X	1.7	7	0
16	- silt seam from 15 to 15.1 ft BGS - shell fragments from 16 to 16.5 ft BGS			SS8	X	2.0	16	0
18	ML-SILT, soft, gray, wet - fine sand seam (SP) from 17 to 17.2 ft BGS - becomes firm @ 17.2 ft BGS	-3.29 -4.79		SS9	X	1.7	1	0
20	SM-SAND, some silt, some shell fragments, fine to medium grained, wet - silt seam (ML) from 18.3 to 18.9 ft BGS - silt seam (ML) from 20 to 20.1 ft BGS			SS10	X	2.0	17	0
22				SS11	X	1.4	7	0
24	SP-SAND, trace silt, fine to medium grained, dark brown, moist	-9.39		SS12	X	2.0	7	0
26	- silt seam (ML), grey, moist from 26 to 26.1 ft BGS			SS13	X	2.0	9	0
28				SS14	X	0.9	10	0
30				SS15	X	2.0	40	0
32				SS16	X	1.0	18	0
34	- silt seam (ML) from 32.9 to 33 ft BGS - silt seam (ML) from 33.5 to 33.6 ft BGS			SS17	X	1.9	13	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
 WATER FOUND ∇

OVERBURDEN LOG 007843 ORIGINAL.GPJ CRA_CORP.GDT 10/6/09



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Groundwater and Sediment Remediation

HOLE DESIGNATION: MW20-50

PROJECT NUMBER: 07843

DATE COMPLETED: July 2, 2004

CLIENT: Occidental Chemical Corporation

DRILLING METHOD: HSA

LOCATION: Alexander Avenue Site

FIELD PERSONNEL: J. Williams/C. Cameron

Tacoma, Washington

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft NGVD	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (ft)	BLOW COUNTS	PID (ppm)
36	SM-SAND, some silt, fine grained, dark grey to black, wet	-22.79	<p style="text-align: center;">BENTONITE SEAL</p> <p style="text-align: center;">2"Ø PVC SCREEN</p> <p style="text-align: center;">2"Ø PVC SUMP</p> <p>WELL DETAILS Screened interval: -31.79 to -36.79ft NGVD 45.00 to 50.00ft BGS Length: 5ft Diameter: 2in Slot Size: 10 Material: PVC</p>	SS18	X	1.9	17	0
38		-25.29		SS19	X	1.1	27	0
40	ML-SILT, little fine sand, dark grey, moist	-26.29		SS20	X	1.7	7	0
42	SM-SAND, some silt, fine grained, dark grey to black, wet	-26.29		SS21	X	1.9	34	.7
44		-31.79		SS22	X	1.4	14	0
46	ML-SILT, some sand, fine grained, dark grey, wet	-33.29		SS23	X	1.7	23	0
48		-36.79		SS24	X	1.9	8	0
50		-36.79		SS25	X	1.9	7	0
52		END OF BOREHOLE @ 50.0ft BGS		-36.79				
54								
56								
58								
60								
62								
64								
66								
68								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
 WATER FOUND ▼

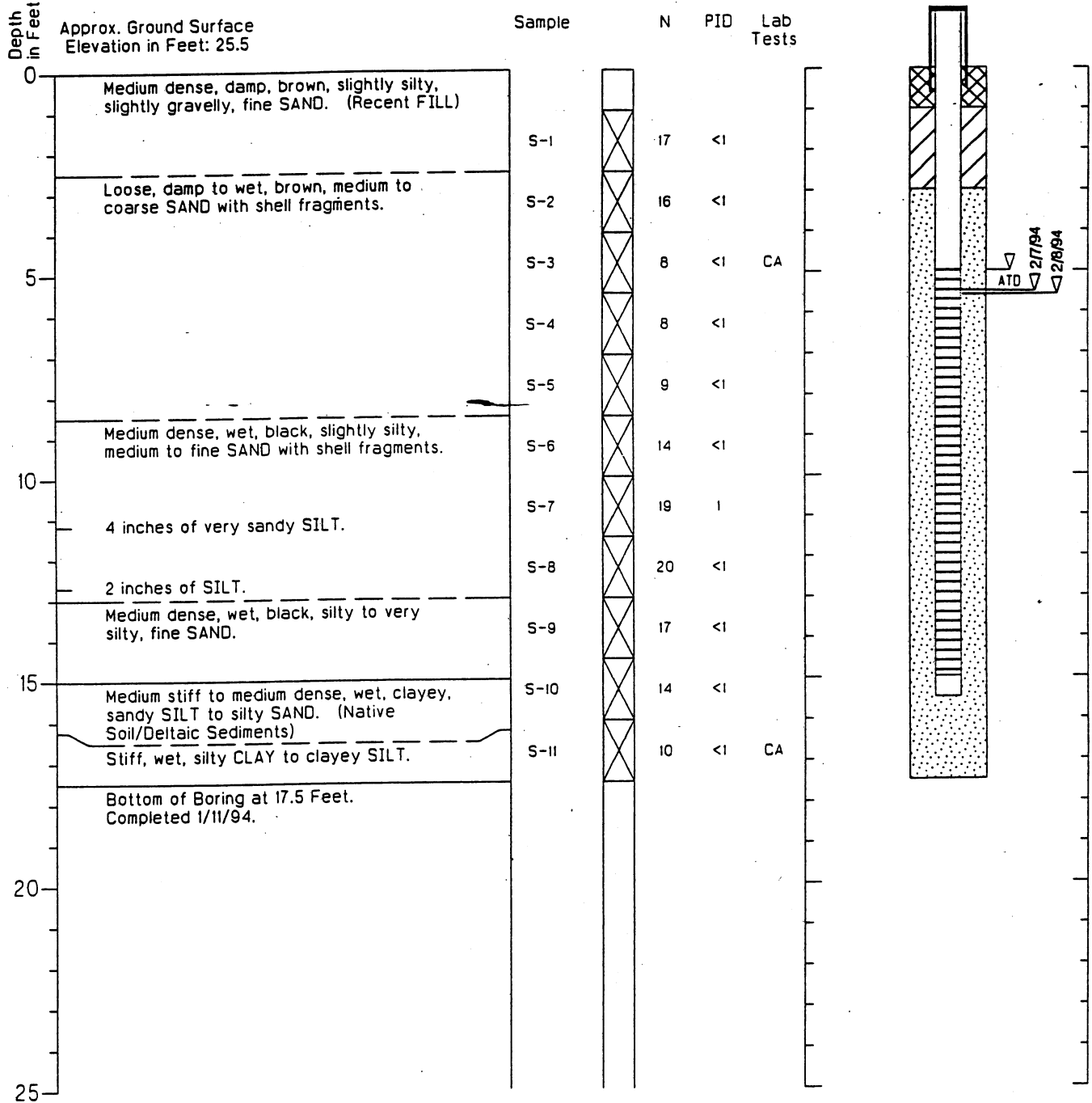
OVERBURDEN LOG 007843_ORIGINAL.GPJ CRA_CORP.GDT 10/6/09

Boring Log and Construction Data for Monitoring Well MW-3

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 2.8
Top of PVC in Feet 28.3



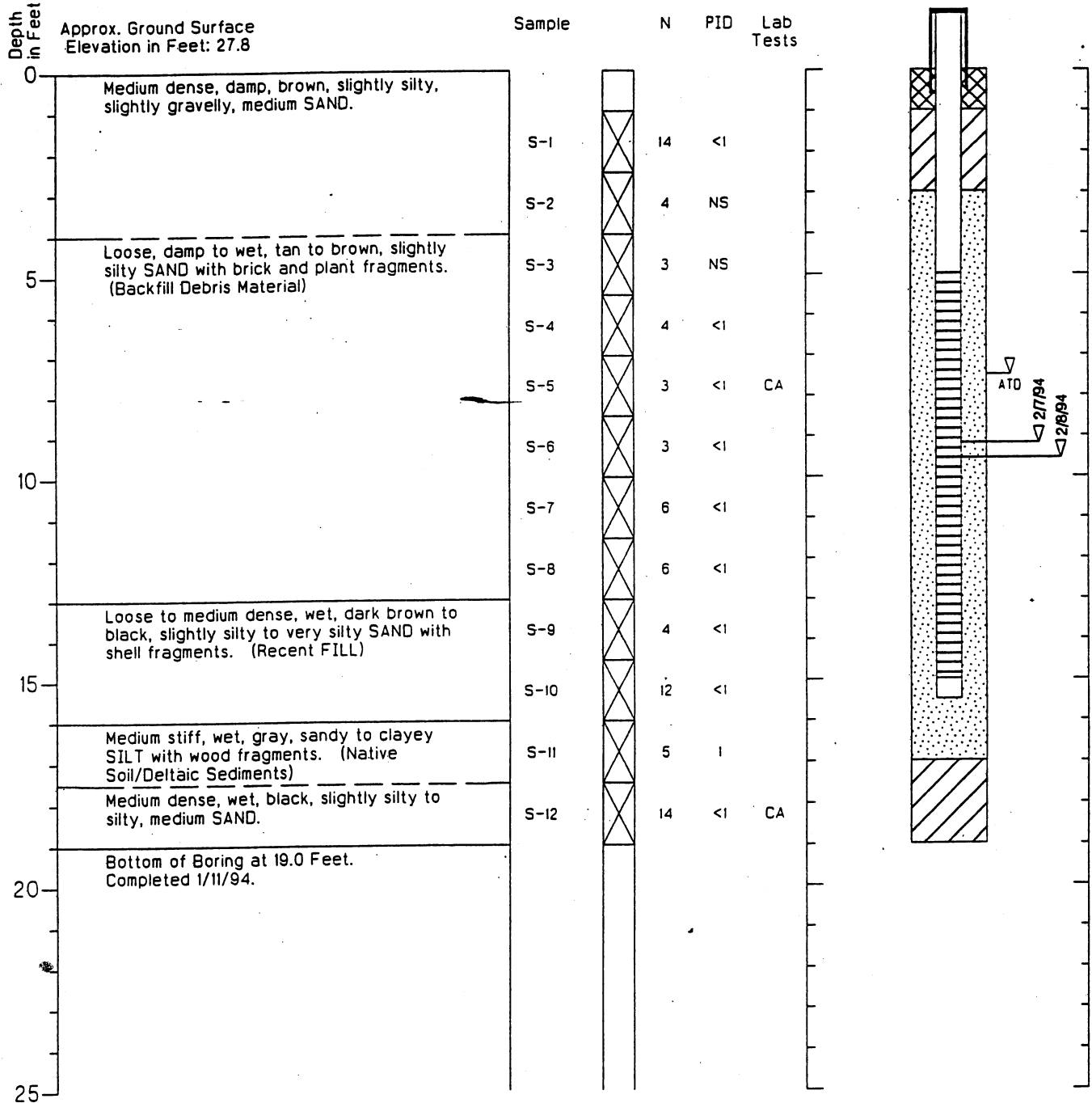
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
4. Reference Elevation Datum - Port of Tacoma (mean lower low water)
High Tide - 2/7/94
Low Tide - 2/8/94

Boring Log and Construction Data for Monitoring Well MW-4

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 2.7
Top of PVC in Feet 30.5



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
4. Reference Elevation Datum - Port of Tacoma (mean lower low water)
High Tide - 2/7/94
Low Tide - 2/8/94



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J-3712-04

1/94

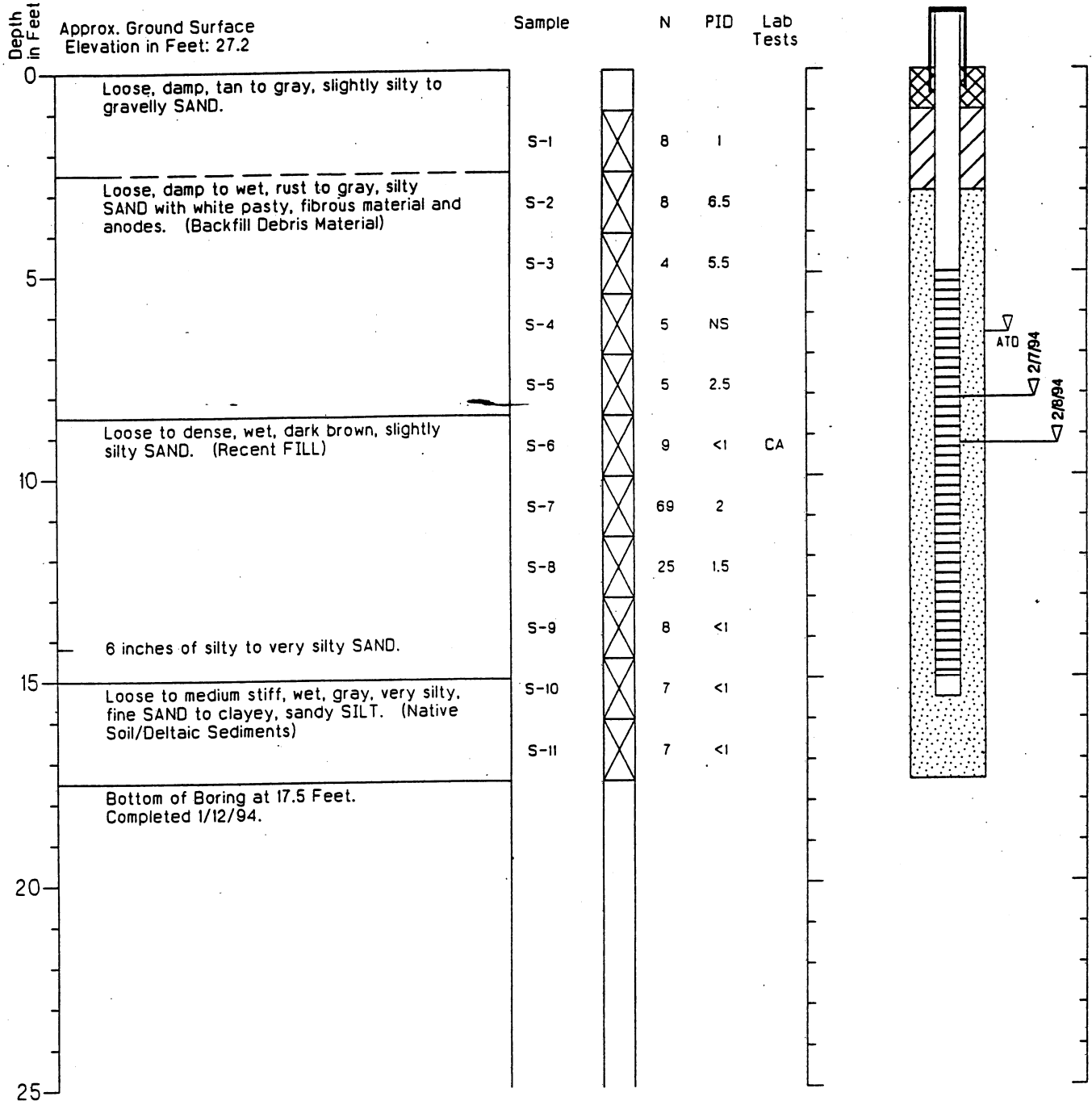
Figure A-5

Boring Log and Construction Data for Monitoring Well MW-5

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 2.8
Top of PVC in Feet 30



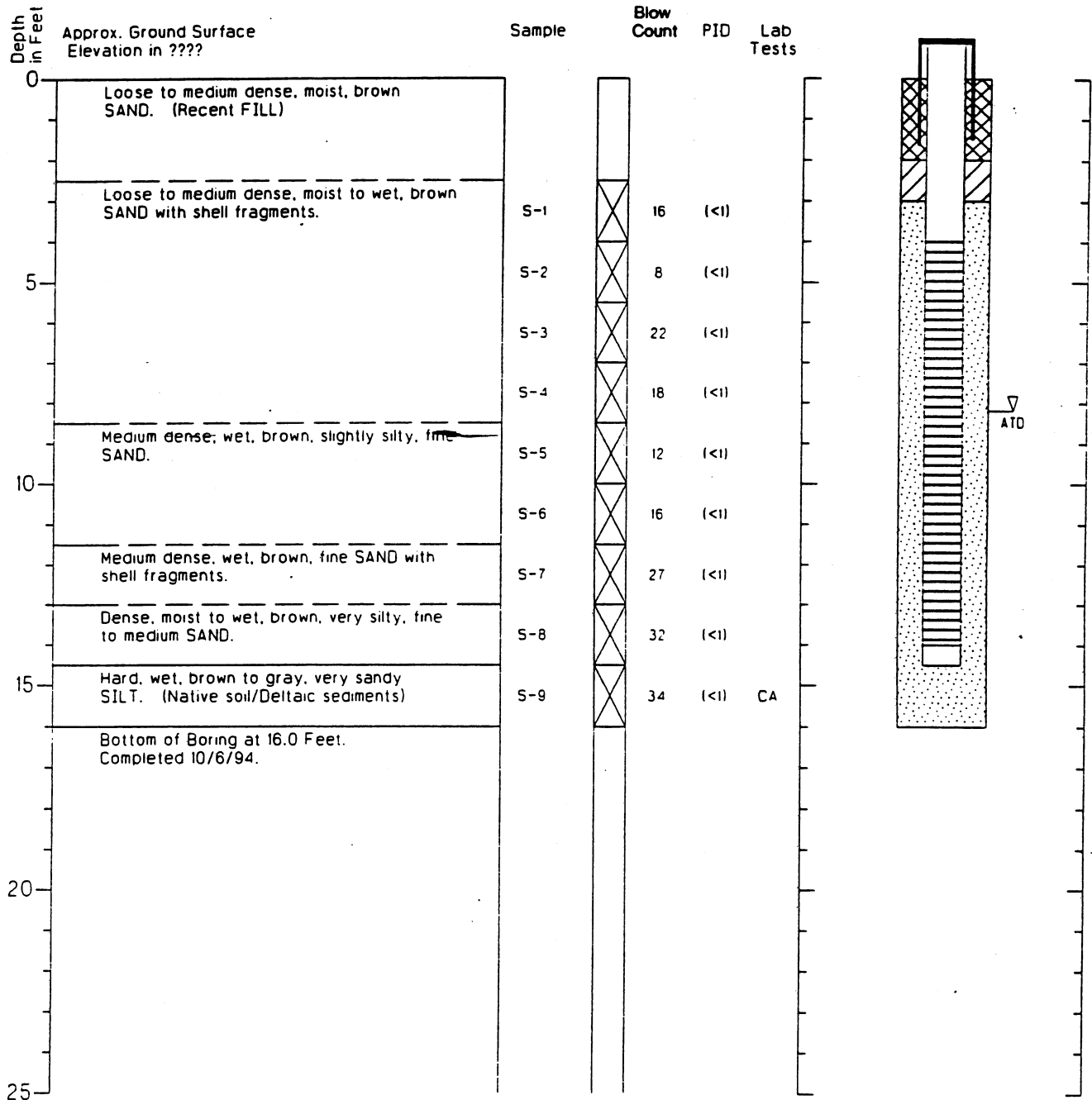
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
4. Reference Elevation Datum - Port of Tacoma (mean lower low water)
High Tide - 2/7/94
Low Tide - 2/8/94

Boring Log and Construction Data for Monitoring Well MW-6

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 2.21



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

PRI311 001205



HARTCROWSER

J-3712-07

10/94

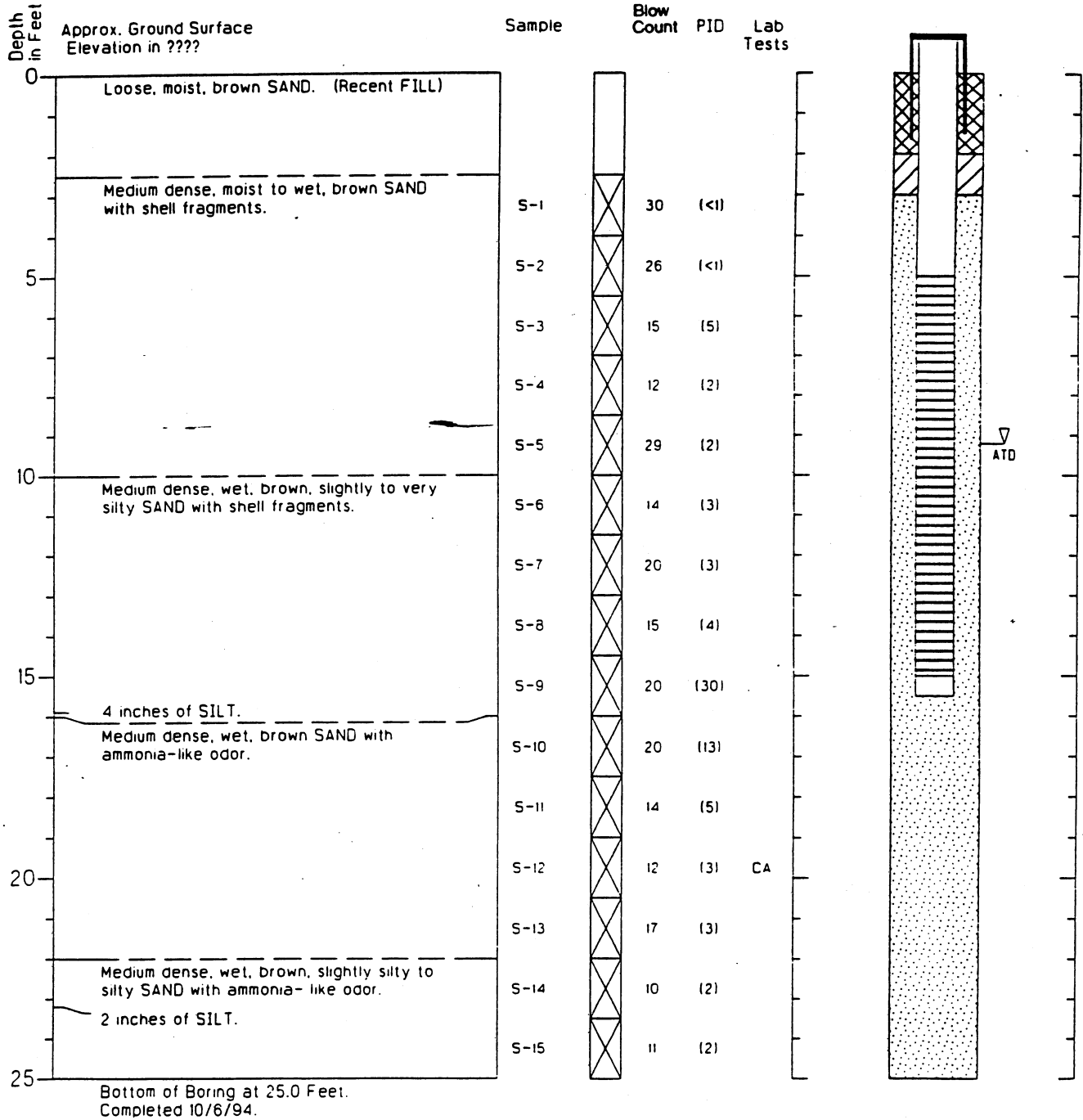
Figure A-2

Boring Log and Construction Data for Monitoring Well MW-7

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 2.49



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

PRI311 001206



HARTCROWSER

J-3712-07

10/94

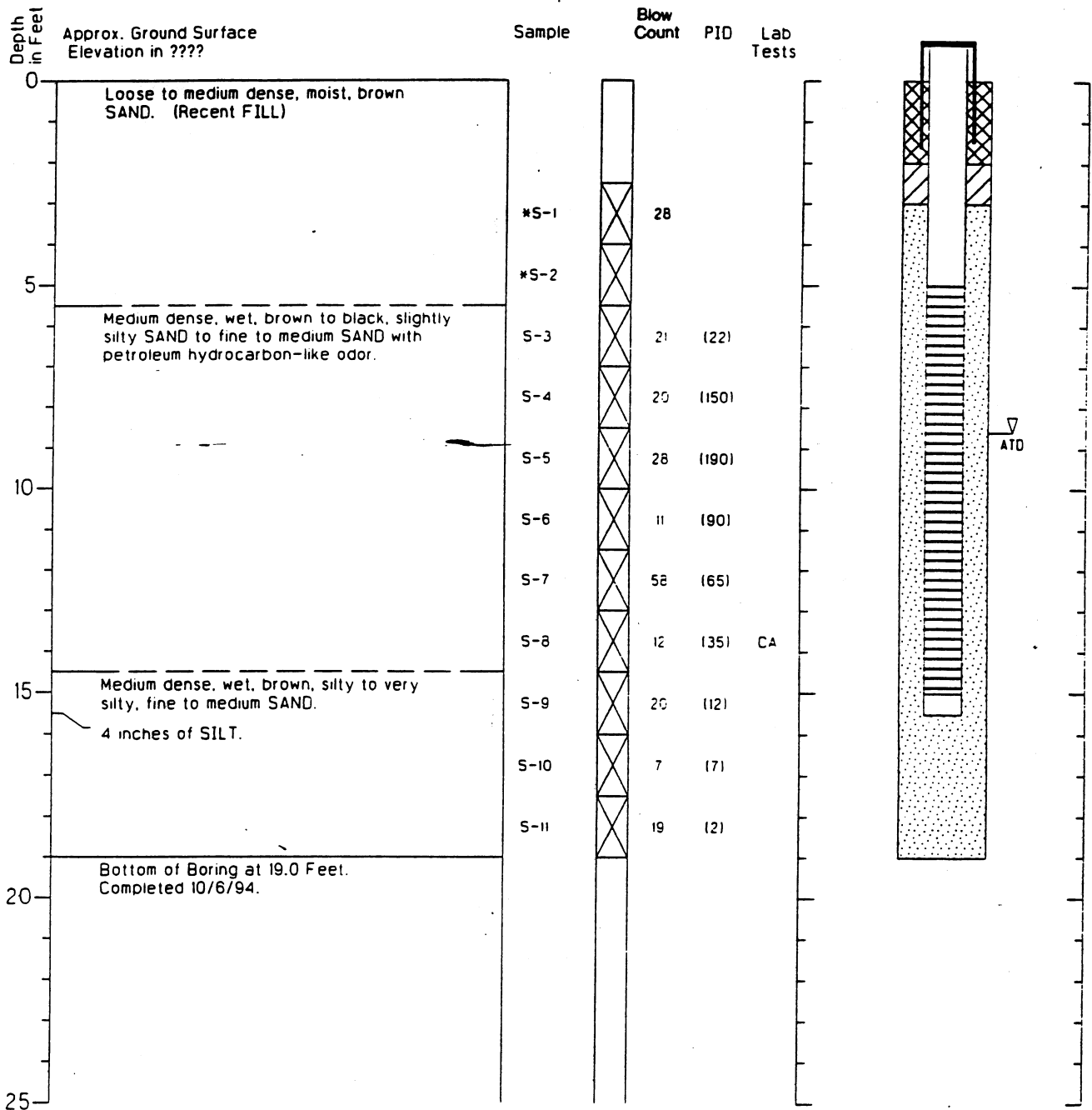
Figure A-3

Boring Log and Construction Data for Monitoring Well MW-8

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 2.63



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

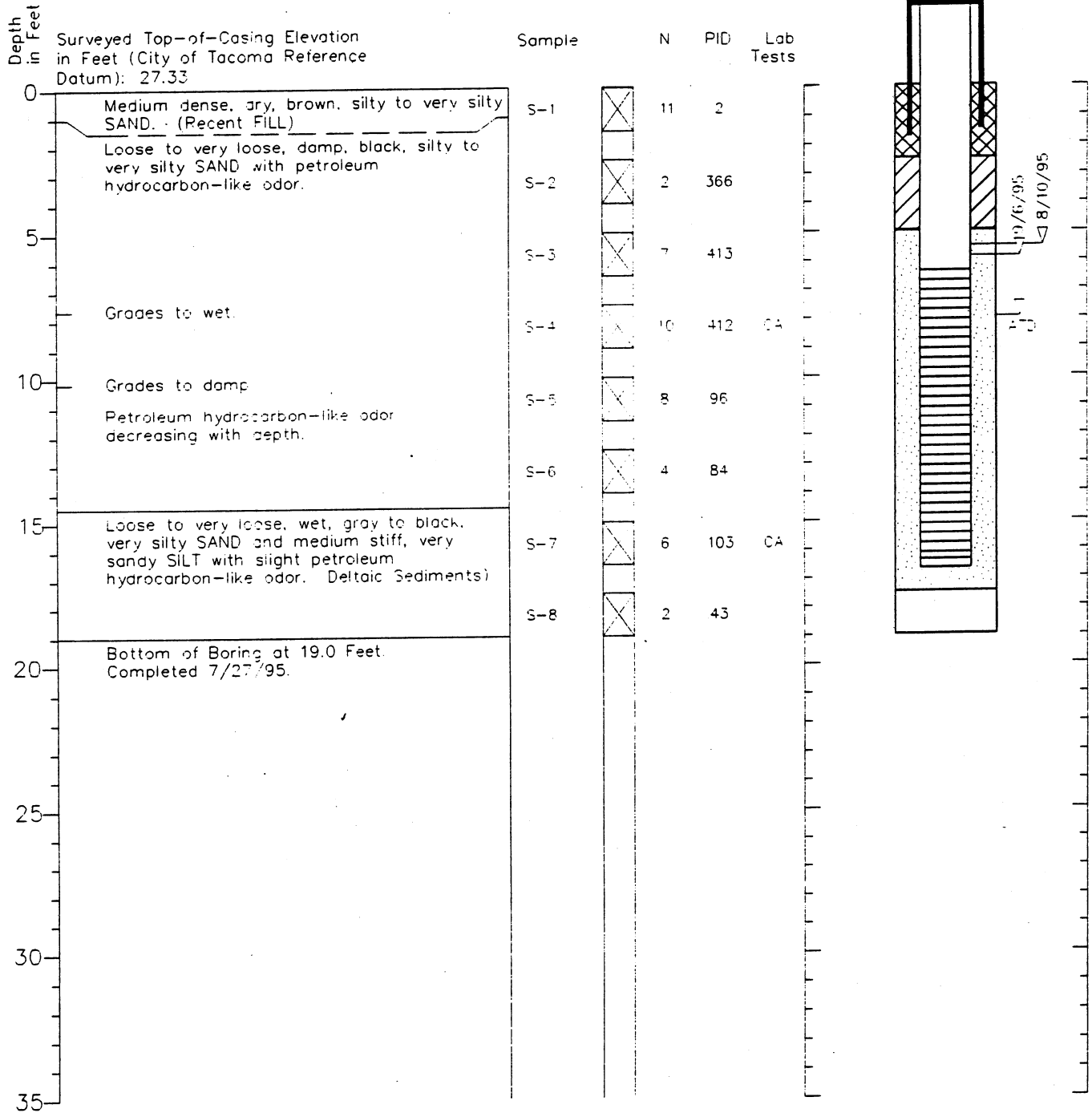
PRI311 001207

Boring Log and Construction Data for Monitoring Well MW-9

Geologic Log

Monitoring Well Design

Casing Stickup in Feet: 3.0



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Ground water level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

Test Pit Log TP-9

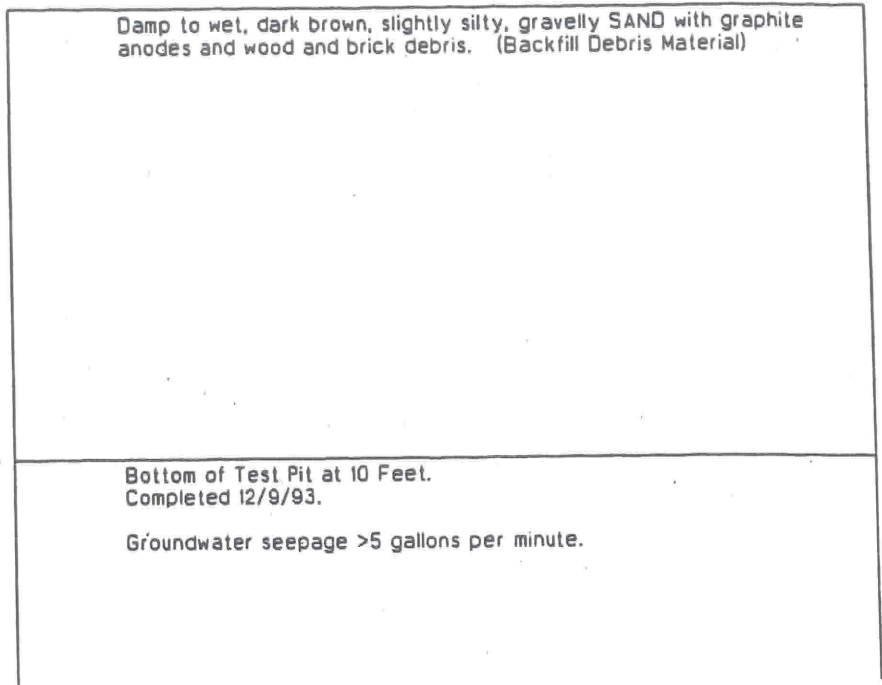
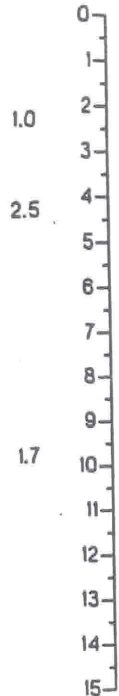
Sample

PID

Depth
in Feet

SOIL DESCRIPTIONS

Ground Surface Elevation in Feet: 27.6



Test Pit Log TP-10

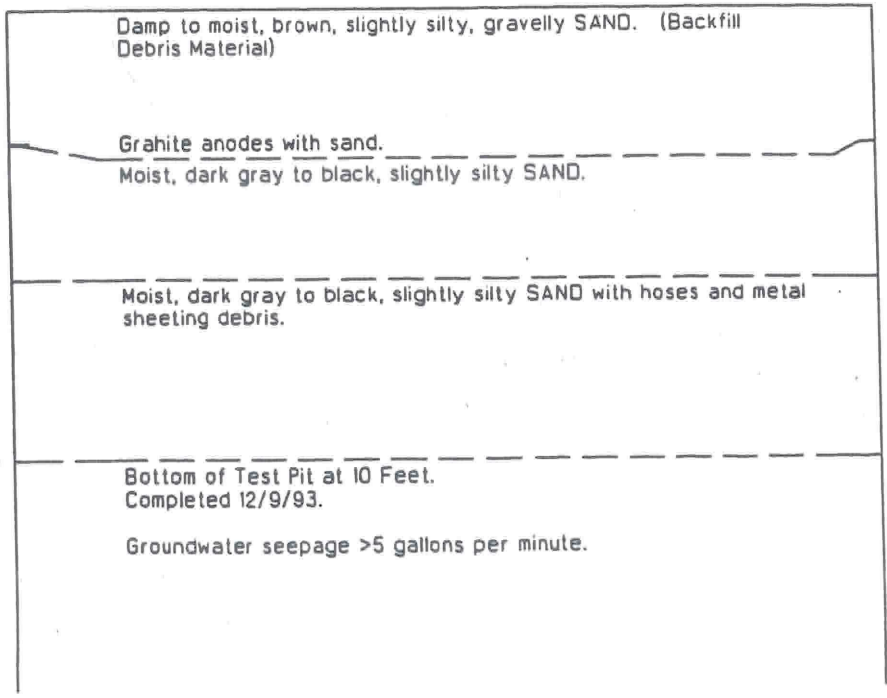
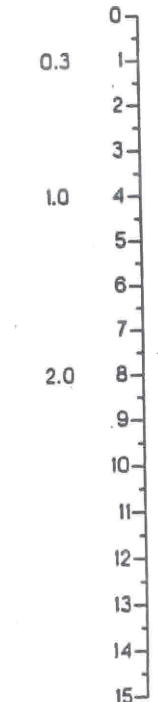
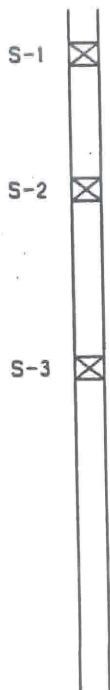
Sample

PID

Depth
in Feet

SOIL DESCRIPTIONS

Ground Surface Elevation in Feet: 27.5



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

Test Pit Log TP-9

Sample	Lab Tests	PID	Depth in Feet
S-1		<2	3
S-2	CA	30	5

SOIL DESCRIPTIONS

0 - 3	(Medium dense to loose), moist, brown, gravelly SAND (FILL)
3 - 4	(Loose), moist to wet, dark brown-gray, slightly silty, fine to medium SAND with shells. (FILL)
4 - 5	Encountered 18-inch-diameter pipe. Appears to run east-west.
5 - 7	Becomes gray with petroleum hydrocarbon-like staining and slight odor.
7 - 9	Bottom of Test Pit at 7 Feet. Completed 3/28/95. Caving at 5- to 7-foot depths.

Test Pit Log TP-10

Sample	Lab Tests	PID	Depth in Feet
S-1		<2	3
S-2	CA	30C	5

SOIL DESCRIPTIONS

0 - 3	(Loose to medium dense), moist, brown, gravelly SAND. (FILL).
3 - 4	(Loose), moist to wet, black, slightly silty, fine to medium SAND with shells. (FILL)
4 - 6	Becomes gray with petroleum hydrocarbon-like staining and odor.
6 - 7	Groundwater seepage at 6 1/2-foot depth.
7 - 9	Bottom of Test Pit at 7 Feet. Completed 3/28/95.

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

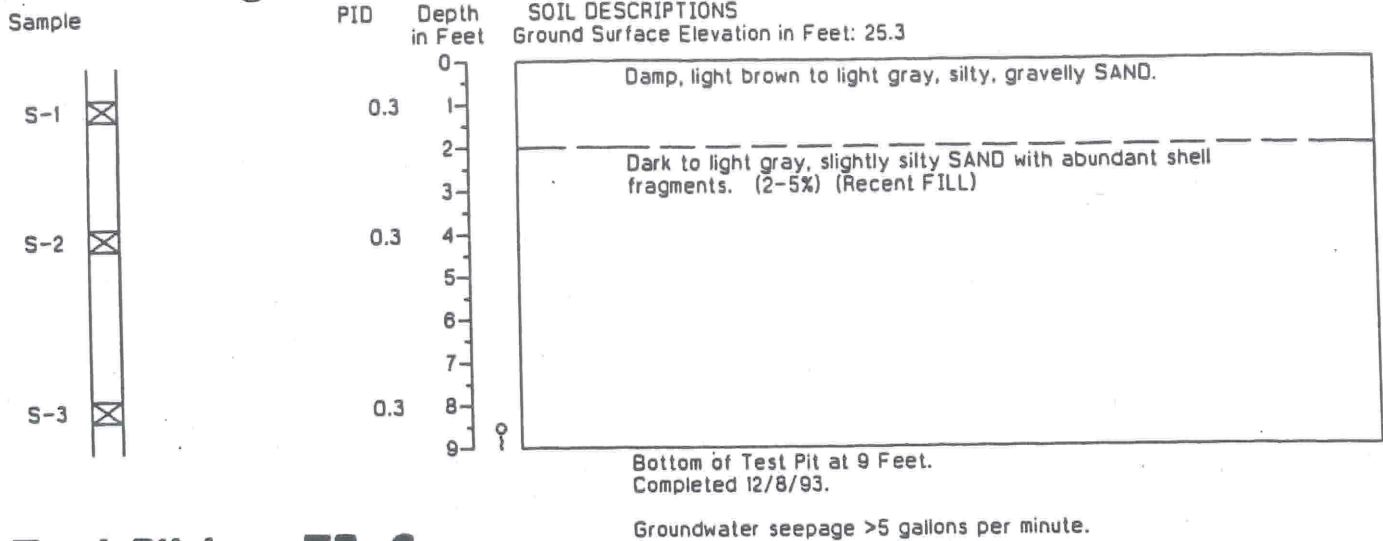


HARTCROWSER

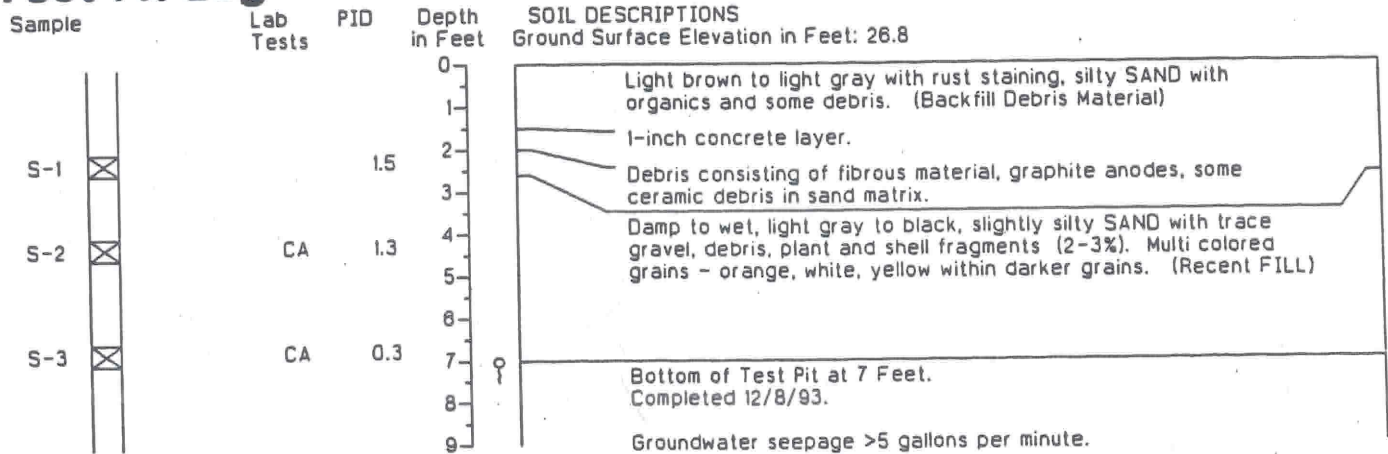
J-3712-09 3/95

Figure A-17

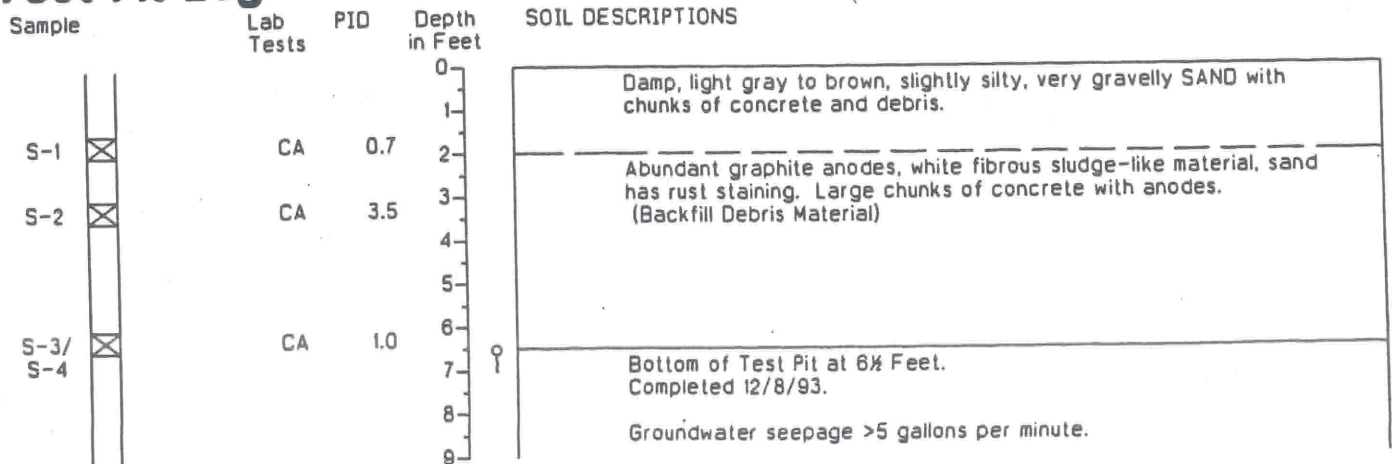
Test Pit Log TP-1



Test Pit Log TP-2



Test Pit Log TP-3



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

Test Pit Log TP-1

Sample	Lab Tests	PID	Depth in Feet
S-1		125	1.5
S-2	CA	350	5.5

SOIL DESCRIPTIONS

0 - 1.5	(Medium dense), moist, brown, gravelly SAND. (FILL) (Not stained)
1.5 - 5.5	(Loose), moist to wet, black, slightly silty, fine to medium SAND with shells and petroleum hydrocarbon-like staining and odor. (FILL)
5.5 - 7.0	Bottom of Test Pit at 7 Feet. Completed 3/28/95. Groundwater seepage observed at 7-foot depth. Caving at 5- to 7-foot depths.

Test Pit Log TP-2

Sample	Lab Tests	PID	Depth in Feet
S-1		250	2.5
S-2	CA	300	5.0

SOIL DESCRIPTIONS

0 - 2.5	(Loose), moist to wet, black, slightly silty, fine to medium SAND with shells and petroleum hydrocarbon-like staining and odor. (FILL)
2.5 - 5.0	
5.0 - 7.0	Bottom of Test Pit at 7 Feet. Completed 3/28/95. Groundwater seepage observed at 7-foot depth.

Test Pit Log TP-3

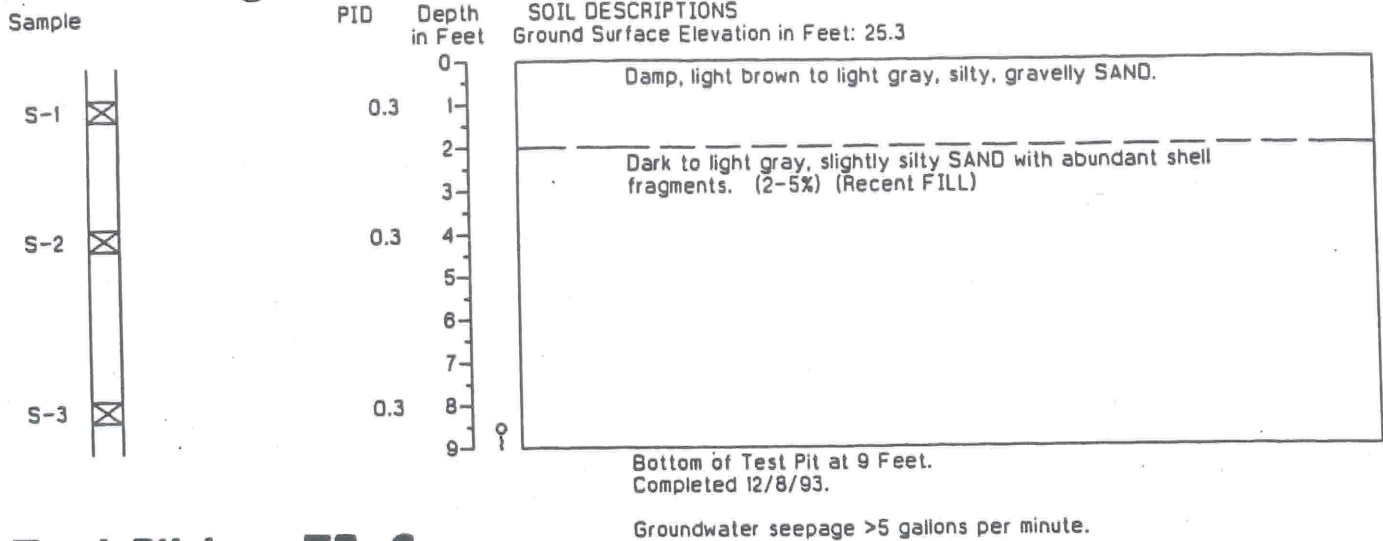
Sample	Lab Tests	PID	Depth in Feet
S-1		250	2.5
S-2	CA	275	5.5

SOIL DESCRIPTIONS

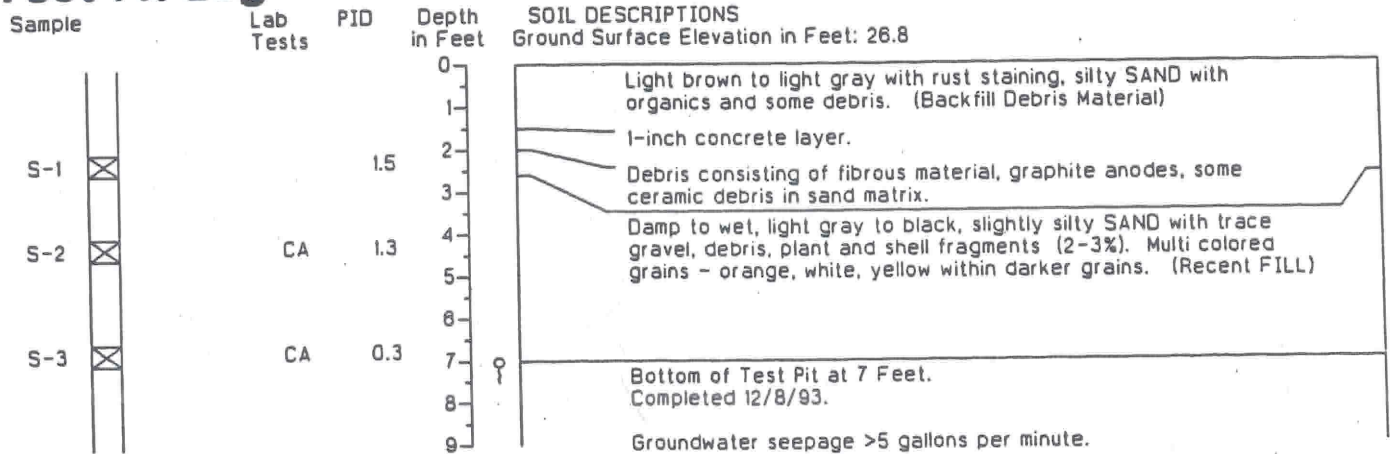
0 - 2.5	(Loose), moist to wet, black, slightly silty, fine to medium SAND with shells and petroleum hydrocarbon-like staining and odor. (FILL)
2.5 - 5.5	
5.5 - 7.0	Bottom of Test Pit at 7 Feet. Completed 3/28/95. Groundwater seepage observed at 7-foot depth. Caving at 5- to 7-foot depths.

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

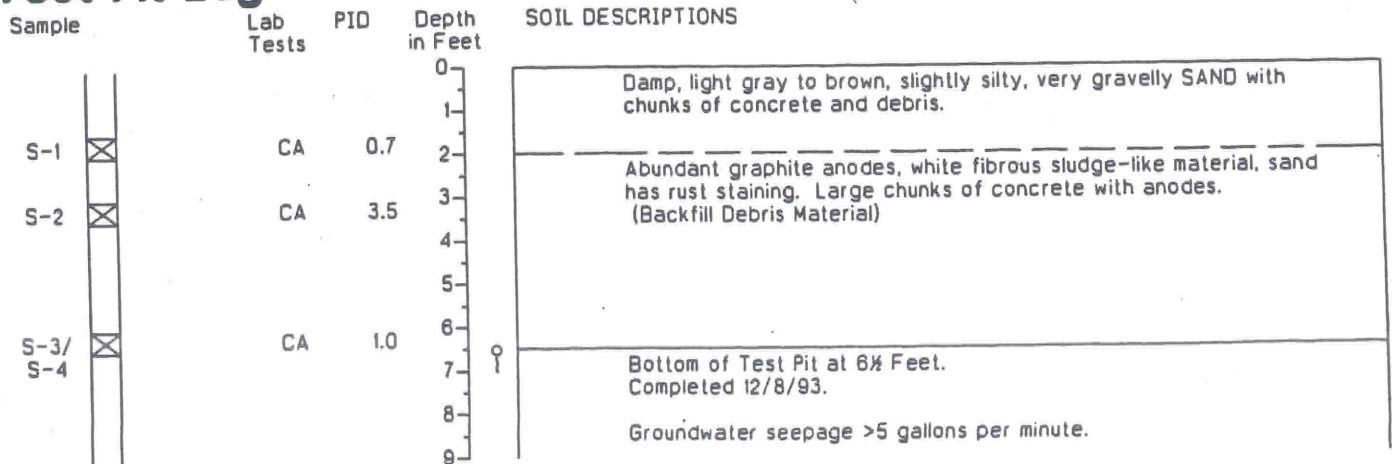
Test Pit Log TP-1



Test Pit Log TP-2



Test Pit Log TP-3



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

Test Pit Log TP-1

Sample	Lab Tests	PID	Depth in Feet
S-1		125	1.5
S-2	CA	350	5.5

SOIL DESCRIPTIONS

0 - 1.5	(Medium dense), moist, brown, gravelly SAND. (FILL) (Not stained)
1.5 - 5.5	(Loose), moist to wet, black, slightly silty, fine to medium SAND with shells and petroleum hydrocarbon-like staining and odor. (FILL)
5.5 - 7.0	Bottom of Test Pit at 7 Feet. Completed 3/28/95. Groundwater seepage observed at 7-foot depth. Caving at 5- to 7-foot depths.

Test Pit Log TP-2

Sample	Lab Tests	PID	Depth in Feet
S-1		250	2.5
S-2	CA	300	5.0

SOIL DESCRIPTIONS

0 - 2.5	(Loose), moist to wet, black, slightly silty, fine to medium SAND with shells and petroleum hydrocarbon-like staining and odor. (FILL)
2.5 - 5.0	
5.0 - 7.0	Bottom of Test Pit at 7 Feet. Completed 3/28/95. Groundwater seepage observed at 7-foot depth.

Test Pit Log TP-3

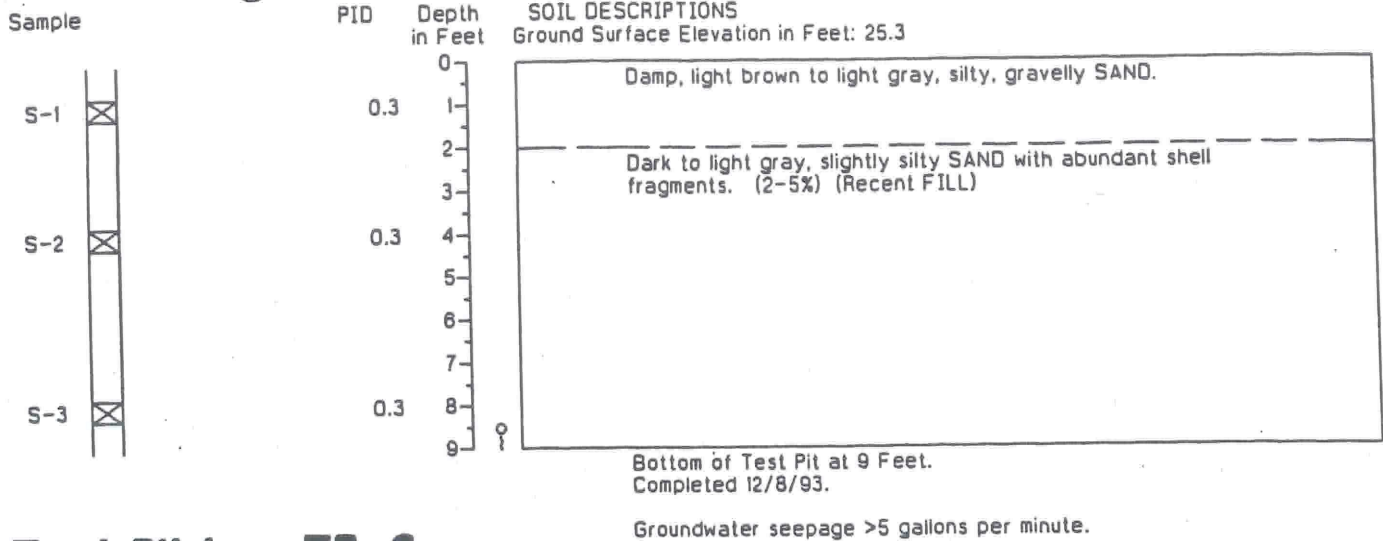
Sample	Lab Tests	PID	Depth in Feet
S-1		250	2.5
S-2	CA	275	5.5

SOIL DESCRIPTIONS

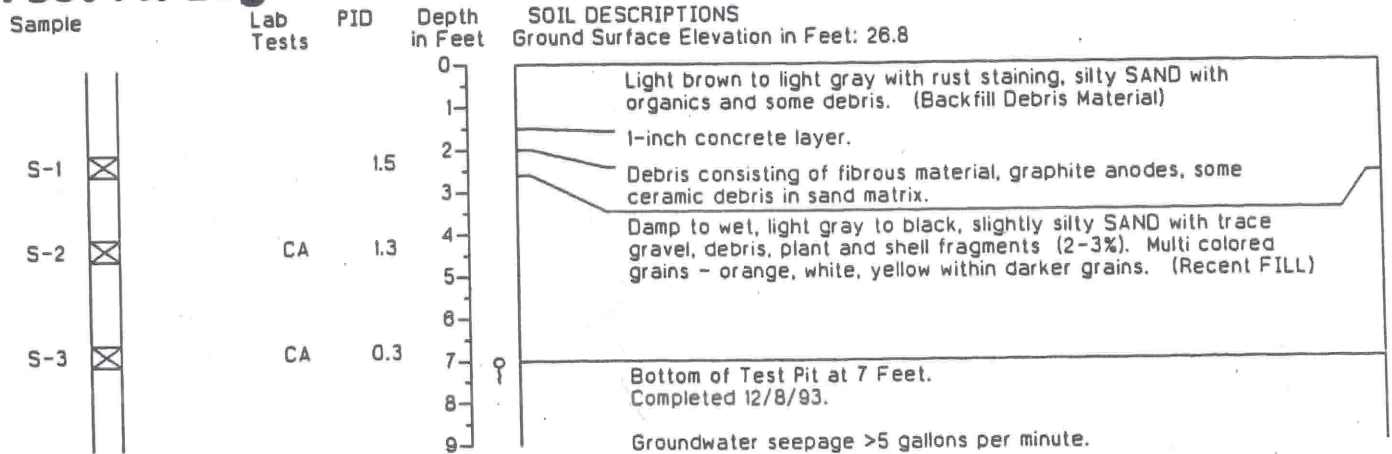
0 - 2.5	(Loose), moist to wet, black, slightly silty, fine to medium SAND with shells and petroleum hydrocarbon-like staining and odor. (FILL)
2.5 - 5.5	
5.5 - 7.0	Bottom of Test Pit at 7 Feet. Completed 3/28/95. Groundwater seepage observed at 7-foot depth. Caving at 5- to 7-foot depths.

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

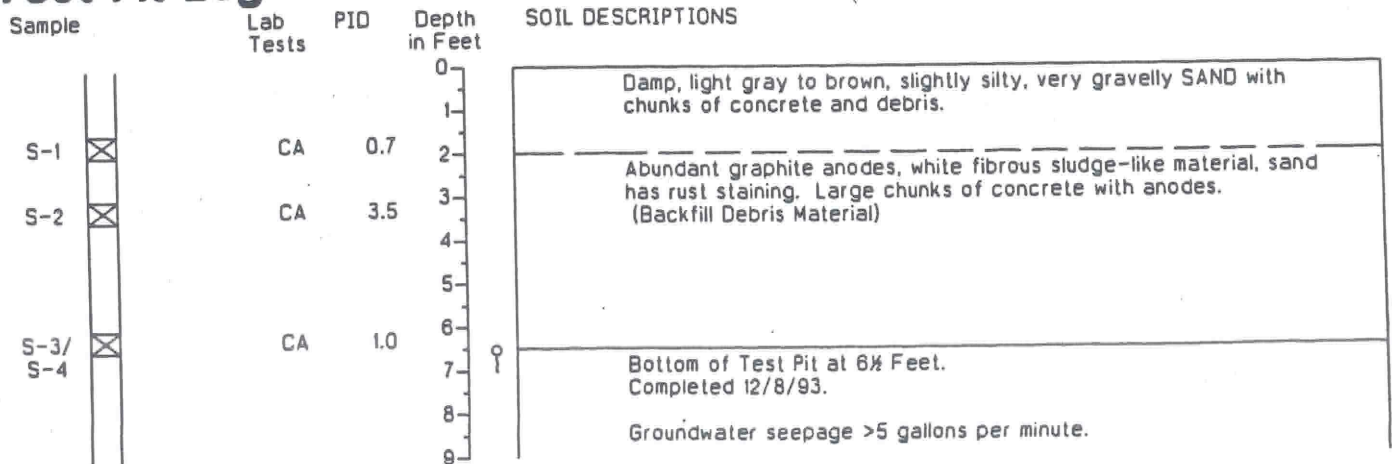
Test Pit Log TP-1



Test Pit Log TP-2



Test Pit Log TP-3



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

Test Pit Log TP-1

Sample	Lab Tests	PID	Depth in Feet
S-1		125	1.5
S-2	CA	350	5.5

SOIL DESCRIPTIONS

0 - 1.5	(Medium dense), moist, brown, gravelly SAND. (FILL) (Not stained)
1.5 - 5.5	(Loose), moist to wet, black, slightly silty, fine to medium SAND with shells and petroleum hydrocarbon-like staining and odor. (FILL)
5.5 - 7.0	Bottom of Test Pit at 7 Feet. Completed 3/28/95. Groundwater seepage observed at 7-foot depth. Caving at 5- to 7-foot depths.

Test Pit Log TP-2

Sample	Lab Tests	PID	Depth in Feet
S-1		250	2.5
S-2	CA	300	5.0

SOIL DESCRIPTIONS

0 - 2.5	(Loose), moist to wet, black, slightly silty, fine to medium SAND with shells and petroleum hydrocarbon-like staining and odor. (FILL)
2.5 - 5.0	
5.0 - 7.0	Bottom of Test Pit at 7 Feet. Completed 3/28/95. Groundwater seepage observed at 7-foot depth.

Test Pit Log TP-3

Sample	Lab Tests	PID	Depth in Feet
S-1		250	2.5
S-2	CA	275	5.5

SOIL DESCRIPTIONS

0 - 2.5	(Loose), moist to wet, black, slightly silty, fine to medium SAND with shells and petroleum hydrocarbon-like staining and odor. (FILL)
2.5 - 5.5	
5.5 - 7.0	Bottom of Test Pit at 7 Feet. Completed 3/28/95. Groundwater seepage observed at 7-foot depth. Caving at 5- to 7-foot depths.

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

Test Pit Log TP-3A

Sample	Depth in Feet	SOIL DESCRIPTIONS
	0	(Loose), moist to wet, brown, slightly silty, fine to medium SAND. (FILL) Becomes gray with petroleum hydrocarbon-like staining.
	1	
	2	
	3	
	4	
	5	
	6	Bottom of Test Pit at 6½ Feet. Completed 3/28/95.
	7	Groundwater seepage observed at 6½-foot depth. No samples collected.
	8	
	9	

Test Pit Log TP-4

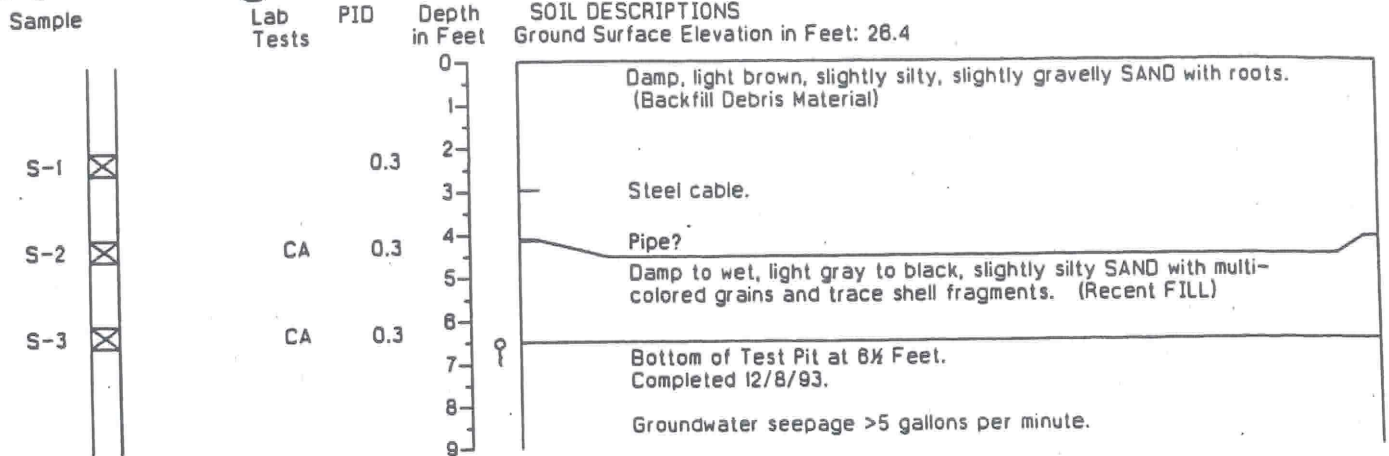
Sample	Lab Tests	PID	Depth in Feet	SOIL DESCRIPTIONS
			0	(Loose), moist to wet, dark gray, slightly silty, fine to medium SAND with shells and petroleum hydrocarbon-like staining and odor. (FILL) Odor more noticeable as soil becomes wet.
S-1		275	1	
			2	
			3	
S-2	CA	300	4	
			5	
			6	Bottom of Test Pit at 7 Feet. Completed 3/28/95.
			7	Groundwater seepage observed at 7-foot depth.
			8	
			9	

Test Pit Log TP-5

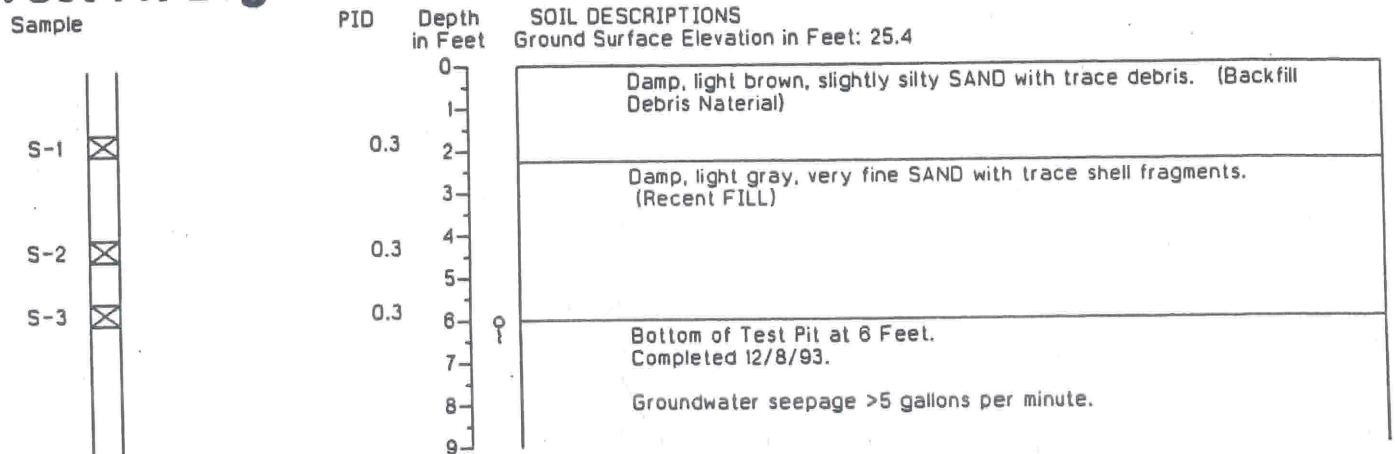
Sample	Lab Tests	PID	Depth in Feet	SOIL DESCRIPTIONS
			0	(Loose), moist to wet, black, slightly silty, fine to medium SAND with shells and petroleum hydrocarbon-like staining. (FILL)
S-1		250	1	
			2	
			3	
S-2	CA	225	4	
			5	
			6	Bottom of Test Pit at 6½ Feet. Completed 3/28/95.
			7	Groundwater seepage observed at 6½-foot depth.
			8	
			9	

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

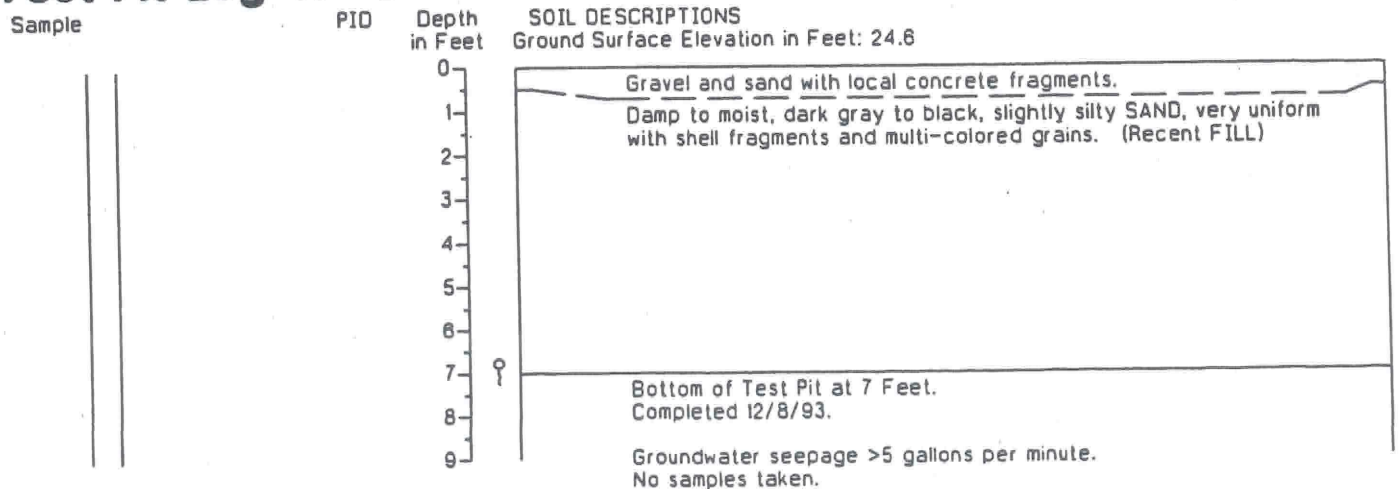
Test Pit Log TP-4



Test Pit Log TP-5



Test Pit Log TP-6



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

Test Pit Log TP-3A

Sample

Depth
in Feet

SOIL DESCRIPTIONS



(Loose), moist to wet, brown, slightly silty, fine to medium SAND. (FILL)

Becomes gray with petroleum hydrocarbon-like staining.

Bottom of Test Pit at 6½ Feet.
Completed 3/28/95.

Groundwater seepage observed at 6½-foot depth.
No samples collected.

Test Pit Log TP-4

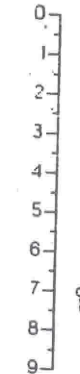
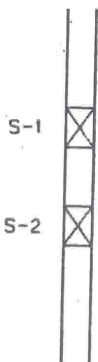
Sample

Lab
Tests

PID

Depth
in Feet

SOIL DESCRIPTIONS



(Loose), moist to wet, dark gray, slightly silty, fine to medium SAND with shells and petroleum hydrocarbon-like staining and odor. (FILL)

Odor more noticeable as soil becomes wet.

Bottom of Test Pit at 7 Feet.
Completed 3/28/95.

Groundwater seepage observed at 7-foot depth.

Test Pit Log TP-5

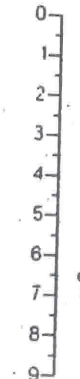
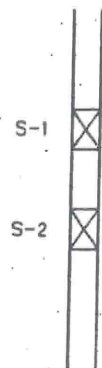
Sample

Lab
Tests

PID

Depth
in Feet

SOIL DESCRIPTIONS



(Loose), moist to wet, black, slightly silty, fine to medium SAND with shells and petroleum hydrocarbon-like staining. (FILL)

Bottom of Test Pit at 6½ Feet.
Completed 3/28/95.

Groundwater seepage observed at 6½-foot depth.

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.



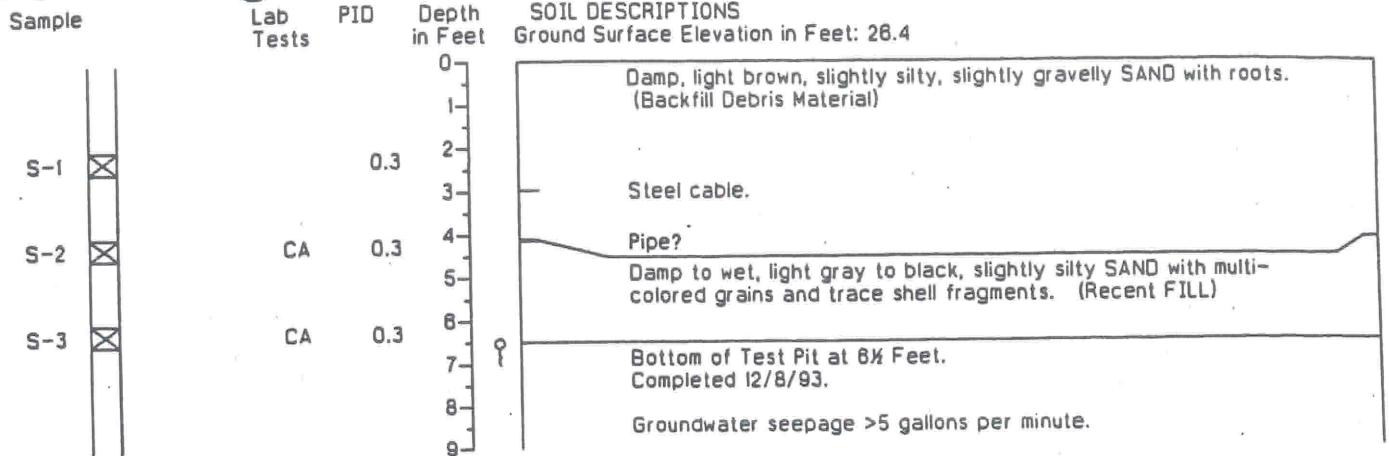
HARTCROWSER

J-3712-09

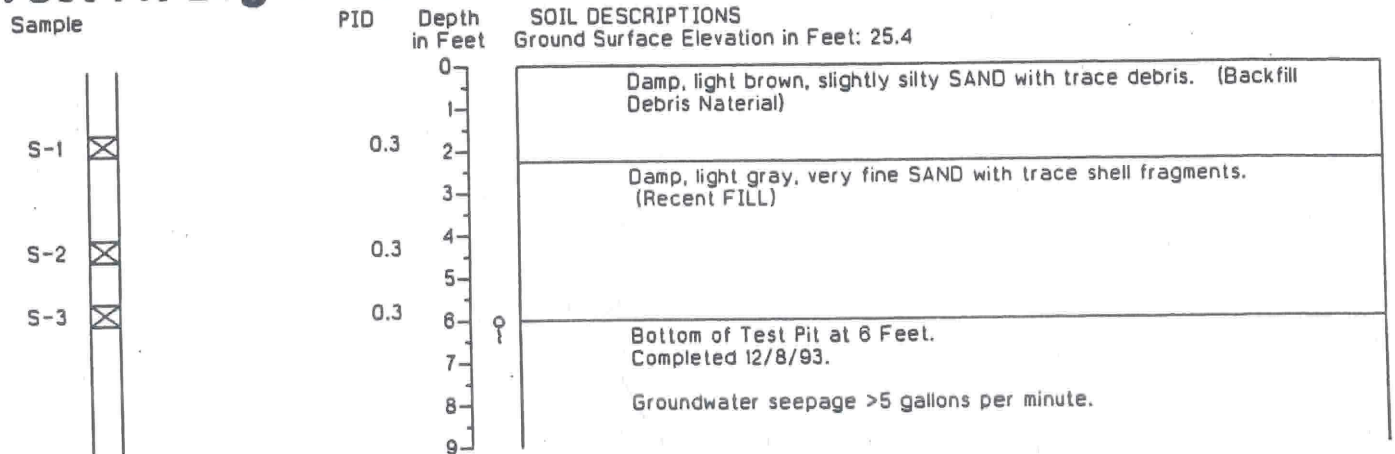
3/95

Figure A-15

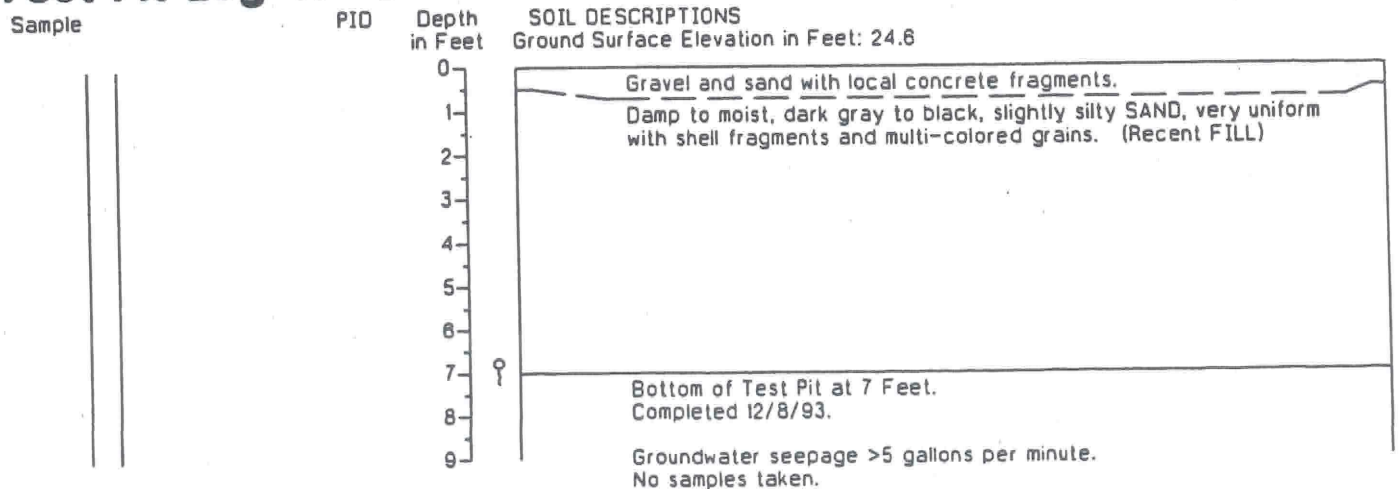
Test Pit Log TP-4



Test Pit Log TP-5



Test Pit Log TP-6



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

Test Pit Log TP-3A

Sample	Depth in Feet	SOIL DESCRIPTIONS
	0	(Loose), moist to wet, brown, slightly silty, fine to medium SAND. (FILL) Becomes gray with petroleum hydrocarbon-like staining.
	1	
	2	
	3	
	4	
	5	
	6	Bottom of Test Pit at 6½ Feet. Completed 3/28/95.
	7	Groundwater seepage observed at 6½-foot depth. No samples collected.
	8	
	9	

Test Pit Log TP-4

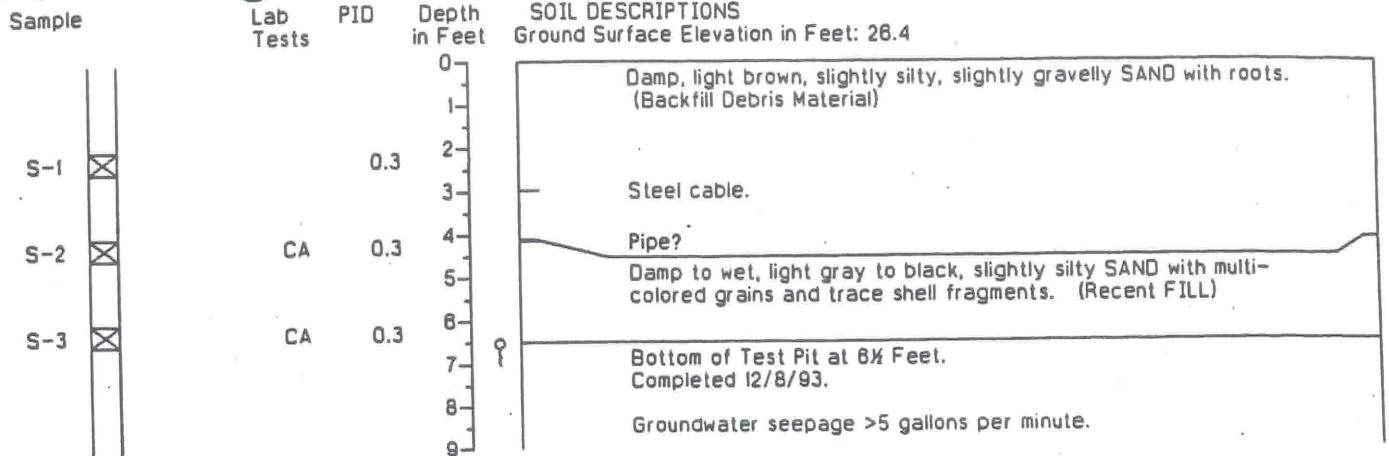
Sample	Lab Tests	PID	Depth in Feet	SOIL DESCRIPTIONS
			0	(Loose), moist to wet, dark gray, slightly silty, fine to medium SAND with shells and petroleum hydrocarbon-like staining and odor. (FILL) Odor more noticeable as soil becomes wet.
S-1		275	1	
			2	
			3	
S-2	CA	300	4	
			5	
			6	Bottom of Test Pit at 7 Feet. Completed 3/28/95.
			7	Groundwater seepage observed at 7-foot depth.
			8	
			9	

Test Pit Log TP-5

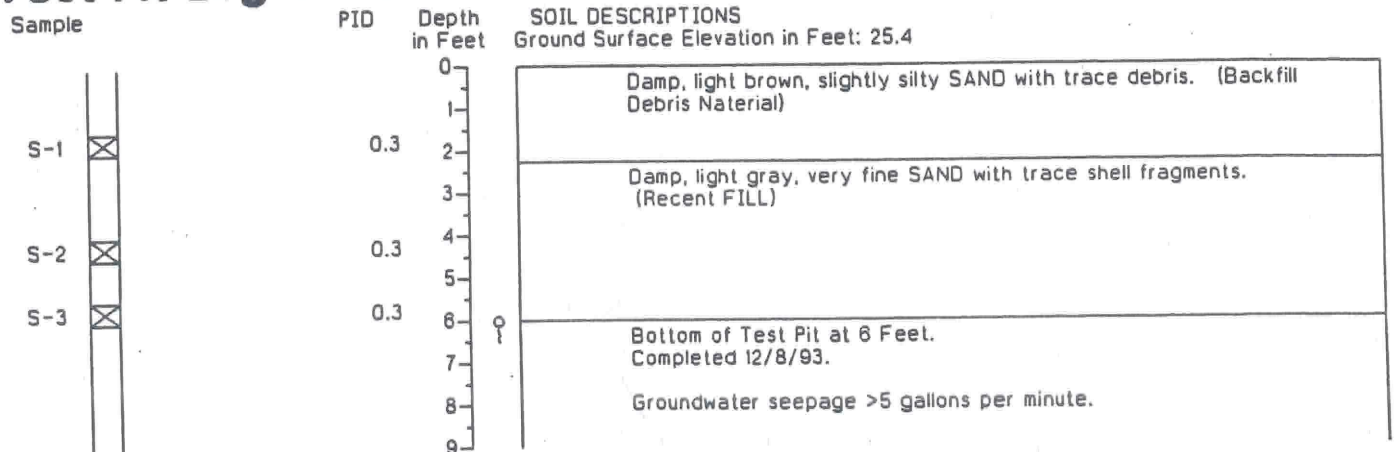
Sample	Lab Tests	PID	Depth in Feet	SOIL DESCRIPTIONS
			0	(Loose), moist to wet, black, slightly silty, fine to medium SAND with shells and petroleum hydrocarbon-like staining. (FILL)
S-1		250	1	
			2	
			3	
S-2	CA	225	4	
			5	
			6	Bottom of Test Pit at 6½ Feet. Completed 3/28/95.
			7	Groundwater seepage observed at 6½-foot depth.
			8	
			9	

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

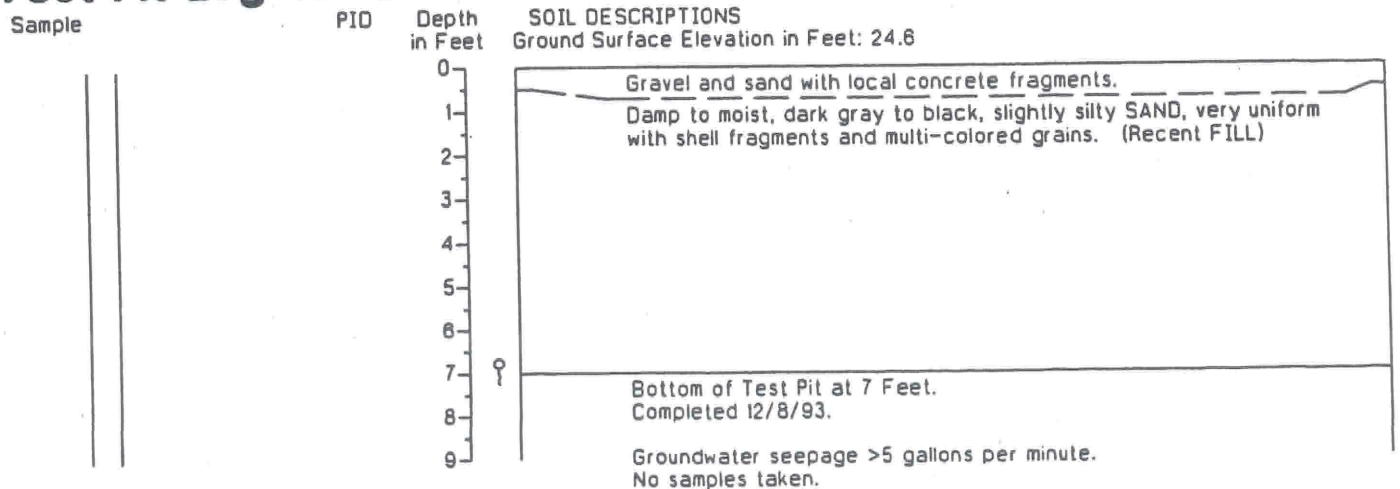
Test Pit Log TP-4



Test Pit Log TP-5

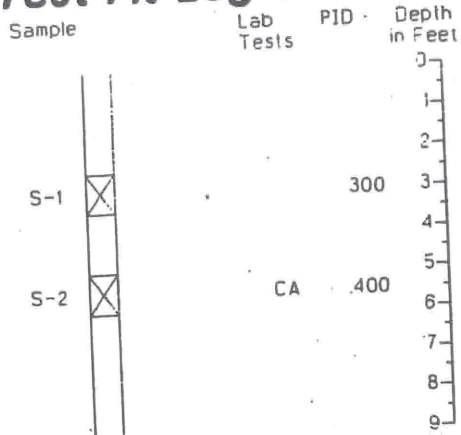


Test Pit Log TP-6

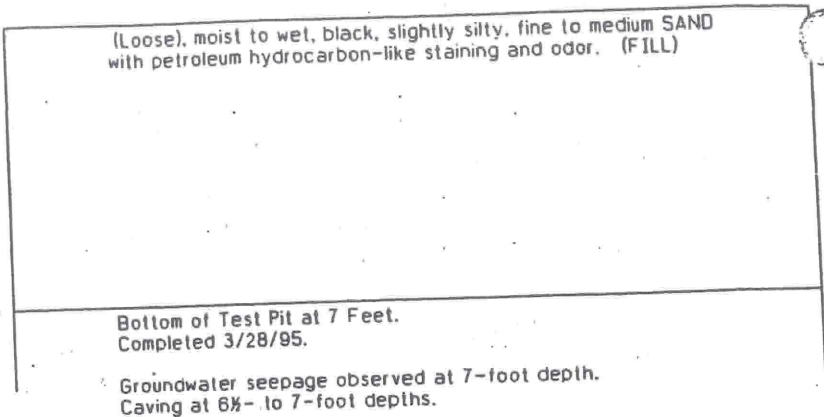


1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

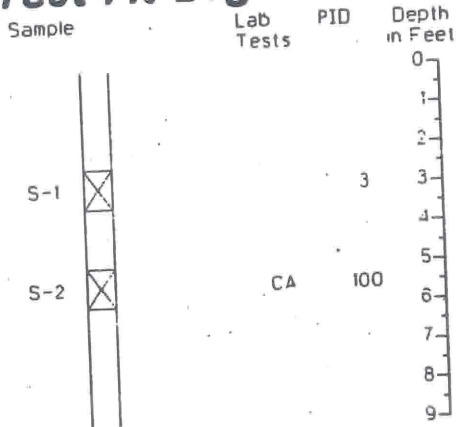
Test Pit Log TP-6



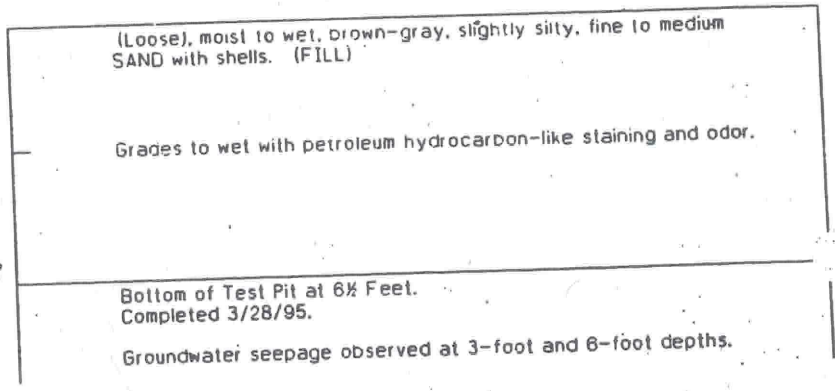
SOIL DESCRIPTIONS



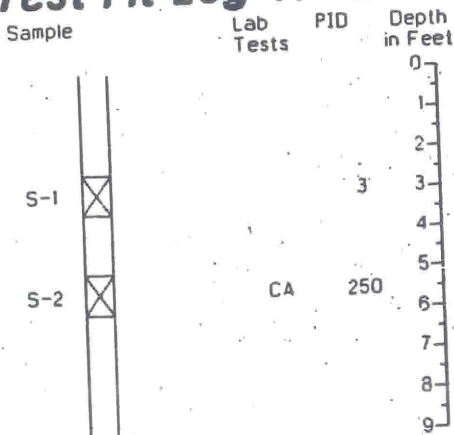
Test Pit Log TP-7



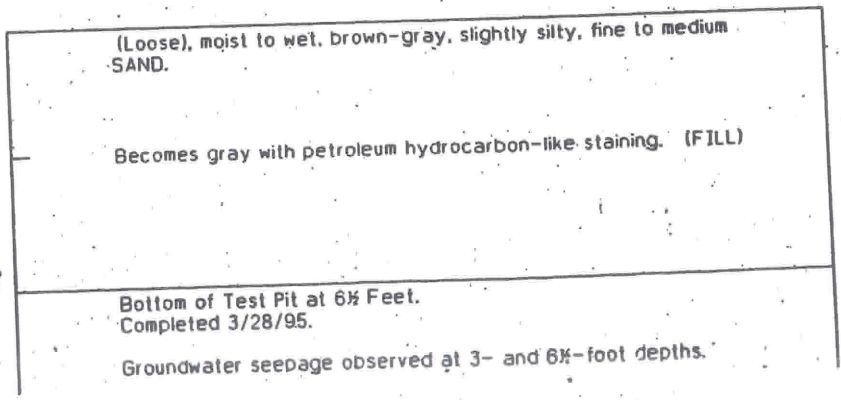
SOIL DESCRIPTIONS



Test Pit Log TP-8

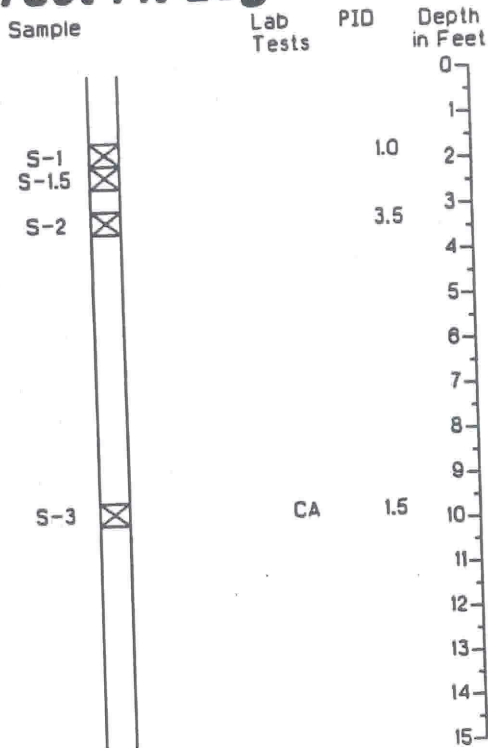


SOIL DESCRIPTIONS

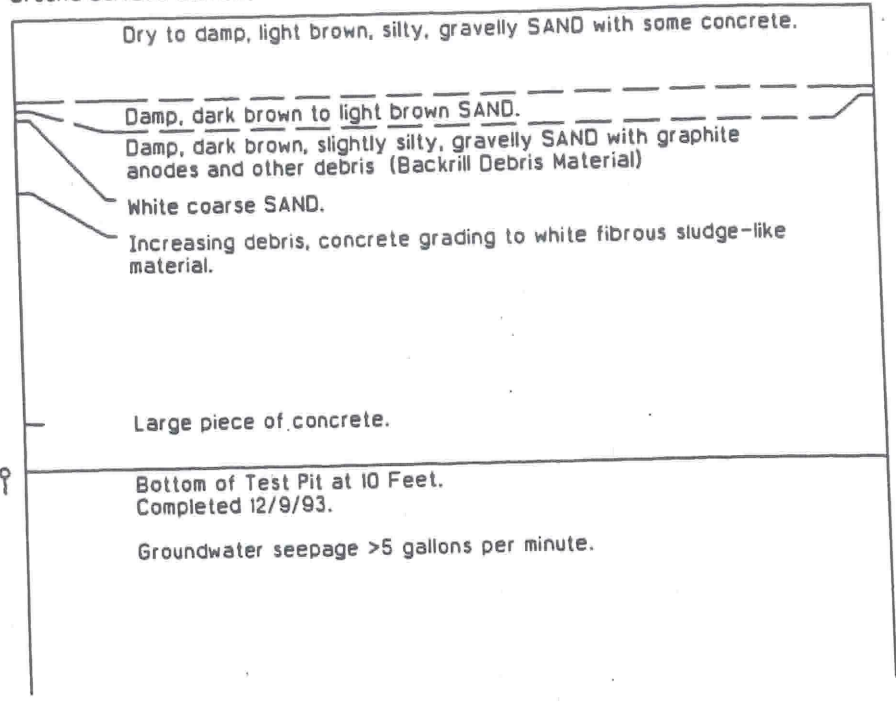


1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

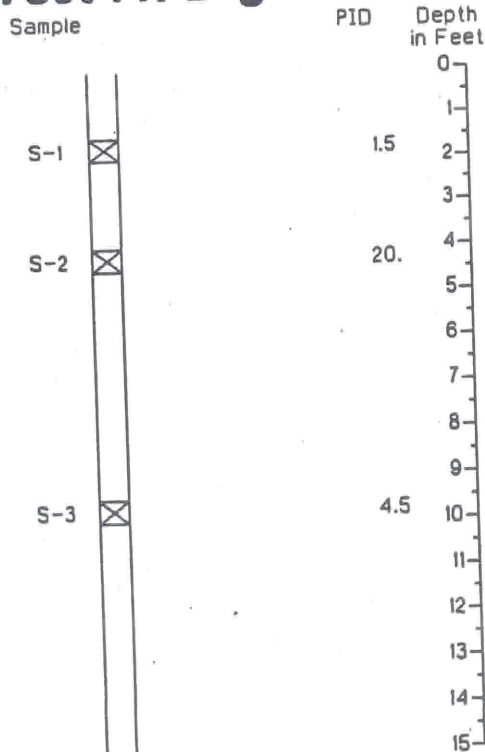
Test Pit Log TP-7



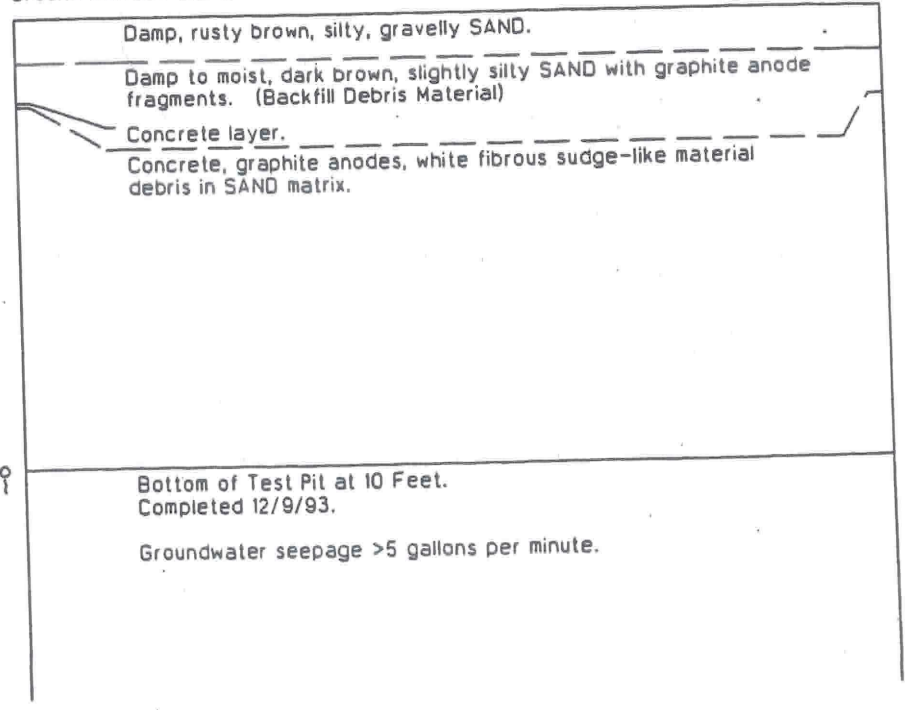
SOIL DESCRIPTIONS
Ground Surface Elevation in Feet: 27.7



Test Pit Log TP-8

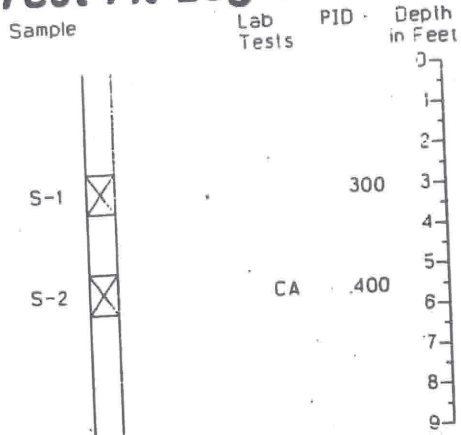


SOIL DESCRIPTIONS
Ground Surface Elevation in Feet: 27.3

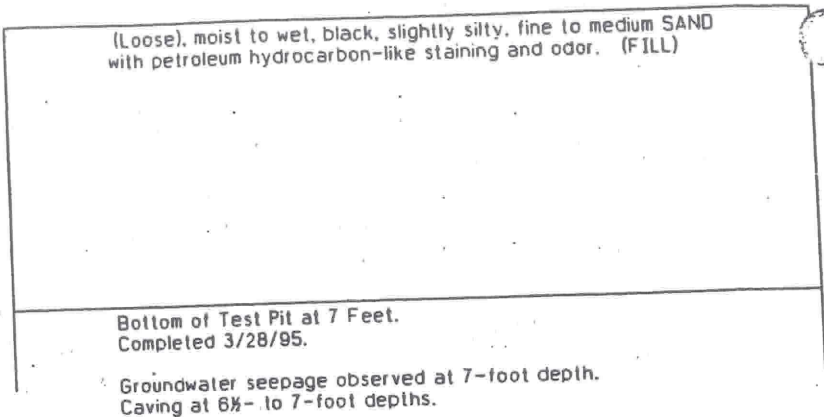


1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

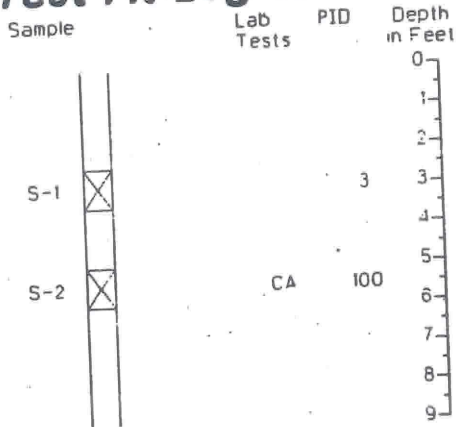
Test Pit Log TP-6



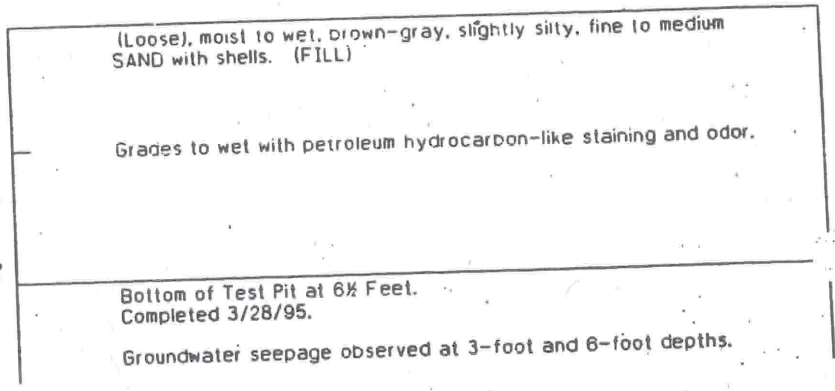
SOIL DESCRIPTIONS



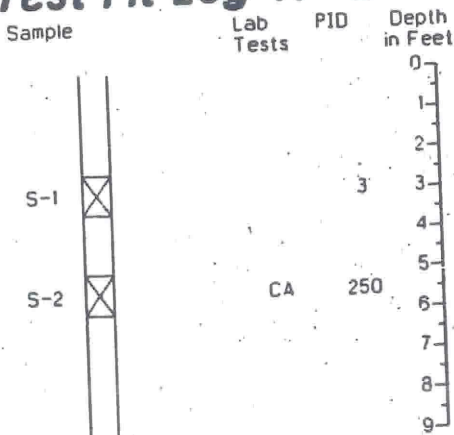
Test Pit Log TP-7



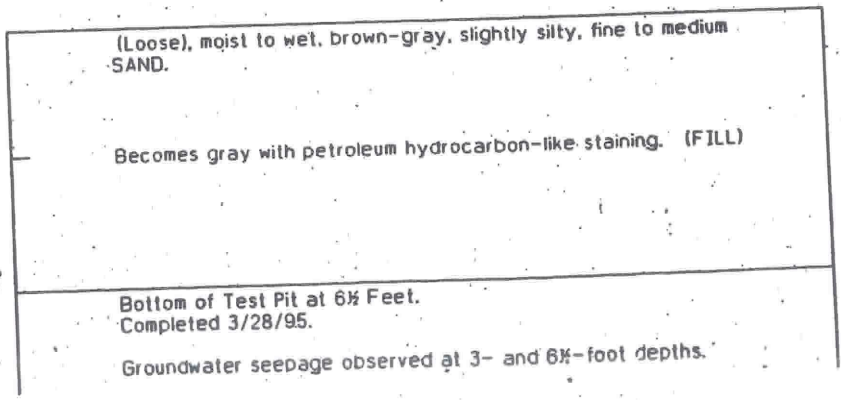
SOIL DESCRIPTIONS



Test Pit Log TP-8

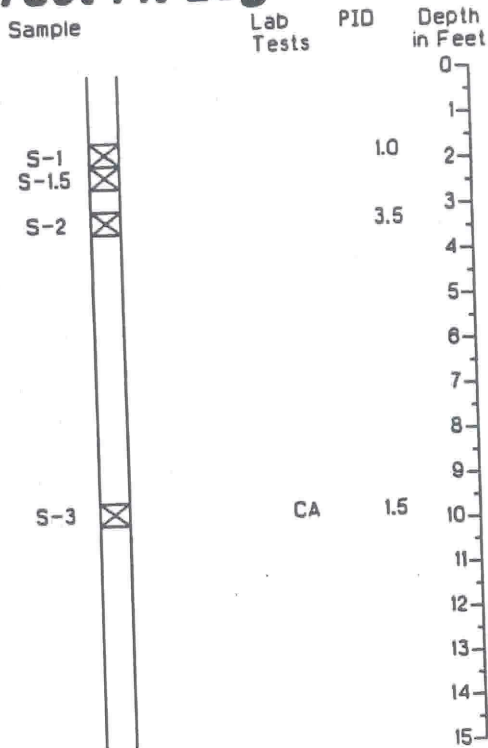


SOIL DESCRIPTIONS

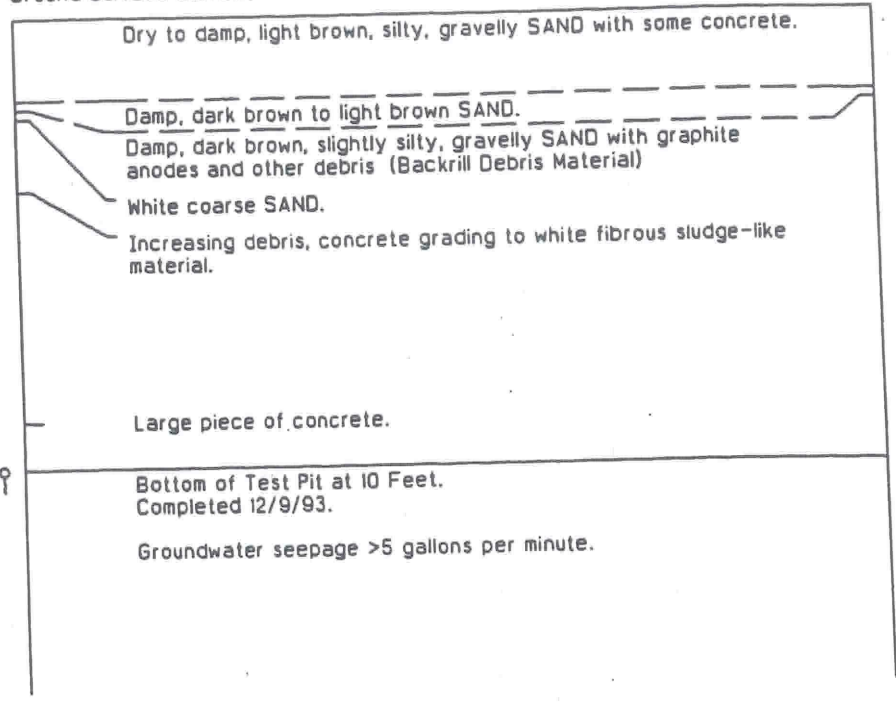


1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

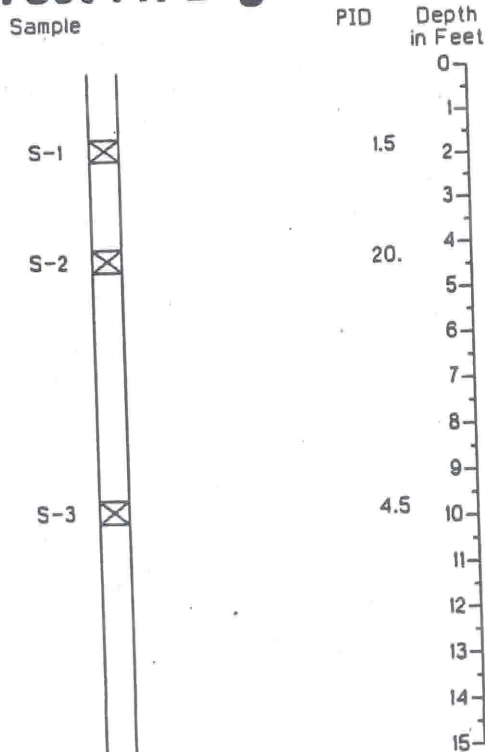
Test Pit Log TP-7



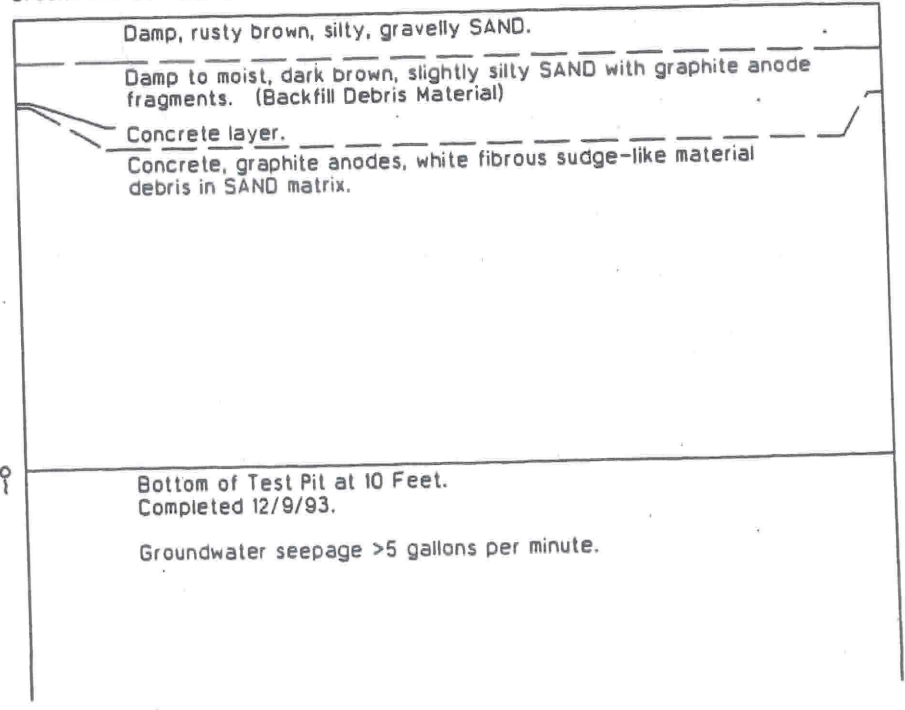
SOIL DESCRIPTIONS
Ground Surface Elevation in Feet: 27.7



Test Pit Log TP-8

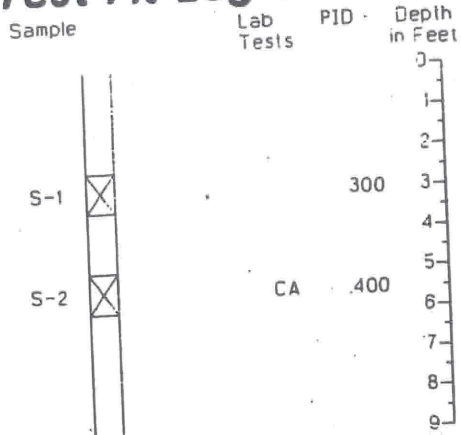


SOIL DESCRIPTIONS
Ground Surface Elevation in Feet: 27.3



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

Test Pit Log TP-6



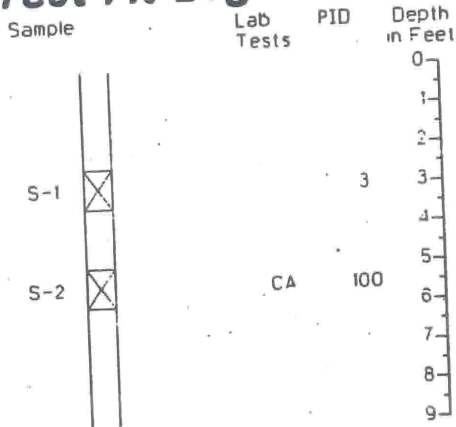
SOIL DESCRIPTIONS

(Loose), moist to wet, black, slightly silty, fine to medium SAND with petroleum hydrocarbon-like staining and odor. (FILL)

Bottom of Test Pit at 7 Feet.
Completed 3/28/95.

Groundwater seepage observed at 7-foot depth.
Caving at 6½- to 7-foot depths.

Test Pit Log TP-7



SOIL DESCRIPTIONS

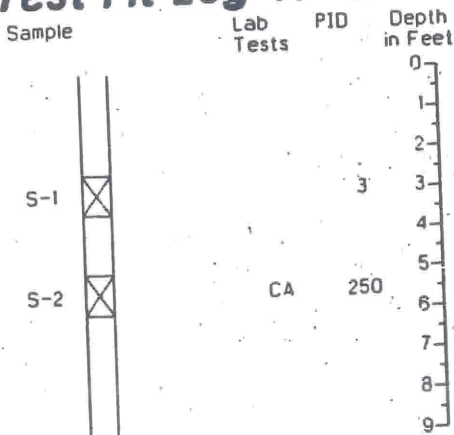
(Loose), moist to wet, brown-gray, slightly silty, fine to medium SAND with shells. (FILL)

Grades to wet with petroleum hydrocarbon-like staining and odor.

Bottom of Test Pit at 6½ Feet.
Completed 3/28/95.

Groundwater seepage observed at 3-foot and 6-foot depths.

Test Pit Log TP-8



SOIL DESCRIPTIONS

(Loose), moist to wet, brown-gray, slightly silty, fine to medium SAND.

Becomes gray with petroleum hydrocarbon-like staining. (FILL)

Bottom of Test Pit at 6½ Feet.
Completed 3/28/95.

Groundwater seepage observed at 3- and 6½-foot depths.

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

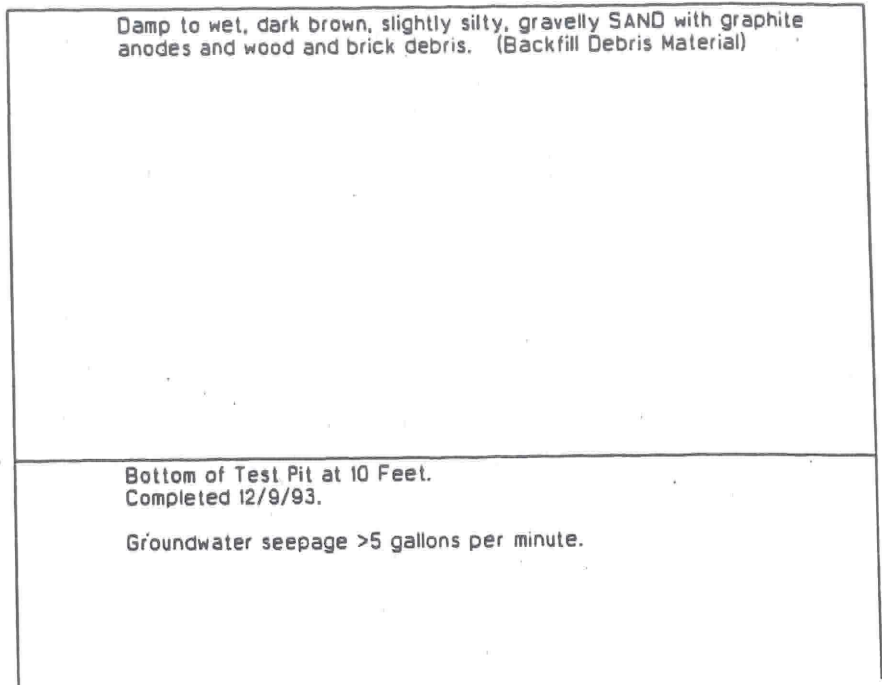
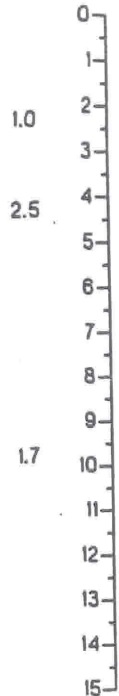
Test Pit Log TP-9

Sample

PID

Depth
in Feet

SOIL DESCRIPTIONS
Ground Surface Elevation in Feet: 27.6



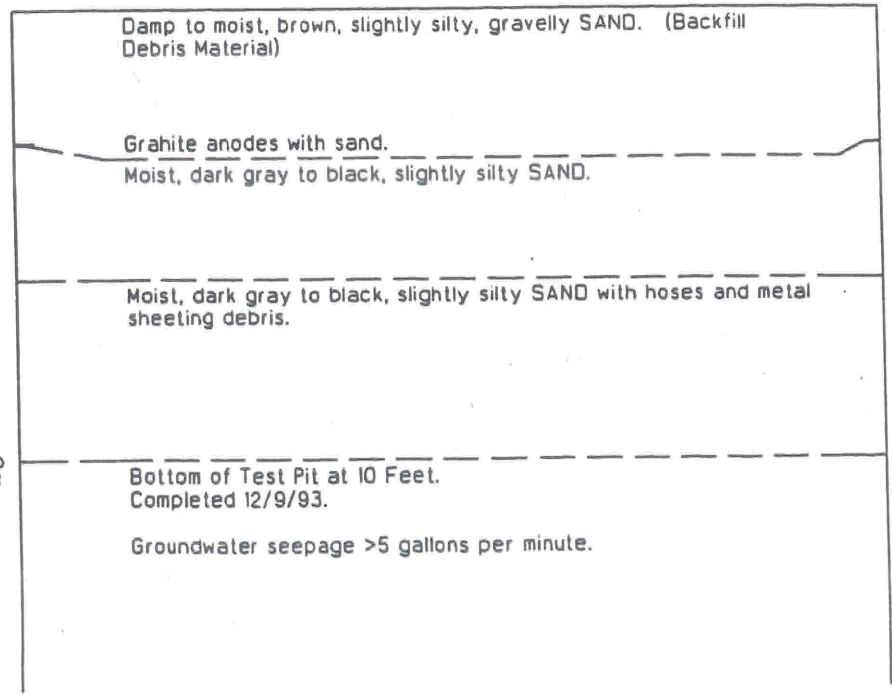
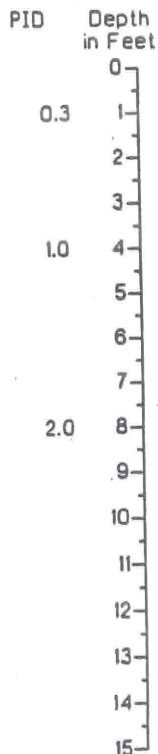
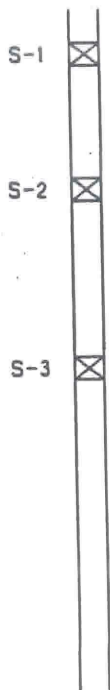
Test Pit Log TP-10

Sample

PID

Depth
in Feet

SOIL DESCRIPTIONS
Ground Surface Elevation in Feet: 27.5



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.

Test Pit Log TP-9

Sample	Lab Tests	PID	Depth in Feet
S-1		<2	3
S-2	CA	30	5

SOIL DESCRIPTIONS

0 - 3	(Medium dense to loose), moist, brown, gravelly SAND (FILL)
3 - 4	(Loose), moist to wet, dark brown-gray, slightly silty, fine to medium SAND with shells. (FILL)
4 - 5	Encountered 18-inch-diameter pipe. Appears to run east-west.
5 - 7	Becomes gray with petroleum hydrocarbon-like staining and slight odor.
7 - 9	Bottom of Test Pit at 7 Feet. Completed 3/28/95. Caving at 5- to 7-foot depths.

Test Pit Log TP-10

Sample	Lab Tests	PID	Depth in Feet
S-1		<2	3
S-2	CA	30C	5

SOIL DESCRIPTIONS

0 - 3	(Loose to medium dense), moist, brown, gravelly SAND. (FILL).
3 - 4	(Loose), moist to wet, black, slightly silty, fine to medium SAND with shells. (FILL)
4 - 6	Becomes gray with petroleum hydrocarbon-like staining and odor.
6 - 7	Groundwater seepage at 6 1/2-foot depth.
7 - 9	Bottom of Test Pit at 7 Feet. Completed 3/28/95.

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater conditions, if indicated, are at the time of excavation. Conditions may vary with time.



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Figure A-17

Key to Exploration Logs

Sample Description

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:

Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits and probes is estimated based on visual observation and is presented parenthetically on the logs.

SAND or GRAVEL Density	Standard Penetration Resistance (N) in Blows/Foot	SILT or CLAY Consistency	Standard Penetration Resistance (N) in Blows/Foot	Approximate Shear Strength in TSF
Very loose	0 to 4	Very soft	0 to 2	<0.125
Loose	4 to 10	Soft	2 to 4	0.125 to 0.25
Medium dense	10 to 30	Medium stiff	4 to 8	0.25 to 0.5
Dense	30 to 50	Stiff	8 to 15	0.5 to 1.0
Very dense	>50	Very stiff	15 to 30	1.0 to 2.0
		Hard	>30	>2.0

Sampling Test Symbols

	1.5" I.D. Split Spoon		Grab (Jar)		3.0" I.D. Split Spoon
	Shelby Tube (Pushed)		Bag		
	Cuttings		Core Run		

Moisture

Dry	Little perceptible moisture
Damp	Some perceptible moisture, likely below optimum
Moist	Likely near optimum moisture content
Wet	Much perceptible moisture, likely above optimum

Minor Constituents

Estimated Percentage

Trace	<5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

Laboratory Test Symbols

GS	Grain Size Classification
CN	Consolidation
UU	Unconsolidated Undrained Triaxial
CU	Consolidated Undrained Triaxial
CD	Consolidated Drained Triaxial
QU	Unconfined Compression
DS	Direct Shear
K	Permeability
PP	Pocket Penetrometer
	Approximate Compressive Strength in TSF
TV	Torvane
	Approximate Shear Strength in TSF
CBR	California Bearing Ratio
MD	Moisture Density Relationship
AL	Atterberg Limits
	Water Content in Percent
	Liquid Limit
	Natural Plastic Limit
PID	Photoionization Detector Reading
CA	Chemical Analysis
DT	In Situ Density in PCF
OT	Tests by Others

SOIL CLASSIFICATION CHART

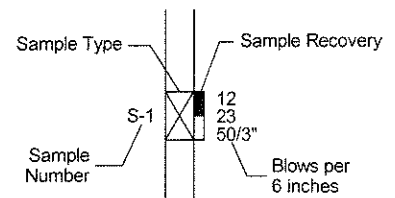
MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
			COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	
GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GP			POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE		GM			SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)			SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)			SM	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE			SC	SILTY SANDS, SAND - SILT MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	Liquid Limit LESS THAN 50		ML	CLAYEY SANDS, SAND - CLAY MIXTURES
				CL	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				OL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
	SILTS AND CLAYS	Liquid Limit GREATER THAN 50		MH	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
				CH	INORGANIC SILTS, MICACEOUS OR DIATOMEACEOUS FINE SAND OR SILTY SOILS
				OH	INORGANIC CLAYS OF HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
					PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

Groundwater Indicators

	Groundwater Level on Date or (ATD) At Time of Drilling
	Groundwater Seepage (Test Pits)

Sample Key



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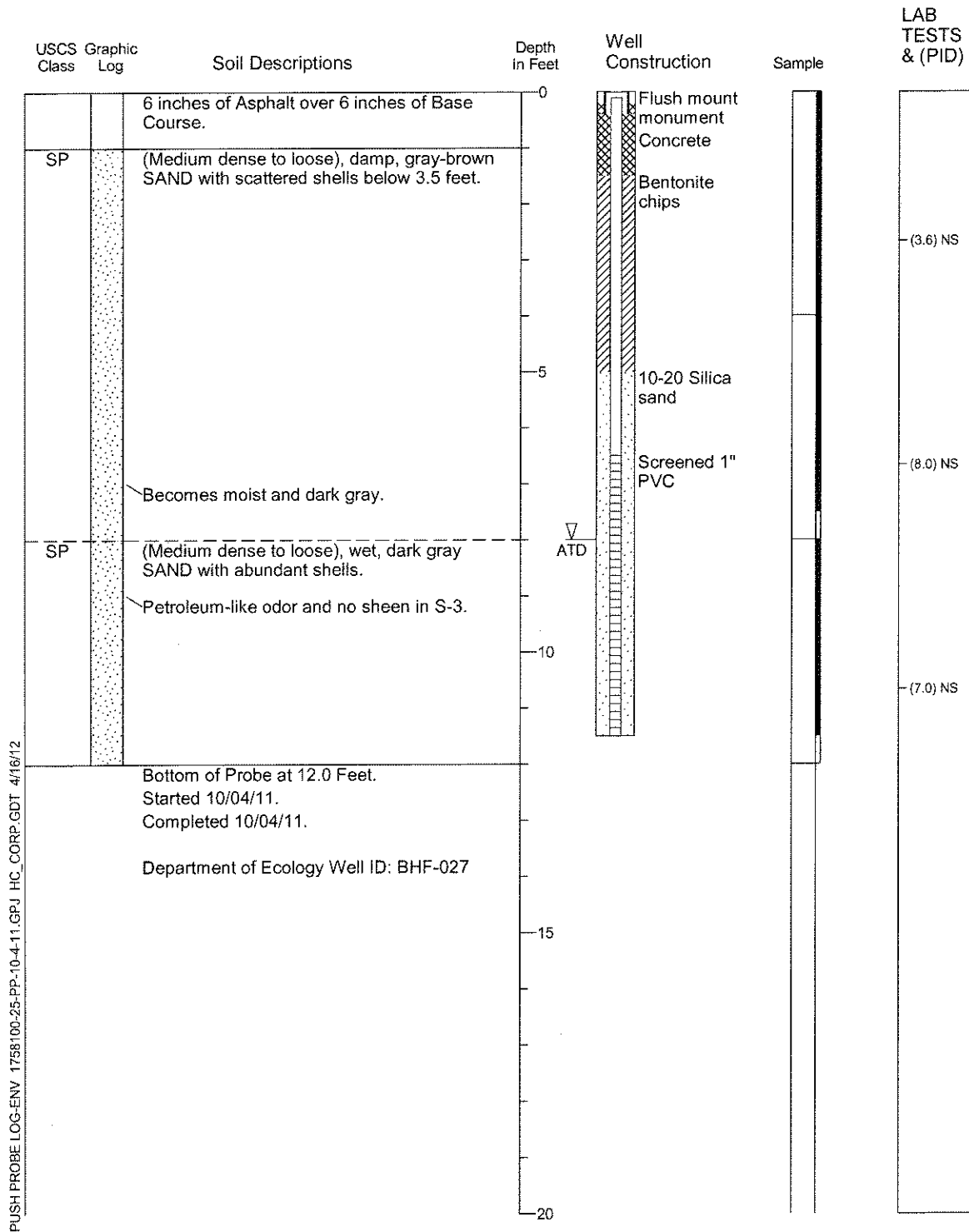
10/11

Figure A-1

Push Probe Log HC-N11-5

Location: N 47.2759577 E -122.4035966
 Approximate Ground Surface Elevation: 9.51 Feet
 Horizontal Datum: WGS 1984
 Vertical Datum: MLLW
 Top of Well Casing Elevation: 17.28 Feet

Drill Equipment: Push Probe
 Sample Type: Acetate Liner
 Hole Diameter: 1 inches
 Logged By: P. Cordell Reviewed By: C. Rust



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen



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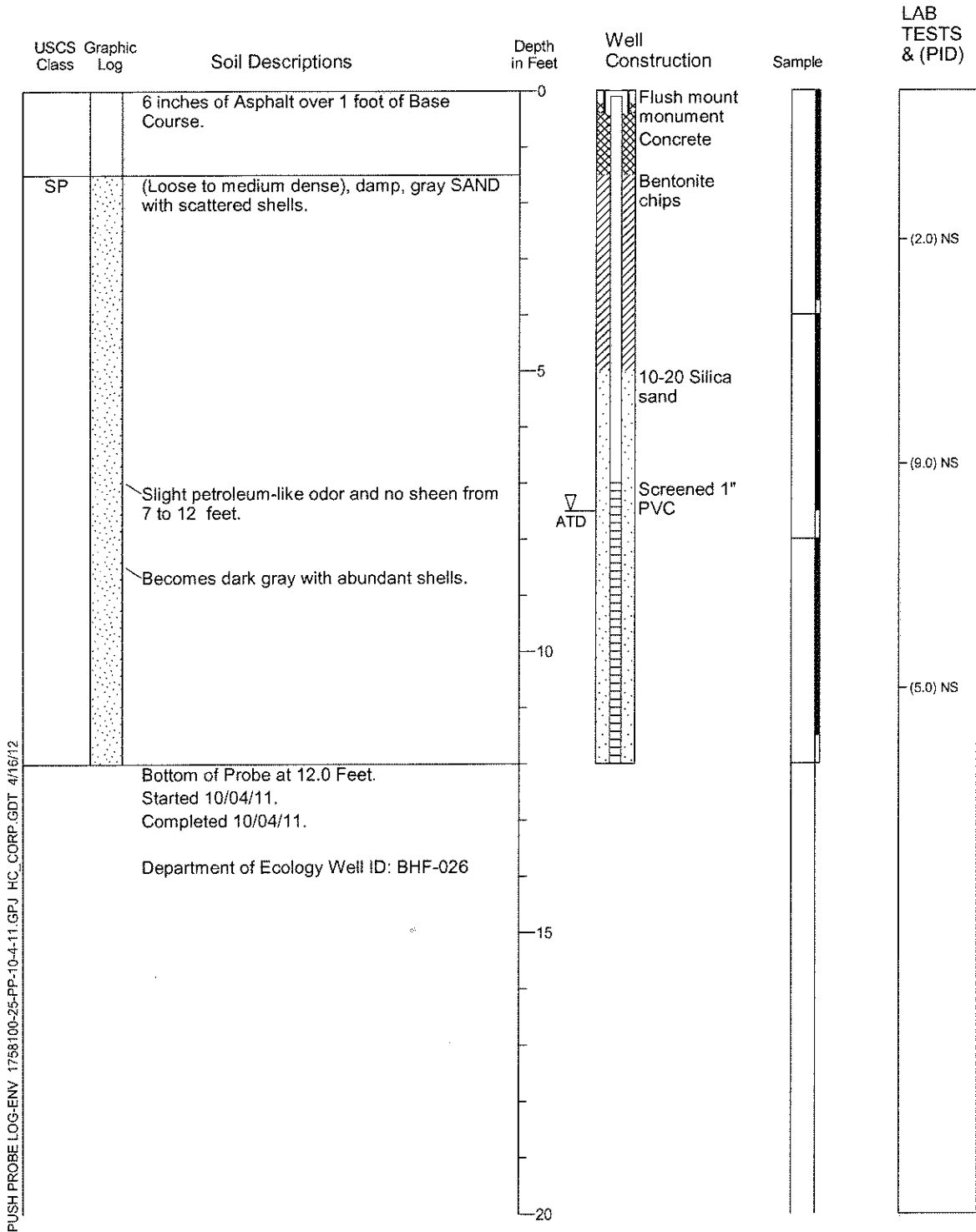
10/11

Figure A-2

Push Probe Log HC-N11-6

Location: N 47.2759524 E -122.403241
 Approximate Ground Surface Elevation: 9.61 Feet
 Horizontal Datum: WGS 1984
 Vertical Datum: MLLW
 Top of Well Casing Elevation: 16.96 Feet

Drill Equipment: Push Probe
 Sample Type: Acetate Liner
 Hole Diameter: 1 inches
 Logged By: P. Cordell Reviewed By: C. Rust



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen



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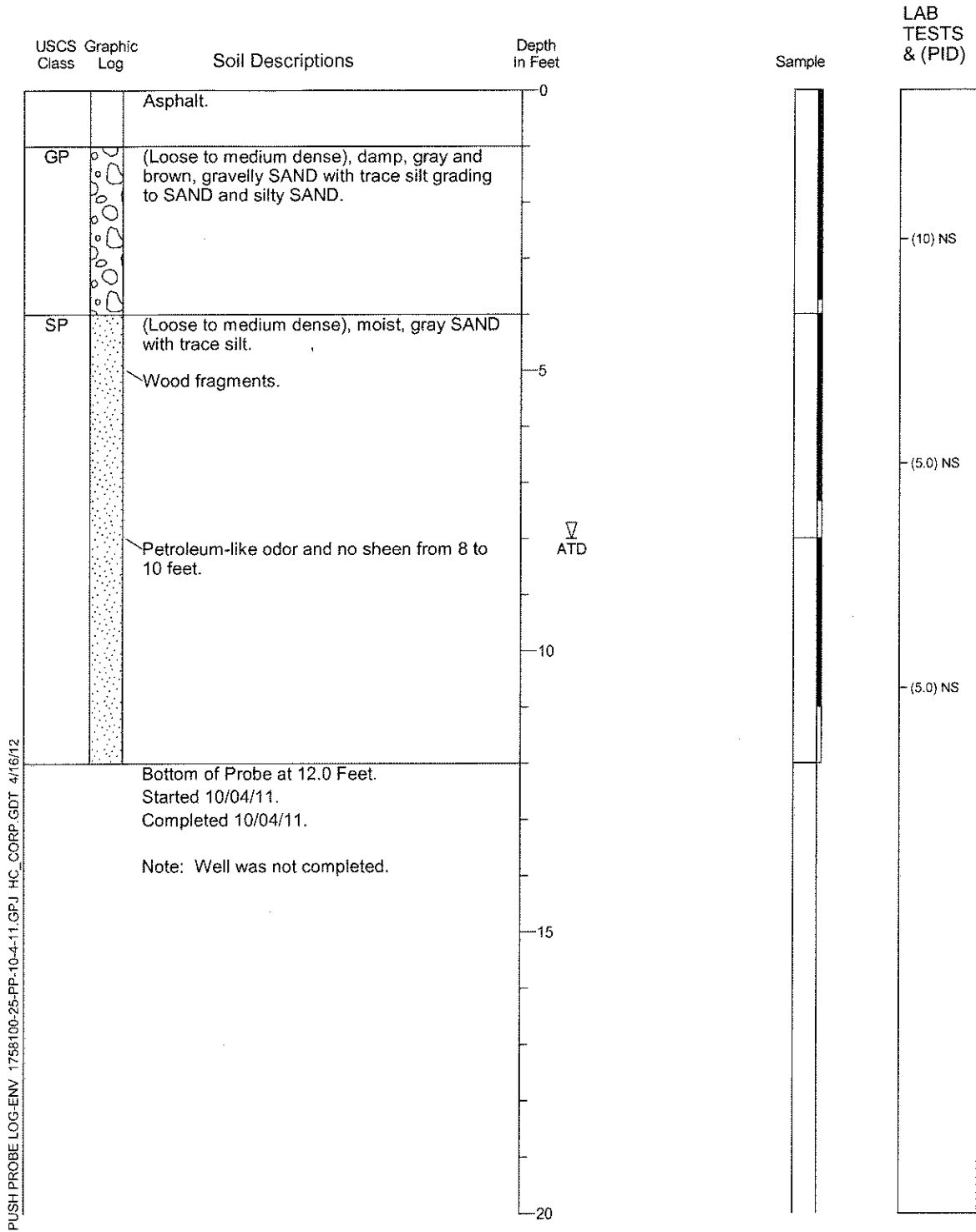
10/11

Figure A-3

Push Probe Log HC-N11-7

Location: N 47.276197 E -122.403615
 Approximate Ground Surface Elevation: NA Feet
 Horizontal Datum: WGS 1984
 Vertical Datum: MLLW

Drill Equipment: Push Probe
 Sample Type: Acetate Liner
 Hole Diameter: 1 inches
 Logged By: P. Cordell Reviewed By: C. Rust



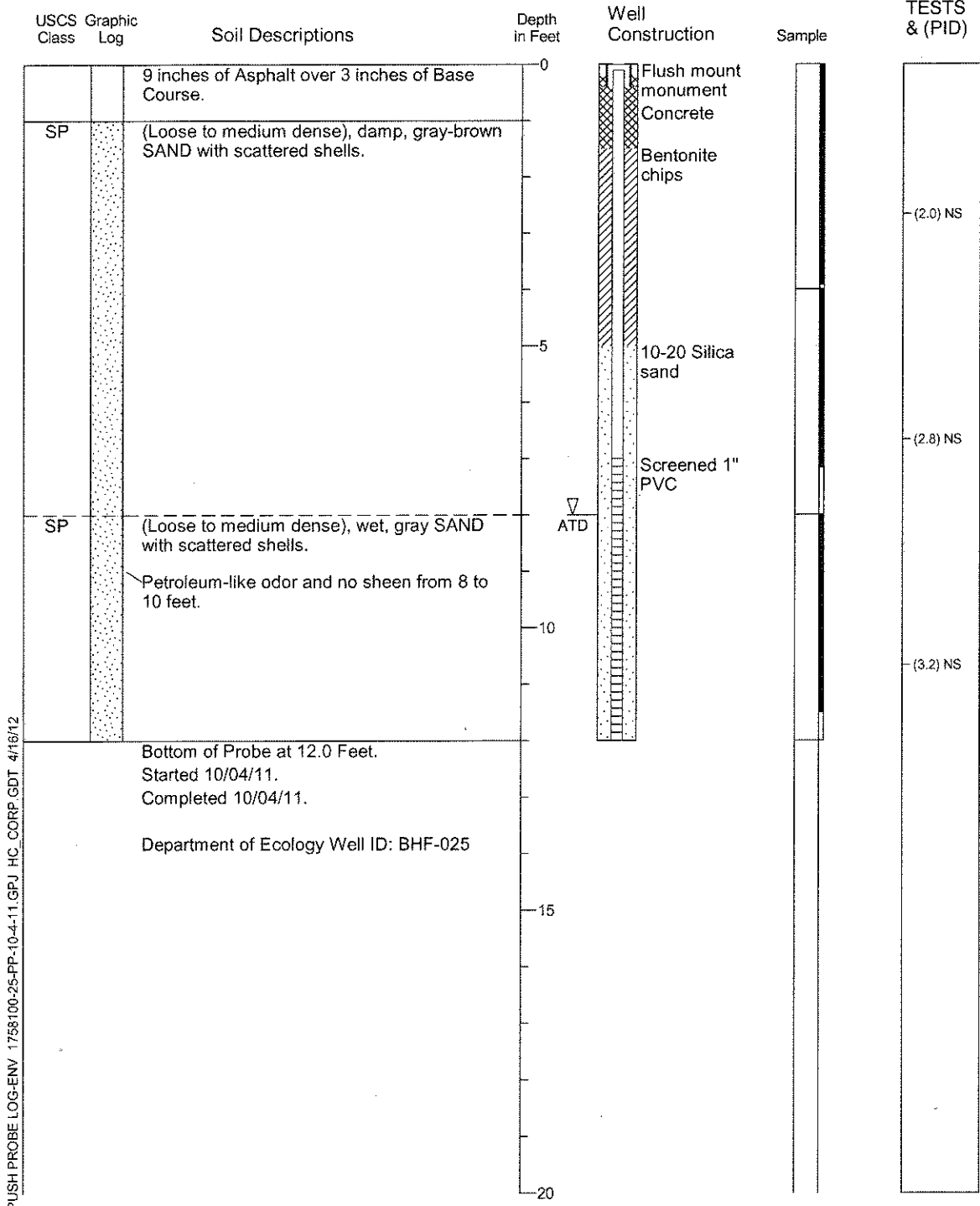
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Push Probe Log HC-N11-8

Location: N 47.2762107 E -122.4036411
 Approximate Ground Surface Elevation: 9.68 Feet
 Horizontal Datum: WGS 1984
 Vertical Datum: MLLW
 Top of Well Casing Elevation: 17.66 Feet

Drill Equipment: Push Probe
 Sample Type: Acetate Liner
 Hole Diameter: 1 inches
 Logged By: P. Cordell Reviewed By: C. Rust

LAB TESTS & (PID)

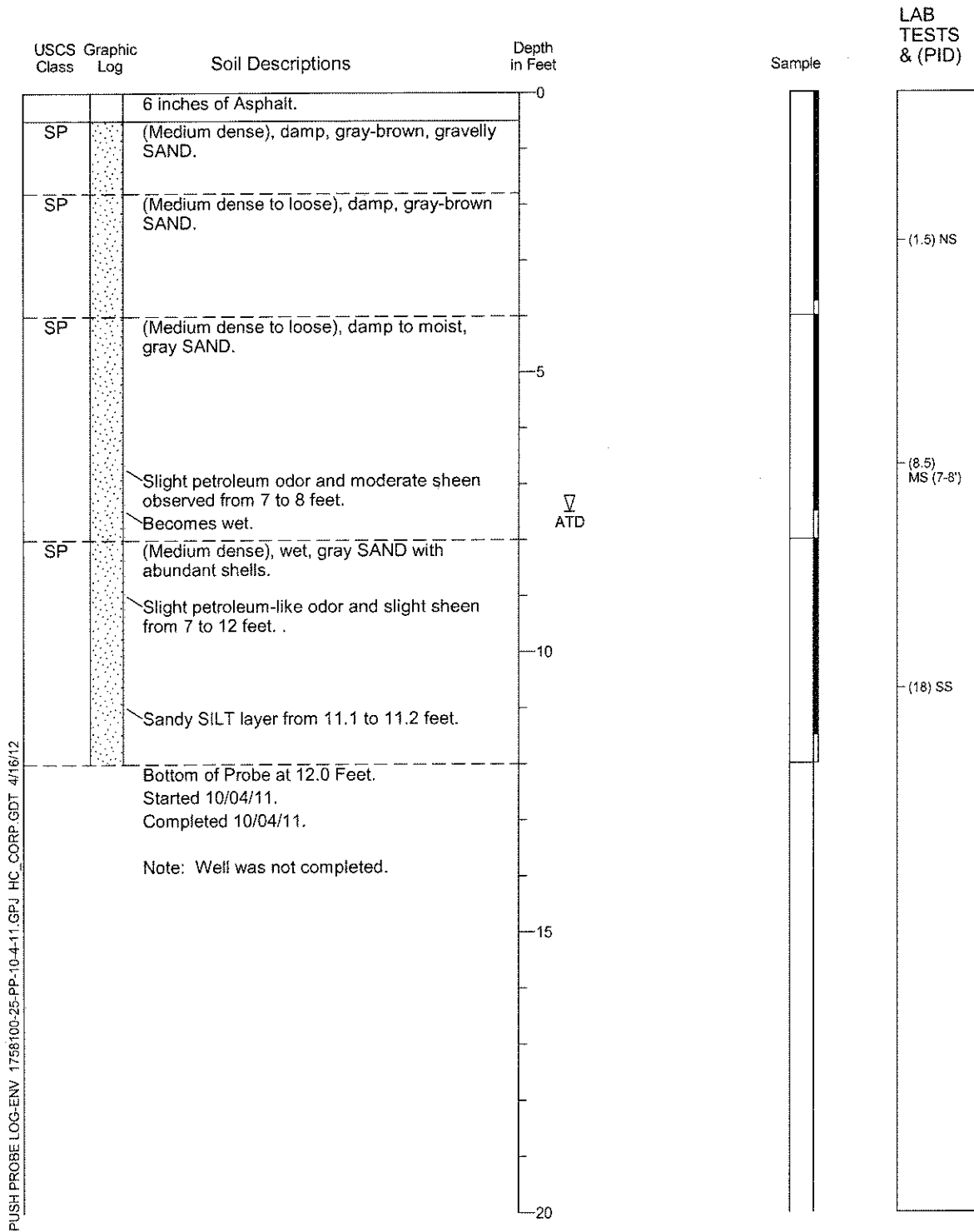


1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Push Probe Log HC-N11-9

Location: N 47.276004 E -122.403319
 Approximate Ground Surface Elevation: NA Feet
 Horizontal Datum: WGS 1984
 Vertical Datum: MLLW

Drill Equipment: Push Probe
 Sample Type: Acetate Liner
 Hole Diameter: 1 inches
 Logged By: P. Cordell Reviewed By: C. Rust



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen



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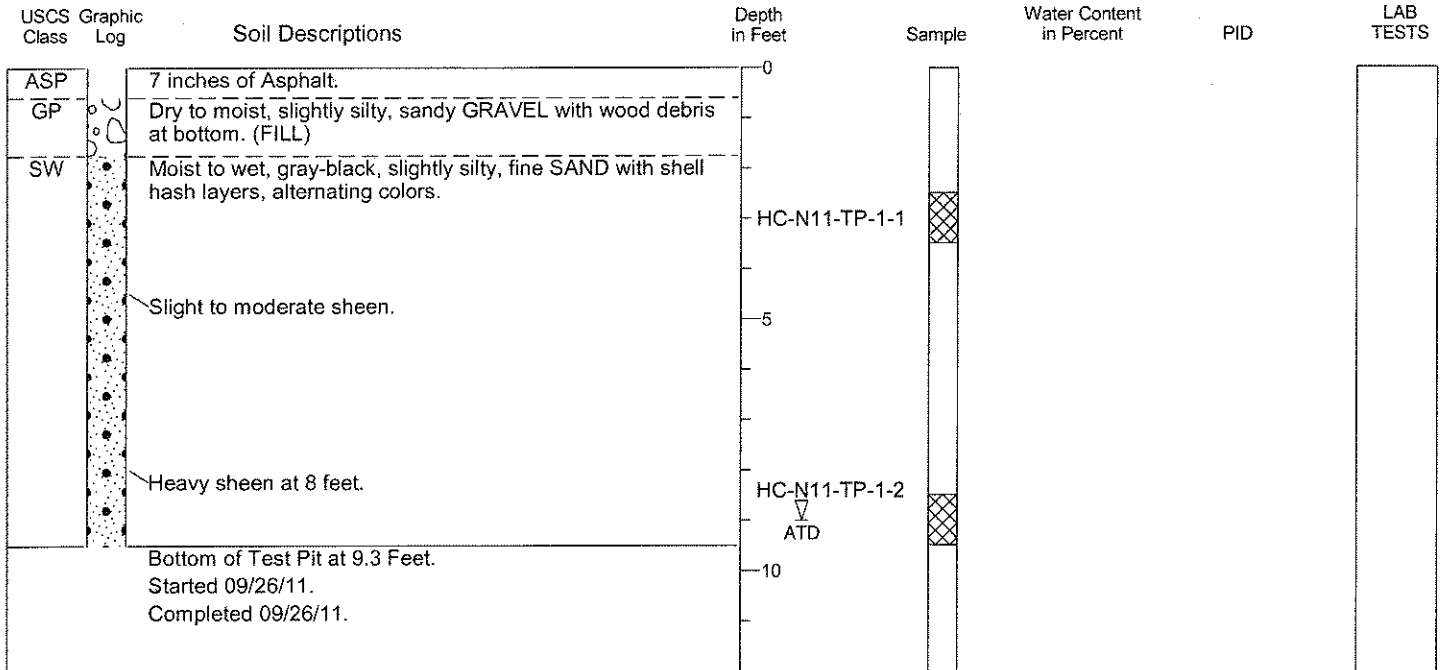
10/11

Figure A-6

Test Pit Log HC-N11-TP-1

Location: Lat: 47.276175 Long: -122.403485
 Approximate Ground Surface Elevation: 17.5 Feet
 Logged By: C. Rust Reviewed By: P. Cordell

Horizontal Datum: WGS 84
 Vertical Datum: MLLW

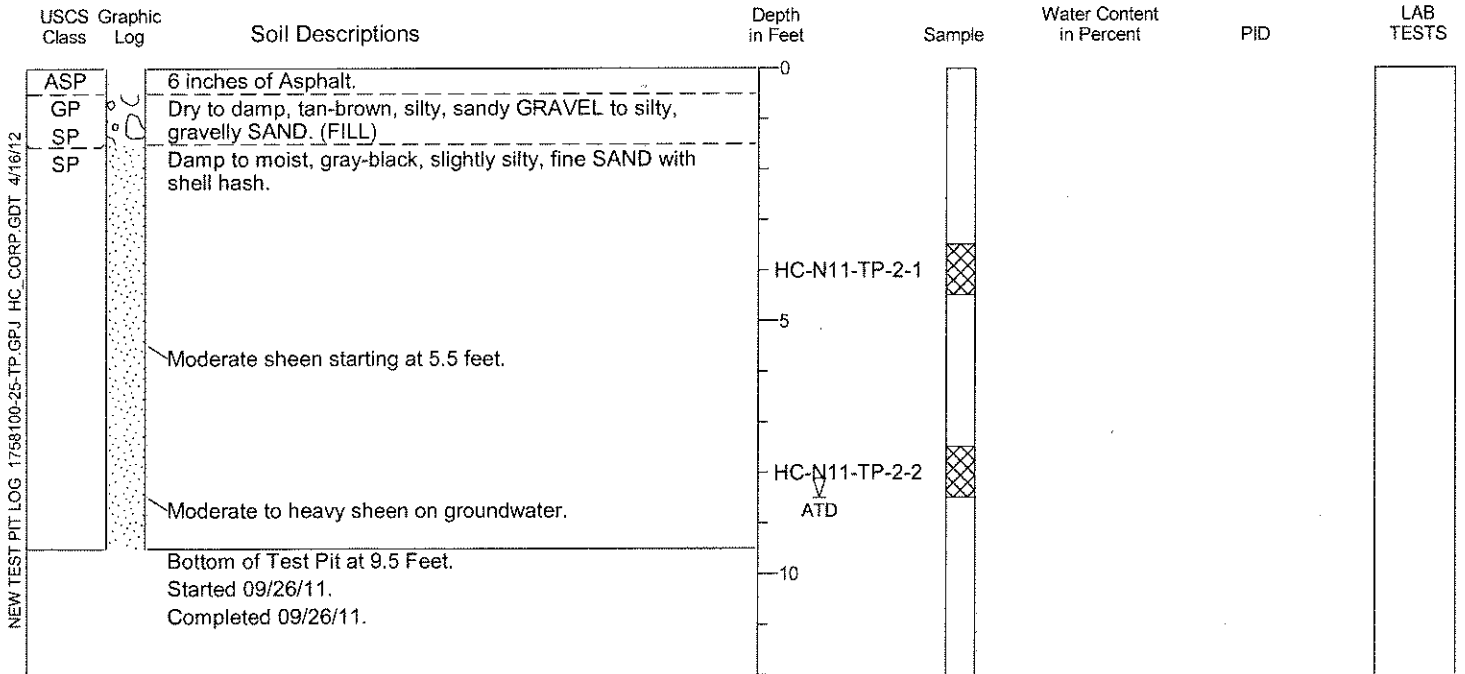


Field indication of petroleum impacts from 4 to 9.25 feet.

Test Pit Log HC-N11-TP-2

Location: Lat: 47.276055 Long: -122.403286
 Approximate Ground Surface Elevation: 17.5 Feet
 Logged By: C. Rust Reviewed By: P. Cordell

Horizontal Datum: WGS 84
 Vertical Datum: MLLW



Field indication of petroleum impacts from 5.5 to 9.5 feet.



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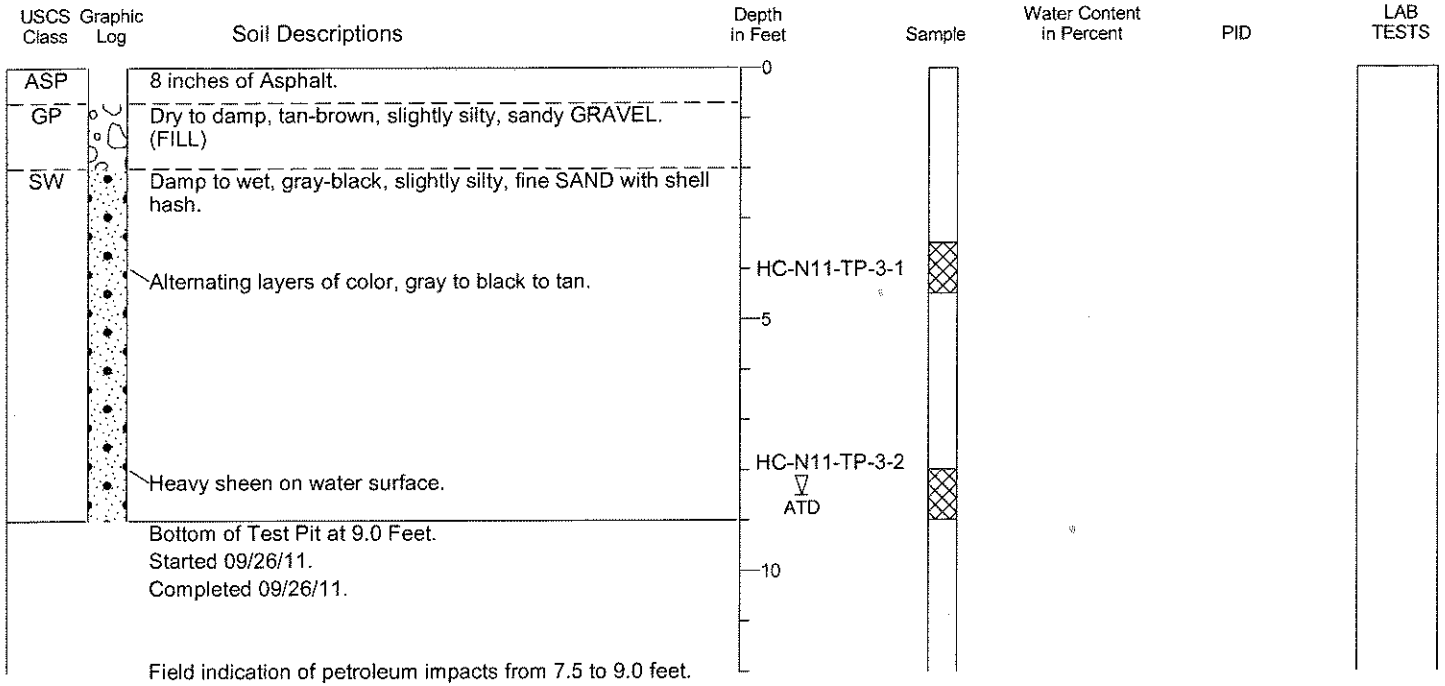
Figure A-7

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater conditions, if indicated, are at time of excavation. Conditions may vary with time.

Test Pit Log HC-N11-TP-3

Location: Lat: 47.276001 Long: -122.403359
 Approximate Ground Surface Elevation: 17.5 Feet
 Logged By: C. Rust Reviewed By: P. Cordell

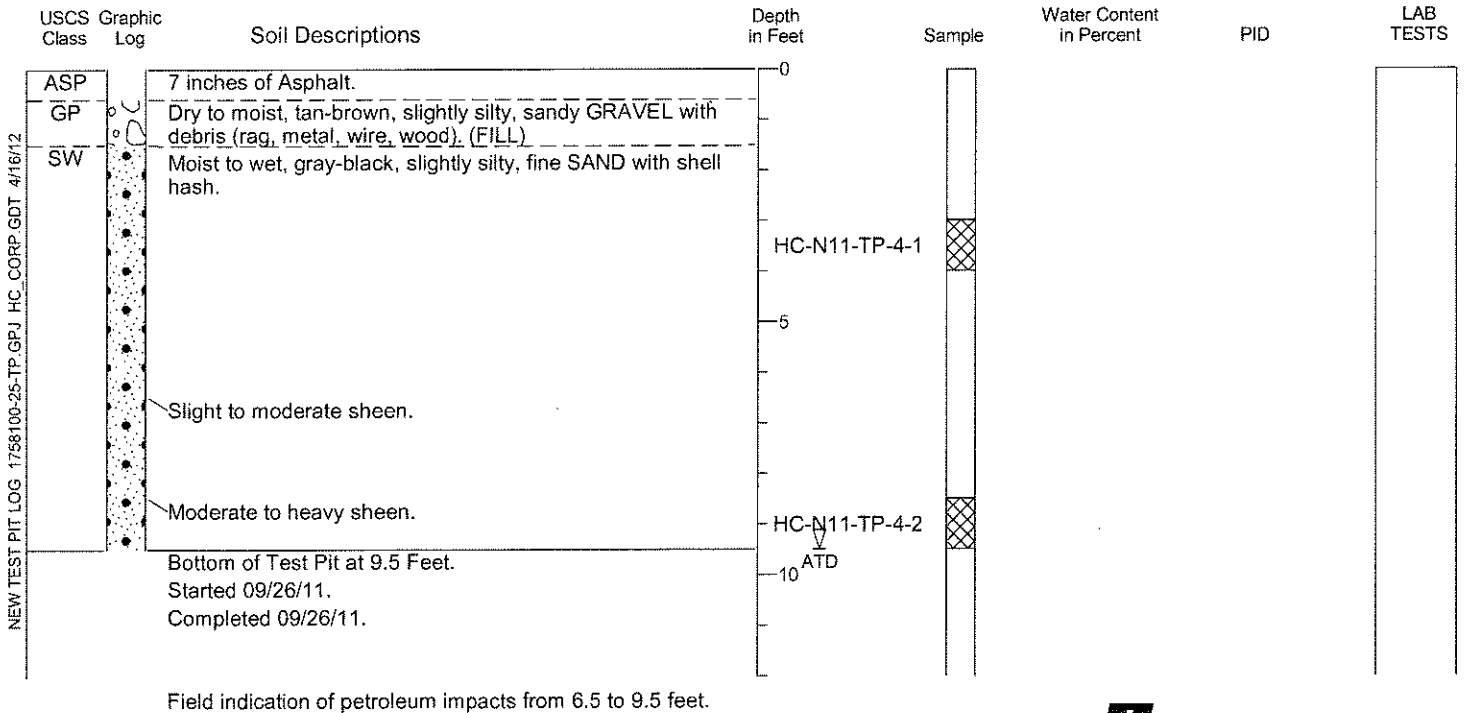
Horizontal Datum: WGS 84
 Vertical Datum: MLLW



Test Pit Log HC-N11-TP-4

Location: Lat: 47.276127 Long: -122.403548
 Approximate Ground Surface Elevation: 17.5 Feet
 Logged By: C. Rust Reviewed By: P. Cordell

Horizontal Datum: WGS 84
 Vertical Datum: MLLW



NEW TEST PIT LOG 1758100-25-TP.GPJ HC CORP.GDT 4/16/12



17581-00

9/11

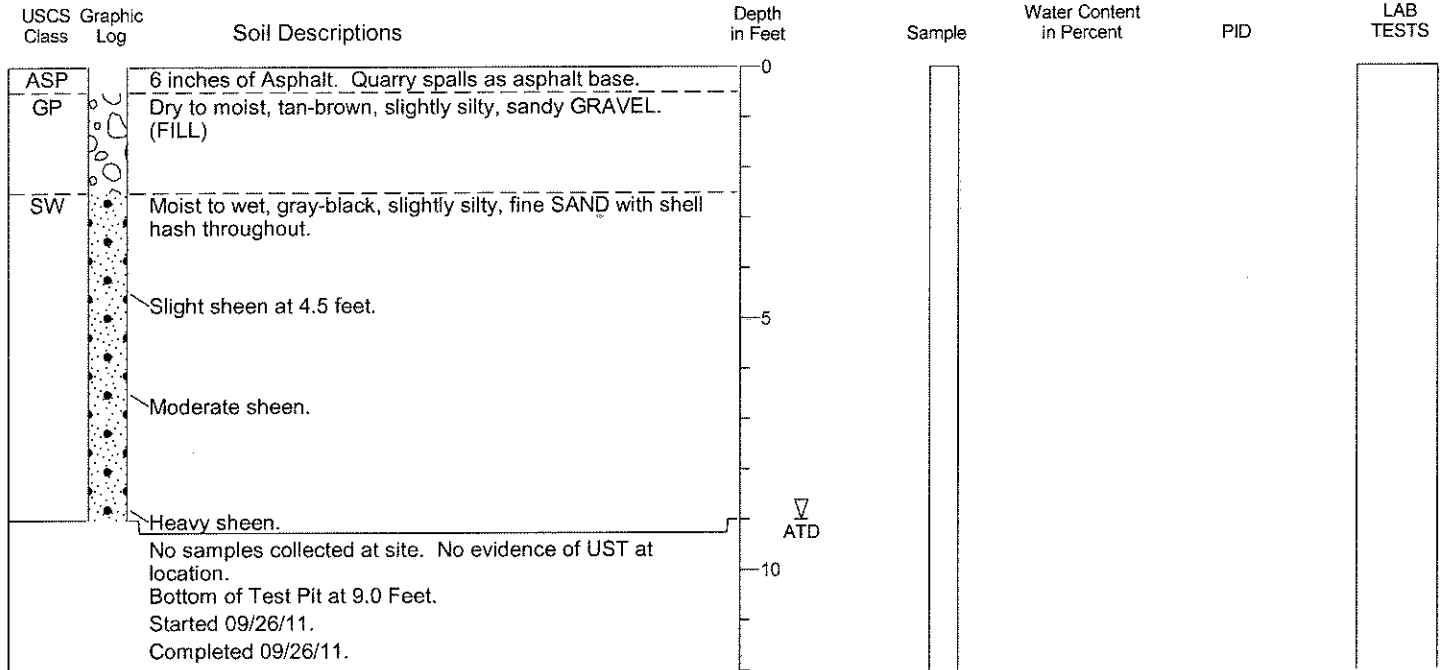
Figure A-8

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2486) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater conditions, if indicated, are at time of excavation. Conditions may vary with time.

Test Pit Log HC-N11-TP-5

Location: Lat: 47.276086 Long: -122.403423
 Approximate Ground Surface Elevation: 17.5 Feet
 Logged By: C. Rust Reviewed By: P. Cordell

Horizontal Datum: WGS 84
 Vertical Datum: MLLW



Field indication of petroleum impacts from 4.5 to 9.0 feet.

NEW TEST PIT LOG 1758100-25-TP.GPJ HC_CORP.GDT 4/18/12



17581-00 9/11
 Figure A-9

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater conditions, if indicated, are at time of excavation. Conditions may vary with time.

Key to Exploration Logs

Sample Description

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:

Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits and probes is estimated based on visual observation and is presented parenthetically on the logs.

SAND or GRAVEL Density	Standard Penetration Resistance (N) in Blows/Foot	SILT or CLAY Consistency	Standard Penetration Resistance (N) in Blows/Foot	Approximate Shear Strength in TSF
Very loose	0 to 4	Very soft	0 to 2	<0.125
Loose	4 to 10	Soft	2 to 4	0.125 to 0.25
Medium dense	10 to 30	Medium stiff	4 to 8	0.25 to 0.5
Dense	30 to 50	Stiff	8 to 15	0.5 to 1.0
Very dense	>50	Very stiff	15 to 30	1.0 to 2.0
		Hard	>30	>2.0

Sampling Test Symbols

1.5" I.D. Split Spoon	Grab (Jar)	3.0" I.D. Split Spoon
Shelby Tube (Pushed)	Bag	
Cuttings	Core Run	

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS (LITTLE OR NO FINES)	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
		CLEAN SANDS (LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50			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
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50			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
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

Moisture

Dry	Little perceptible moisture
Damp	Some perceptible moisture, likely below optimum
Moist	Likely near optimum moisture content
Wet	Much perceptible moisture, likely above optimum

Minor Constituents

Estimated Percentage

Trace	<5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

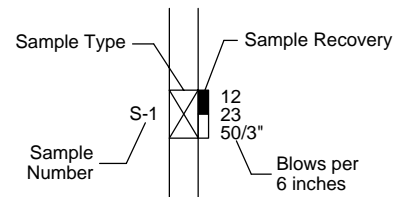
Laboratory Test Symbols

GS	Grain Size Classification
CN	Consolidation
UU	Unconsolidated Undrained Triaxial
CU	Consolidated Undrained Triaxial
CD	Consolidated Drained Triaxial
QU	Unconfined Compression
DS	Direct Shear
K	Permeability
PP	Pocket Penetrometer
	Approximate Compressive Strength in TSF
TV	Torvane
	Approximate Shear Strength in TSF
CBR	California Bearing Ratio
MD	Moisture Density Relationship
AL	Atterberg Limits
	Liquid Limit
	Natural Plastic Limit
PID	Photoionization Detector Reading
CA	Chemical Analysis
DT	In Situ Density in PCF
OT	Tests by Others

Groundwater Indicators

	Groundwater Level on Date or (ATD) At Time of Drilling
	Groundwater Seepage (Test Pits)

Sample Key



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17581-00

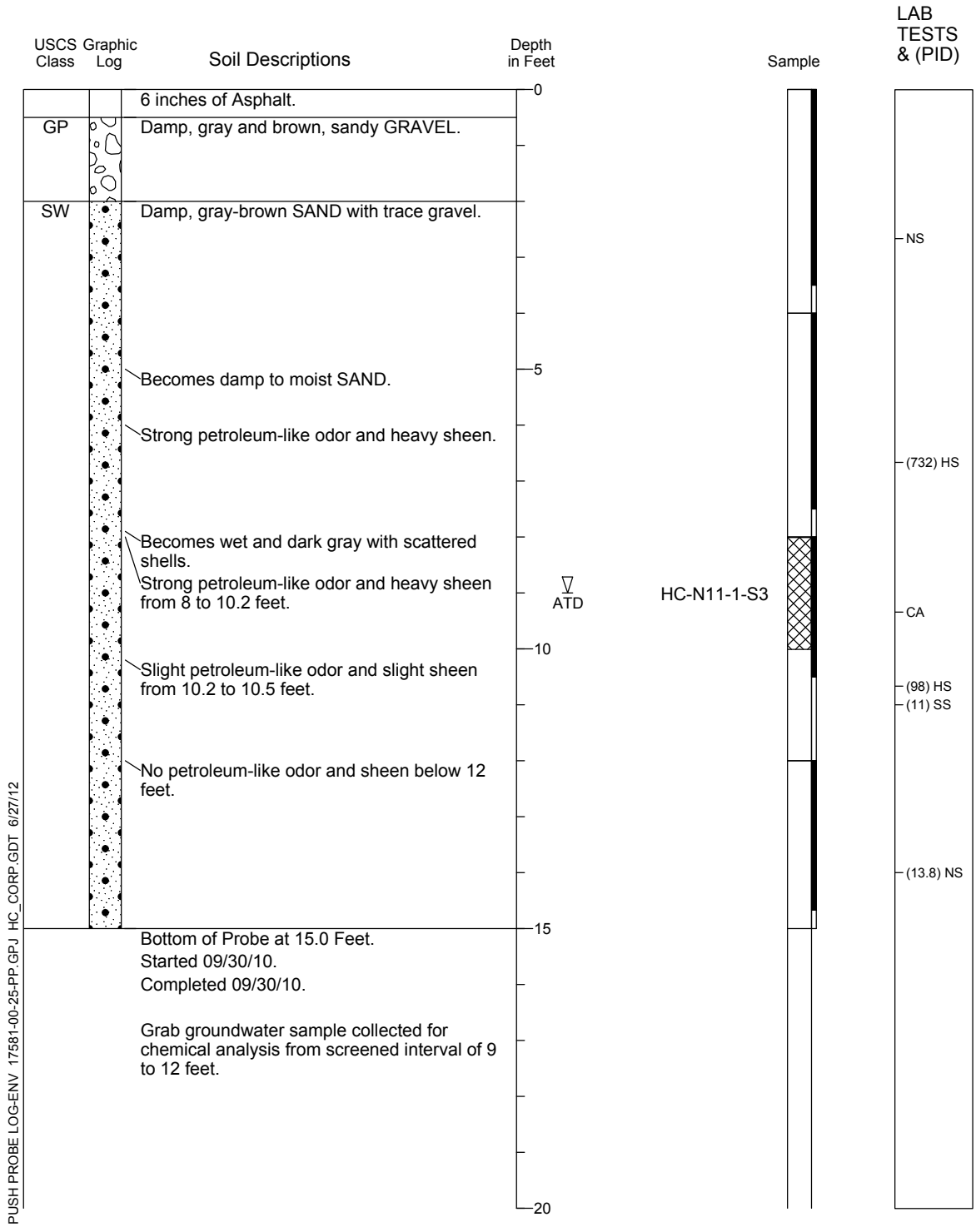
9/10

Figure B-1

Push Probe Log HC-N11-1

Location: See Figure 3.
 Approximate Ground Surface Elevation: 17 Feet
 Horizontal Datum: NA
 Vertical Datum: MLLW

Drill Equipment: Push Probe
 Sample Type: Acetate Liner
 Hole Diameter: 2 inches
 Logged By: P. Cordell Reviewed By: C. Rust

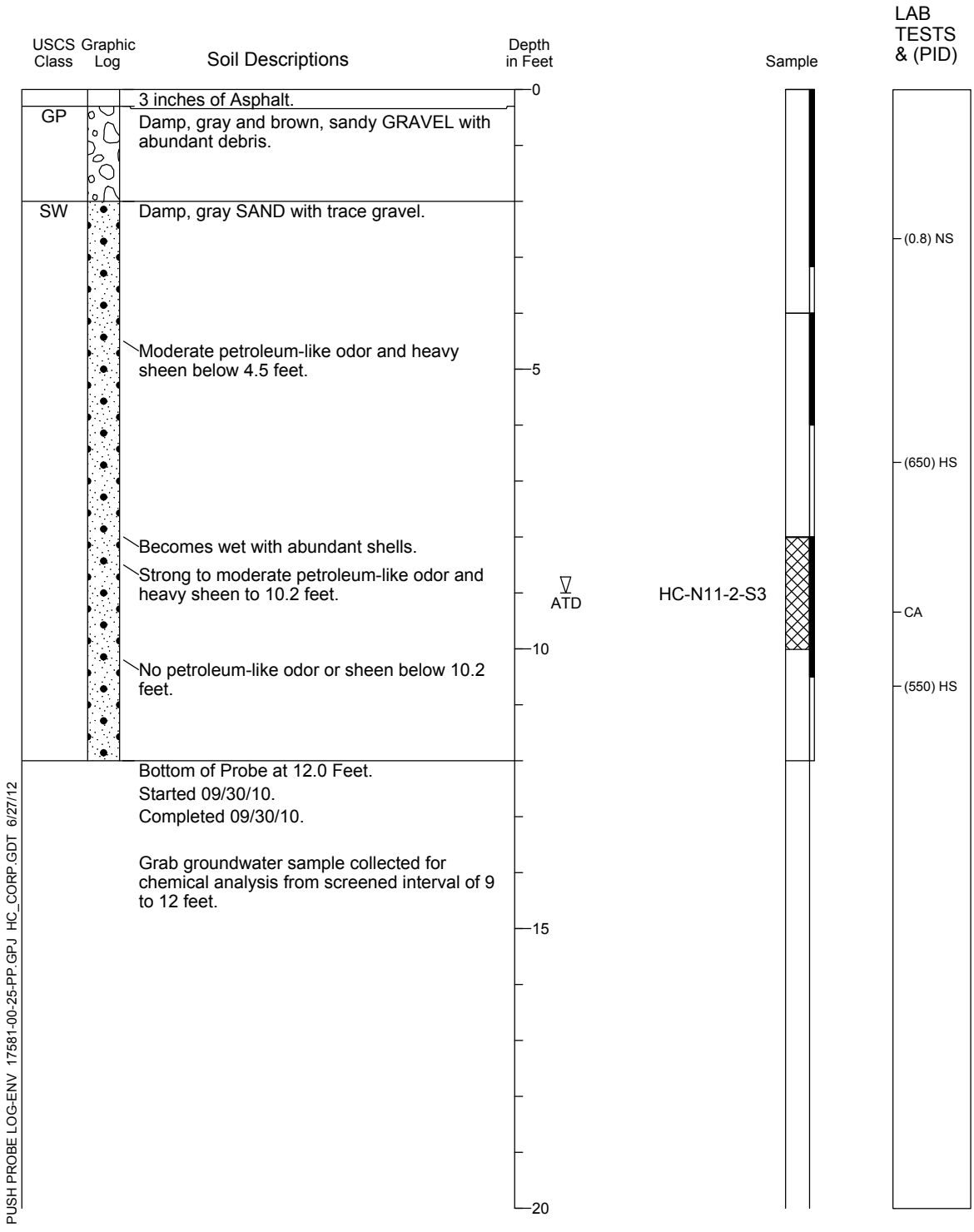


1. Refer to Figure B-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; HS = Heavy Sheen

Push Probe Log HC-N11-2

Location: See Figure 3.
 Approximate Ground Surface Elevation: 17 Feet
 Horizontal Datum: NA
 Vertical Datum: MLLW

Drill Equipment: Push Probe
 Sample Type: Acetate Liner
 Hole Diameter: 2 inches
 Logged By: P. Cordell Reviewed By: C. Rust



1. Refer to Figure B-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; HS = Heavy Sheen



HARTCROWSER

17581-00

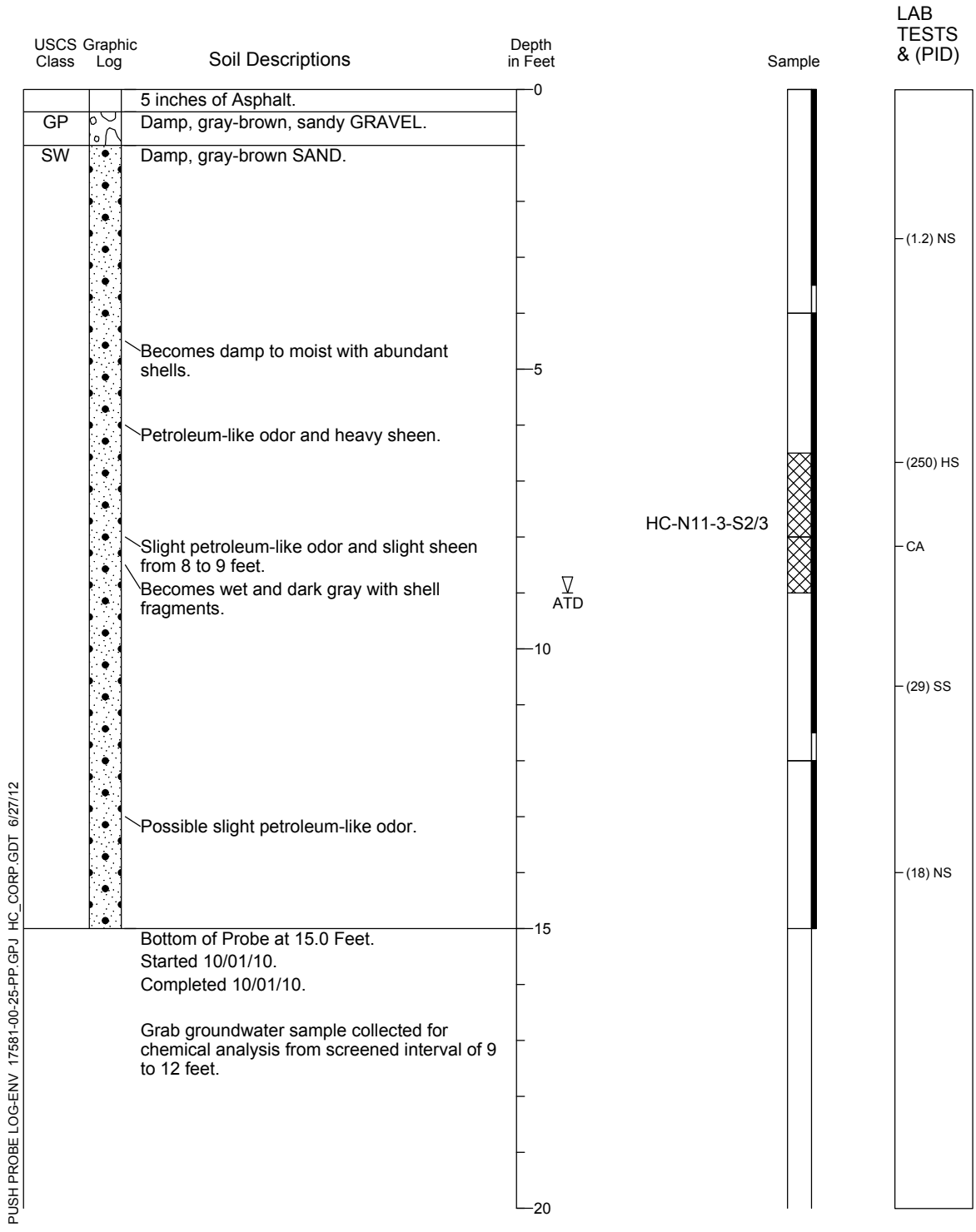
9/10

Figure B-3

Push Probe Log HC-N11-3

Location: See Figure 3.
 Approximate Ground Surface Elevation: 17 Feet
 Horizontal Datum: NA
 Vertical Datum: MLLW

Drill Equipment: Push Probe
 Sample Type: Acetate Liner
 Hole Diameter: 2 inches
 Logged By: P. Cordell Reviewed By: C. Rust

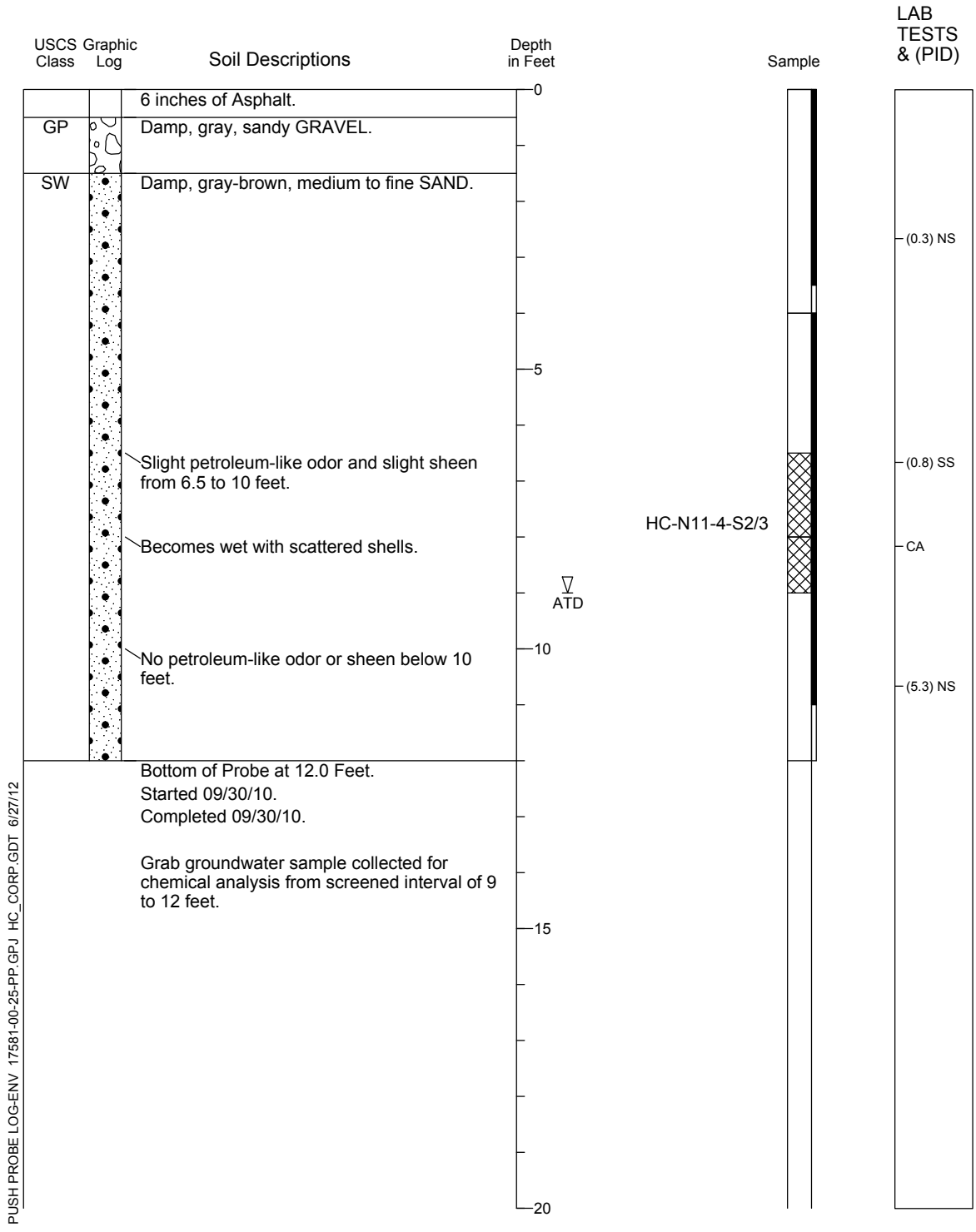


1. Refer to Figure B-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; HS = Heavy Sheen

Push Probe Log HC-N11-4

Location: See Figure 3.
 Approximate Ground Surface Elevation: 17 Feet
 Horizontal Datum: NA
 Vertical Datum: MLLW

Drill Equipment: Push Probe
 Sample Type: Acetate Liner
 Hole Diameter: 2 inches
 Logged By: P. Cordell Reviewed By: C. Rust

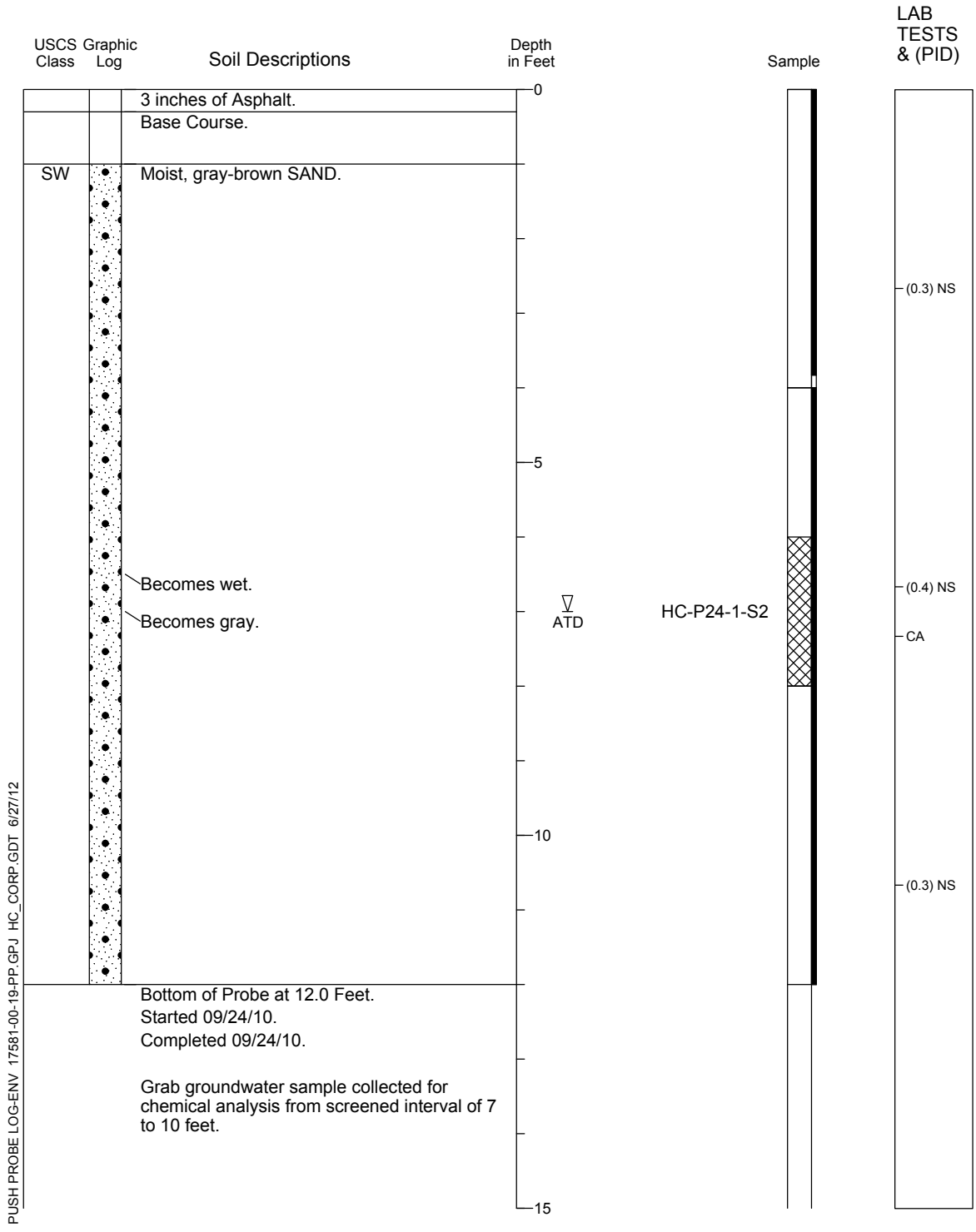


1. Refer to Figure B-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; HS = Heavy Sheen

Push Probe Log HC-P24-1

Location: See Figure 3.
 Approximate Ground Surface Elevation: 17 Feet
 Horizontal Datum: NA
 Vertical Datum: MLLW

Drill Equipment: Push Probe
 Sample Type: Acetate Liner
 Hole Diameter: 2 inches
 Logged By: P. Cordell Reviewed By: C. Rust

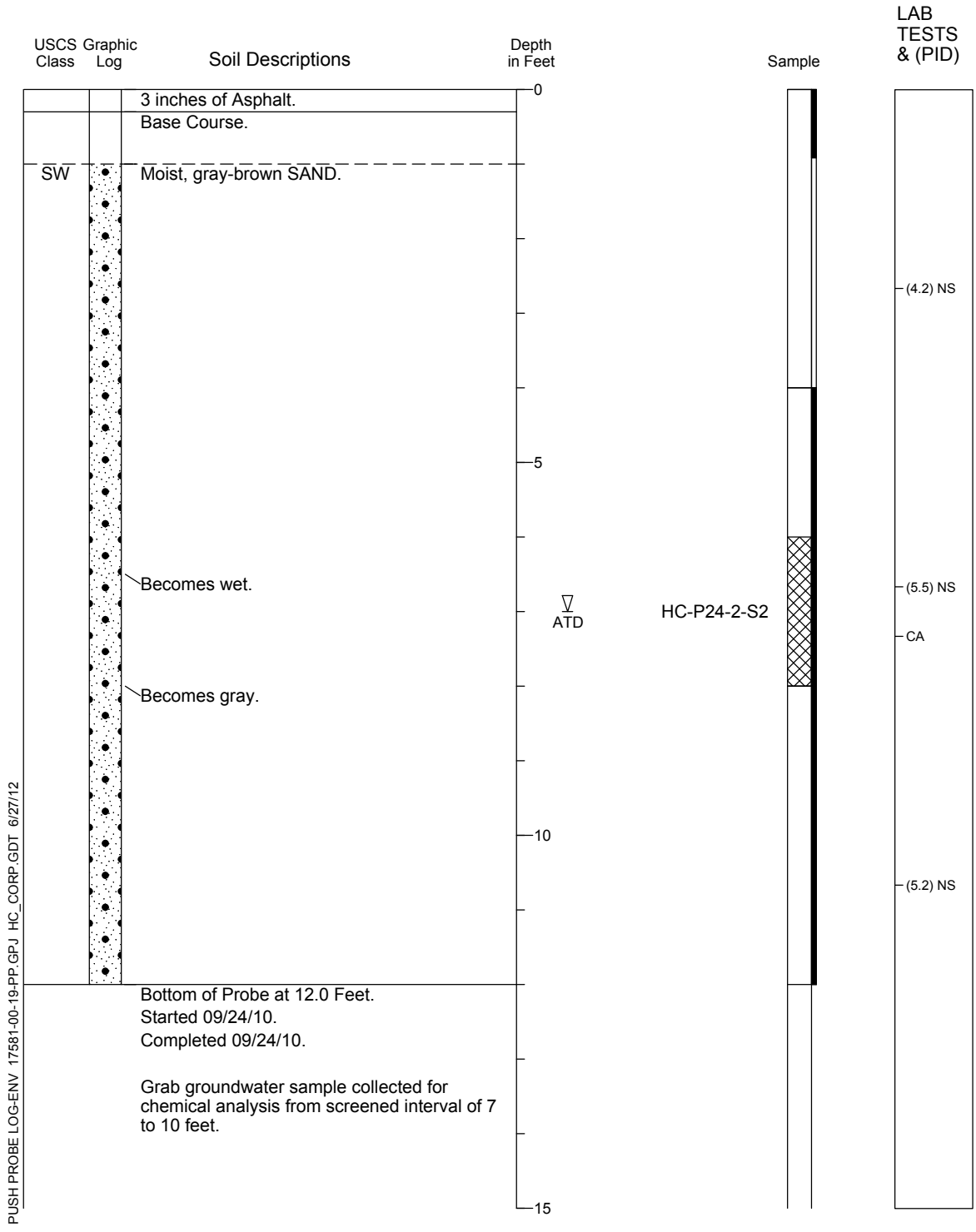


1. Refer to Figure C-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen

Push Probe Log HC-P24-2

Location: See Figure 3.
 Approximate Ground Surface Elevation: 17 Feet
 Horizontal Datum: NA
 Vertical Datum: MLLW

Drill Equipment: Push Probe
 Sample Type: Acetate Liner
 Hole Diameter: 2 inches
 Logged By: P. Cordell Reviewed By: C. Rust

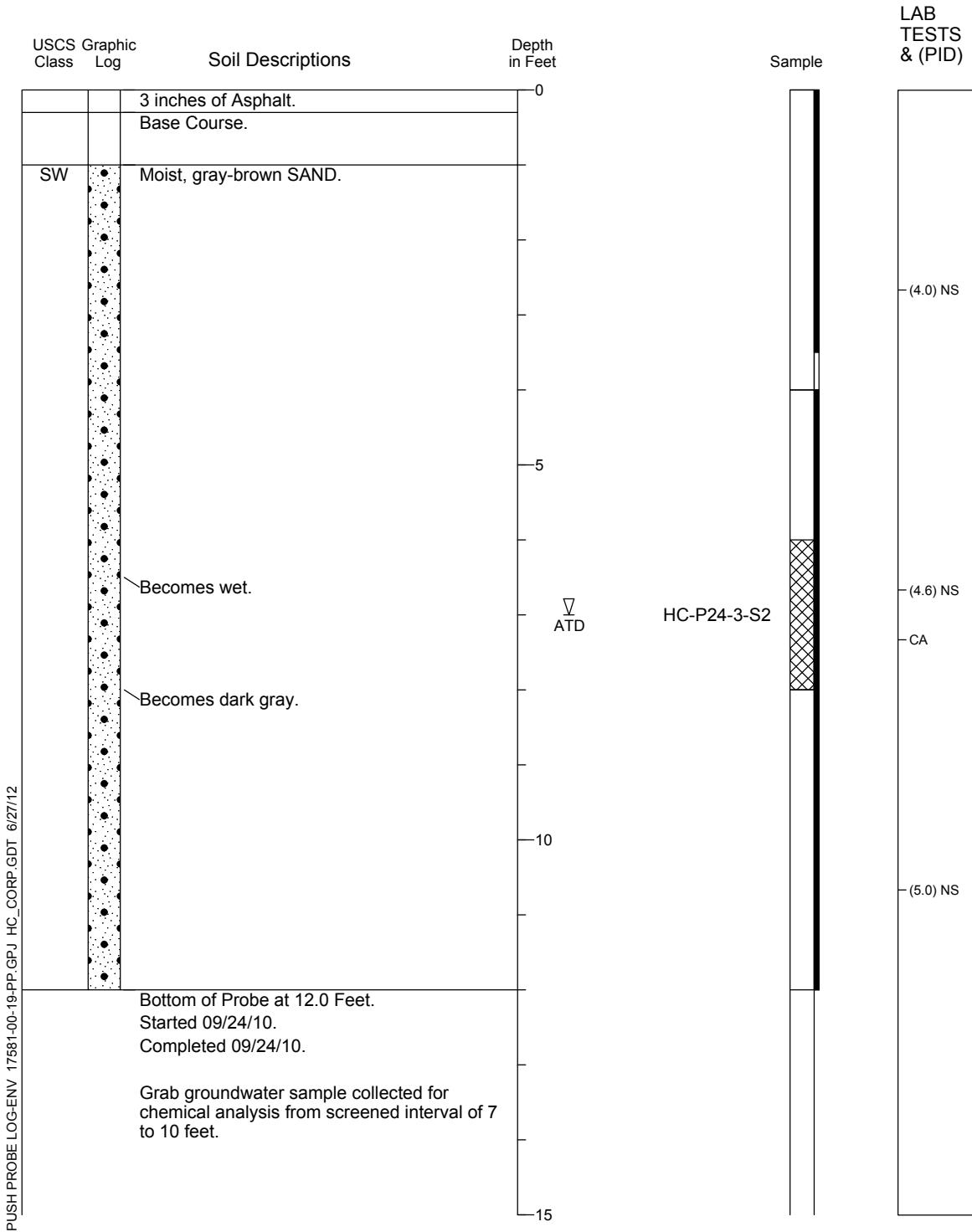


1. Refer to Figure C-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen

Push Probe Log HC-P24-3

Location: See Figure 3.
 Approximate Ground Surface Elevation: 17 Feet
 Horizontal Datum: NA
 Vertical Datum: MLLW

Drill Equipment: Push Probe
 Sample Type: Acetate Liner
 Hole Diameter: 2 inches
 Logged By: P. Cordell Reviewed By: C. Rust

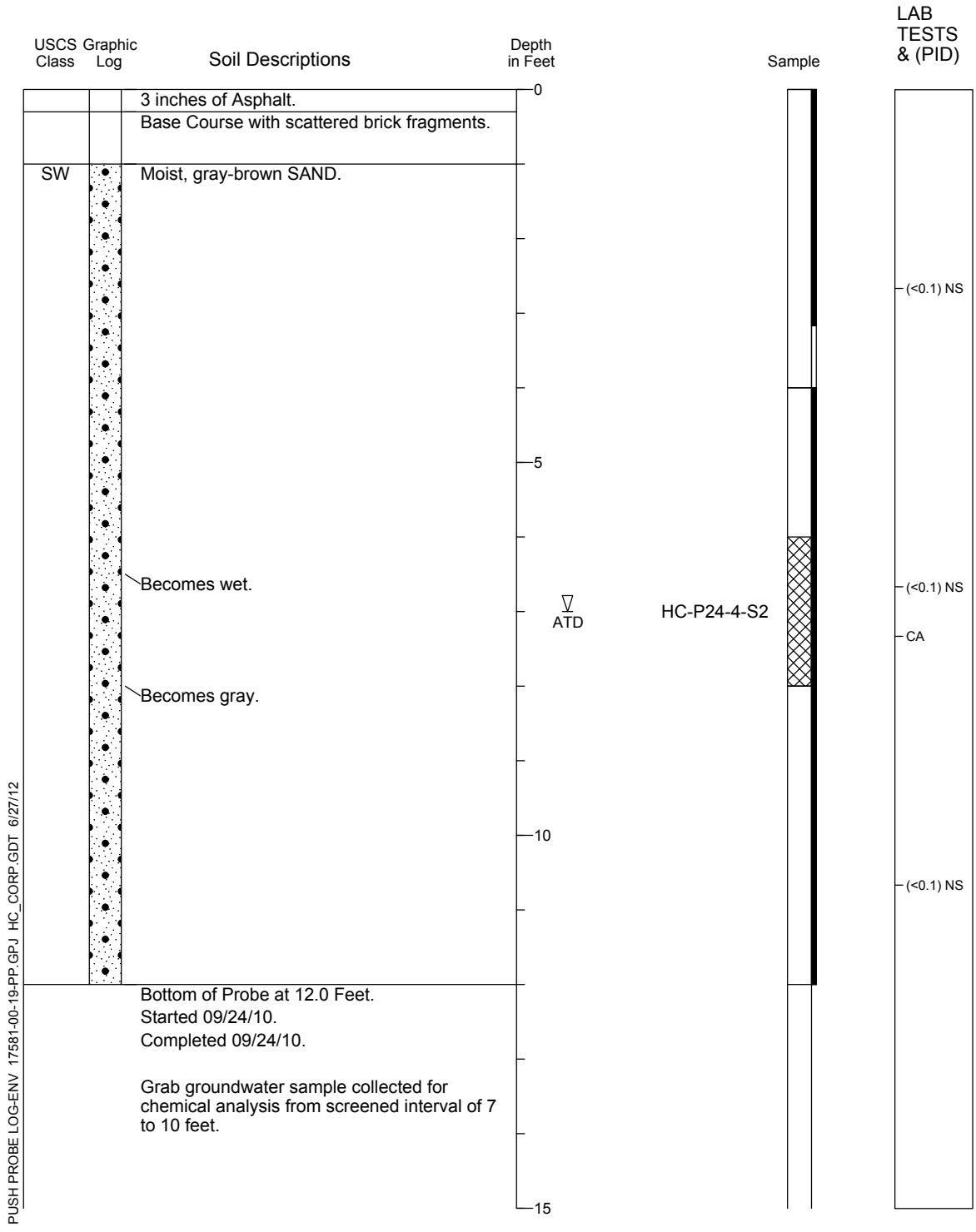


1. Refer to Figure C-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen

Push Probe Log HC-P24-4

Location: See Figure 3.
 Approximate Ground Surface Elevation: 17 Feet
 Horizontal Datum: NA
 Vertical Datum: MLLW

Drill Equipment: Push Probe
 Sample Type: Acetate Liner
 Hole Diameter: 2 inches
 Logged By: P. Cordell Reviewed By: C. Rust



1. Refer to Figure C-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen



Water Resources & Environmental Services

Project: OxyChem 709-721 Alexander Avenue	Job #: 0411-5	Boring #: 721 BH-13
Location: 721 Alexander Ave, Tacoma, WA	Approximate Elevation: Not Surveyed	
Subcontractor/Equipment: Cascade Probe Rig	Drilling Method: Direct Push	
Date: 5/21/12	Logged By: S. Dudziak	

Depth (ft.)	Soil Description	Lithology	Color	Comments
0	Silty Sandy Gravel (GM) Fill		Medium Brown	
	Slightly Silty Sand (SP)		Dark Brown	
5				Strong odor @ 5 ft Soil is moist @ 5 ft
	Slightly Silty Sand (SP)		Dark Gray	
10				Very Strong odor @ 9 ft Collected sample 721BH13-9-10'
			Dark Gray	
15				Moderate odor @ 14 ft
	Clayey Silt (ML)		Gray	
	Silty Sand (SM)		Gray	
20				No odor, no sheen from 16 - 25 ft
	Sandy Silt (ML)		Gray	
	Sand (SP)		Gray	
25				



Water Resources & Environmental Services

Project: OxyChem 709-721 Alexander Avenue	Job #: 0411-5	Boring #: 721 BH-15
Location: 721 Alexander Ave, Tacoma, WA	Approximate Elevation: Not Surveyed	
Subcontractor/Equipment: Cascade Probe Rig	Drilling Method: Direct Push	
Date: 5/22/12	Logged By: S. Dudziak	

Depth (ft.)	Soil Description	Lithology	Color	Comments
0	Silty Sandy Gravel (GM) Fill		Dark Brown	
	Slightly Silty Sand (SP) - Medium Grained		Dark Brown	
5				Strong odor @ 6 ft Soil is moist @ 6 ft
	Slightly Silty Sand (SP) - Fine Grained		Dark Gray	
				Very Strong Odor; Soil is wet @ 7 ft Soil contains shell fragments starting @ 7 ft Collected sample 721BH15-7.5-8.5' ▼
10				Moderate odor @ 10 ft
15				Moderate sheen @15 ft Shell fragments stop @ 15 ft
	Silty Sand (SM)		Dark Gray	
				No odor from 18 to 25 ft
	Sandy Silt (ML)		Dark Gray	
	Sand (SP) - Medium Grained		Dark Gray	
25				



Water Resources & Environmental Services

Project: OxyChem 709-721 Alexander Avenue	Job #: 0411-5	Boring #: 721 BH-04
Location: 721 Alexander Ave, Tacoma, WA	Approximate Elevation: Not Surveyed	
Subcontractor/Equipment: Cascade Probe Rig	Drilling Method: Direct Push	
Date: 5/22/12	Logged By: S. Dudziak	

Depth (ft.)	Soil Description	Lithology	Color	Comments
0	Silty Sandy Gravel (GM) Fill		Dark Brown	
	Slightly Silty Sand (SP)		Dark Brown	
	Slightly Silty Sand (SP) - Fine Grained		Medium Brown	
5				Slight odor
	Silt (ML)		Dark Gray	Collected sample 721 BH04 6-7'
	Sand (SP)		Dark Gray	Strong odor
10				
				Moderate odor
15				
	Silty Sand (SM)		Dark Gray	No odor from 17.5 to 25 ft
20				
	Sandy Silt (ML)			
	Sand (SP) - Medium Grained			
25				



Water Resources & Environmental Services

Project: OxyChem 709-721 Alexander Avenue	Job #: 0411-5	Boring #: 721BH-02
Location: 721 Alexander Ave, Tacoma, WA	Approximate Elevation: Not Surveyed	
Subcontractor/Equipment: Cascade Probe Rig	Drilling Method: Direct Push	
Date: 05/23/12	Logged By: A. Harris	

Depth (ft.)	Soil Description	Lithology	Color	Comments
0	Asphalt			
	Gravel (GP)		Gray to Brown	
	Sand (SP)		Brown	
5				
			Dark Gray	Color change and strong petroleum odor at 8 ft Collected sample 721BH02 8.5-8.75'
10	Clayey Silt (ML)		Dark Brown Dark Gray	Distinct boundary from Sand to Clayey Silt at 9.6 ft
	Sand (SM)			
	Sand (SP)		Dark Gray	Marine inclusions
	Silty Clay (ML)			
15	Sand (SP)		Dark Gray	Wood debris at 14.7 ft Marine inclusions
	Silty Clay (ML)			
	Sand (SP)		Dark Gray	
	Clayey Silt (ML)			
	Sandy Silt (ML)			Marine inclusions
	Clay (OL)			
20	Silty Sand (SM)			



Water Resources & Environmental Services

Project: OxyChem 709-721 Alexander Avenue	Job #: 0411-5	Boring #: 709MW-21
Location: 709 Alexander Ave, Tacoma, WA	Approximate Elevation: Not Surveyed	
Subcontractor/Equipment: Cascade Probe Rig	Drilling Method: Direct Push	
Date: 6/01/12	Logged By: S. Dudziak	

Depth (ft.)	Soil Description	Lithology	Color	Comments
0	Silty Sandy Gravel (GM) Fill		Dark Brown	No odor
	Sand (SP)		Dark Brown	
5	Slightly Silty Sand (SP) - Fine Grained		Dark Gray	
				Moderate odor Collected sample 709MW-21 4-5'
10				Moderate to strong odor @ 9 to 10 ft Thin silt layer at 10 ft
				No odor from 11.5 to 25 ft
15				
	Clayey Silt (ML)		Dark Gray	
	Silty Sand (SM)		Dark Gray	
20				
	Silt (ML)		Dark Gray	
	Sand (SP)		Dark Gray	
25				



Water Resources & Environmental Services

Project: OxyChem 709-721 Alexander Avenue	Job #: 0411-5	Boring #: 709BH-11
Location: 709 Alexander Ave, Tacoma, WA	Approximate Elevation: Not Surveyed	
Subcontractor/Equipment: Cascade Probe Rig	Drilling Method: Direct Push	
Date: 6/01/12	Logged By: S. Dudziak	

Depth (ft.)	Soil Description	Lithology	Color	Comments
0	Gravelly Silty Sand (SM) Fill		Dark Brown	
	Slightly Silty Sand (SP)		Dark Brown	No odor
5				
	Slightly Silty Sand (SP)		Dark Gray	Strong odor @ 6.5 ft Collected sample 709BH11-7.5-8.5'
10				Slight odor @ 10 ft
15	Silt (ML)		Dark Gray	1-inch thick silt layer @ 14.5 ft
	Slightly Silty Sand (SP)		Dark Gray	No odor from 15 to 25 ft
	Silt (ML)		Dark Gray	
	Silty Sand (SM)		Dark Gray	
20				
	Sand (SP)		Dark Gray	
25				



Water Resources & Environmental Services

Project: OxyChem 709-721 Alexander Avenue	Job #: 0411-5	Boring #: 721MW-10
Location: 709 Alexander Ave, Tacoma, WA	Approximate Elevation: Not Surveyed	
Subcontractor/Equipment: Cascade Probe Rig	Drilling Method: Direct Push	
Date: 6/05/12	Logged By: S. Dudziak	

Depth (ft.)	Soil Description	Lithology	Color	Comments
0	Gravelly Sand (SP) Fill		Brown	
	Silt (ML)		Dark Brown	
	Sand (SP)		Brown	
5				Slight odor
	Sand (SP)		Dark Gray	Strong odor
10				Collected sample 721MW10-9-10'
	Silt (ML)		Dark Gray	1/2 inch layer of silt at 13 ft 2 in.
	Sand (SP)		Dark Gray	No odor below silt layer.
15	Silt (ML)		Dark Gray	
	Silty Sand (SM)		Dark Gray	
20	Sand (SP)		Dark Gray	
25	Silty Sand (SM)		Dark Gray	

APPENDIX B - Data Tables for Site Data Used in this RI

Table B-1 - 2014-2015 RI Soil Data

Pr # 130097-01D - Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	B-101 7/17/14 (2-4 ft.)	B-101 7/17/14 (8-9 ft.)	B-101 7/17/14 (20-21.5 ft.)	B-102 7/17/14 (3-4 ft.)	B-102 7/17/14 (8-9 ft.)	B-102 7/17/14 (20-21.5 ft.)	B-103 8/25/14 (3-4 ft.)	B-103 8/25/14 (7-8 ft.)	B-103 8/25/14 (22-24 ft.)	B-104 8/25/14 (2-3.5 ft.)	B-104 8/25/14 (10-12 ft.)	B-104 8/25/14 (22-24 ft.)	B-105 7/23/14 (3-4 ft.)	B-105 7/23/14 (7-8 ft.)	B-105 7/23/14 (20-21 ft.)	B-106 7/16/14 (1-3 ft.)	B-106 7/16/14 (6.5-8 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																		
Gasoline Range Hydrocarbons in mg/kg	30	5.2 U	2,600	6.5 U	5.7 U	5.5 U	6.9 U	4.6 U	920	6.3 U	5.7 U	5.3 U	5.0 U	7.8 U	300	7.9 U	6.7 U	4,400
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																		
Diesel Range Hydrocarbons in mg/kg	2,000	5.2 U	2,400	6.0 U	5.3 U	6.0 U	6.1 U	5.2 U		6.0 U	5.3 U	13	6.2 U	5.5 U	42	6.0 U	8.4	5,800
Oil Range Hydrocarbons in mg/kg	2,000	10 U	100	12 U	10 U	12 U	12 U	10 U	35	12 U	11 U	13 U	12 U	11 U	190	12 U	11 U	280
Total TPHs D+O (ND=1/2U) in ug/L	2,000	ND	2,500	ND	ND	ND	ND	ND	1,040	ND	ND	19.5	ND	ND	232	ND	13.9	6,080
Metals																		
Lead in mg/kg	1,000	4			2 U						4			2 U			2 U	
Conventional Chemistry Parameters																		
Total Organic Carbon in Percent													0.23	0.127				
Total Solids in Percent													77.16	82.98				
Volatile Organic Compounds (VOC)																		
1,1,1,2-Tetrachloroethane in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
1,1,1-Trichloroethane in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
1,1,2 - Trichlorotrifluoroethane in mg/kg		0.0016 U	0.82 U	0.0027 U	0.0021 U	0.0021 U	0.002 U	0.0022 U	0.26 U	0.0015 U	0.0015 U	0.0018 U	0.0017 U	0.0024 U	0.002 U	0.0024 U	0.0025 U	2.7 U
1,1,2,2-Tetrachloroethane in mg/kg	700	0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
1,1,2-Trichloroethane in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
1,1-Dichloroethane in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
1,1-Dichloroethene in mg/kg	175,000	0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
1,1-Dichloropropene in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
1,2,3-Trichlorobenzene in mg/kg		0.0039 U	2 U	0.0067 U	0.0052 U	0.0053 U	0.005 U	0.0054 U	0.65 U	0.0037 U	0.0038 U	0.0044 U	0.0042 U	0.006 U	0.0049 U	0.006 U	0.0061 U	6.6 U
1,2,3-Trichloropropane in mg/kg		0.0016 U	0.82 U	0.0027 U	0.0021 U	0.0021 U	0.002 U	0.0022 U	0.26 U	0.0015 U	0.0015 U	0.0018 U	0.0017 U	0.0024 U	0.002 U	0.0024 U	0.0025 U	2.7 U
1,2,4-Trichlorobenzene in mg/kg		0.0039 U	2 U	0.0067 U	0.0052 U	0.0053 U	0.005 U	0.0054 U	0.65 U	0.0037 U	0.0038 U	0.0044 U	0.0042 U	0.006 U	0.0049 U	0.006 U	0.0061 U	6.6 U
1,2,4-Trimethylbenzene in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0036	200
1,2-Dibromo-3-chloropropane in mg/kg		0.0039 U	2 U	0.0067 U	0.0052 U	0.0053 U	0.005 U	0.0054 U	0.65 U	0.0037 U	0.0038 U	0.0044 U	0.0042 U	0.006 U	0.0049 U	0.006 U	0.0061 U	6.6 U
1,2-Dibromoethane (EDB) in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
1,2-Dichlorobenzene in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
1,2-Dichloroethane (EDC) in mg/kg	1,000	0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
1,2-Dichloropropane in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
1,3,5-Trimethylbenzene in mg/kg	35,000	0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	46
1,3-Dichlorobenzene in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
1,3-Dichloropropane in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
1,4-Dichloro-2-Butene in mg/kg		0.0039 U	2 U	0.0067 U	0.0052 U	0.0053 U	0.005 U	0.0054 U	0.65 U	0.0037 U	0.0038 U	0.0044 U	0.0042 U	0.006 U	0.0049 U	0.006 U	0.0061 U	6.6 U
1,4-Dichlorobenzene in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
2,2-Dichloropropane in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
2-Butanone in mg/kg		0.0039 U	2 U	0.0067 U	0.0052 U	0.0053 U	0.005 U	0.0054 U	0.65 U	0.0037 U	0.0038 U	0.0044 U	0.0042 U	0.006 U	0.02	0.006 U	0.0061 U	6.6 U
2-Chloroethyl Vinyl Ether in mg/kg		0.0039 U	2 U	0.0067 U	0.0052 U	0.0053 U	0.005 U	0.0054 U	0.65 U	0.0037 U	0.0038 U	0.0044 U	0.0042 U	0.006 U	0.0049 U	0.006 U	0.0061 U	6.6 U
2-Chlorotoluene in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
2-Hexanone in mg/kg		0.0039 U	2 U	0.0067 U	0.0052 U	0.0053 U	0.005 U	0.0054 U	0.65 U	0.0037 U	0.0038 U	0.0044 U	0.0042 U	0.006 U	0.0049 U	0.006 U	0.0061 U	6.6 U
4-Chlorotoluene in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
4-Methyl-2-pentanone in mg/kg		0.0039 U	2 U	0.0067 U	0.0052 U	0.0053 U	0.005 U	0.0054 U	0.65 U	0.0037 U	0.0038 U	0.0044 U	0.0042 U	0.006 U	0.0049 U	0.006 U	0.0061 U	6.6 U
Acetone in mg/kg	3,150,000	0.019 U	2 U	0.017 U	0.0078 U	0.052	0.024 U	0.021 U	0.65 U	0.028	0.023	0.03	0.014 U	0.015 U	0.028	0.024 U	0.016 U	6.6 U
Acrolein in mg/kg		0.039 U	20 U	0.067 U	0.052 U	0.053 U	0.05 U	0.054 U	6.5 U	0.037 U	0.038 U	0.044 U	0.042 U	0.06 U	0.049 U	0.06 U	0.061 U	66 U
Acrylonitrile in mg/kg	1	0.0039 U	2 U	0.0067 U	0.0052 U	0.0053 U	0.005 U	0.0054 U	0.65 U	0.0037 U	0.0038 U	0.0044 U	0.0042 U	0.006 U	0.0049 U	0.006 U	0.0061 U	6.6 U
Benzene in mg/kg	0.02	0.0008 U	0.41 U	0.0013 U	0.001 U	0.36	0.0026	0.0011 U	0.13 U	0.12	0.0008 U	0.11	0.033	0.0012 U	0.001 U	0.043	0.0059	22
Bromobenzene in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
Bromochloromethane in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
Bromodichloromethane in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
Bromoethane in mg/kg		0.0016 U	0.82 U	0.0027 U	0.0021 U	0.0021 U	0.002 U	0.0022 U	0.26 U	0.0015 U	0.0015 U	0.0018 U	0.0017 U	0.0024 U	0.002 U	0.0024 U	0.0025 U	2.7 U
Bromoform in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
Bromomethane in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
Carbon disulfide in mg/kg		0.0008 U	0.41 U	0.0024	0.001 U	0.014	0.0052	0.0011 U	0.13 U	0.0038 U	0.0008 U	0.0084 U	0.0028 U	0.0012 U	0.0037	0.0066	0.0012 U	1.3 U
Carbon tetrachloride in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
Chlorobenzene in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
Chloroethane in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
Chloroform in mg/kg	4,000	0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.

Table B-1 - 2014-2015 RI Soil Data

Pr # 130097-01D - Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	B-101 7/17/14 (2-4 ft.)	B-101 7/17/14 (8-9 ft.)	B-101 7/17/14 (20-21.5 ft.)	B-102 7/17/14 (3-4 ft.)	B-102 7/17/14 (8-9 ft.)	B-102 7/17/14 (20-21.5 ft.)	B-103 8/25/14 (3-4 ft.)	B-103 8/25/14 (7-8 ft.)	B-103 8/25/14 (22-24 ft.)	B-104 8/25/14 (2-3.5 ft.)	B-104 8/25/14 (10-12 ft.)	B-104 8/25/14 (22-24 ft.)	B-105 7/23/14 (3-4 ft.)	B-105 7/23/14 (7-8 ft.)	B-105 7/23/14 (20-21 ft.)	B-106 7/16/14 (1-3 ft.)	B-106 7/16/14 (6.5-8 ft.)
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
cis-1,3-Dichloropropene in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
Dibromochloromethane in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
Dibromomethane in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
Ethylbenzene in mg/kg	0.06	0.0008 U	0.41 U	0.0013 U	0.001 U	0.0019 U	0.001 U	0.0011 U	0.13 U	0.001 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0038 U	71
Hexachlorobutadiene in mg/kg	0.01	0.0039 U	2 U	0.0067 U	0.0052 U	0.0053 U	0.005 U	0.0054 U	0.65 U	0.0037 U	0.0038 U	0.0044 U	0.0042 U	0.006 U	0.0049 U	0.006 U	0.0061 U	6.6 U
Isopropylbenzene in mg/kg	350,000	0.0008 U	0.41 U	0.0013 U	0.001 U	0.0091 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	9.2
Methylene chloride in mg/kg	20,000	0.0029 U	1.1 U	0.005 U	0.0043 U	0.0056 U	0.0046 U	0.0049 U	0.64 U	0.0021 U	0.0022 U	0.0019 U	0.0034 U	0.006 UJ	0.0029 UJ	0.003 UJ	0.0055 U	2.7 U
Methylidide in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.17	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
n-Butylbenzene in mg/kg	175,000	0.0008 U	0.9	0.0013 U	0.001 U	0.0015 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	19
n-Propylbenzene in mg/kg	350,000	0.0008 U	0.77	0.0013 U	0.001 U	0.012 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0074 U	0.0008 U	0.0012 U	0.0012 U	0.0012 U	0.0012 U	28
p-Isopropyltoluene in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	8.7
sec-Butylbenzene in mg/kg	350,000	0.0008 U	0.51	0.0013 U	0.001 U	0.002 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.002 U	0.0008 U	0.0012 U	0.0043 U	0.0012 U	0.0012 U	6.7
Styrene in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
tert-Butylbenzene in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
Tetrachloroethene (PCE) in mg/kg	0.005	0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
Toluene in mg/kg	280,000	0.0008 U	0.41 U	0.0015 U	0.0013 U	0.0028 U	0.001 U	0.0014 U	0.13 U	0.0049 U	0.0008 U	0.002 U	0.001 U	0.0012 U	0.001 U	0.0053 U	0.0022 U	9.3
trans-1,2-Dichloroethene in mg/kg	70,000	0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
trans-1,3-Dichloropropene in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
Trichloroethene (TCE) in mg/kg	0.005	0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
Trichlorofluoromethane in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
Vinyl acetate in mg/kg		0.0039 U	2 U	0.0067 U	0.0052 U	0.0053 U	0.005 U	0.0054 U	0.65 U	0.0037 U	0.0038 U	0.0044 U	0.0042 U	0.006 U	0.0049 U	0.006 U	0.0061 U	6.6 U
Vinyl chloride in mg/kg	0.005	0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0012 U	1.3 U
m,p-Xylenes in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0037 U	0.001 U	0.0011 U	0.13 U	0.0014 U	0.0008 U	0.0018 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0085 U	170
o-Xylene in mg/kg		0.0008 U	0.41 U	0.0013 U	0.001 U	0.0011 U	0.001 U	0.0011 U	0.13 U	0.0007 U	0.0008 U	0.0009 U	0.0008 U	0.0012 U	0.001 U	0.0012 U	0.0017 U	15
Total Xylenes in mg/kg		ND	ND	ND	ND	0.0042 U	ND	ND	ND	0.0018 U	ND	0.0022 U	ND	ND	ND	ND	0.01 U	180
Naphthalene in mg/kg	6	0.0039 U	2 U	0.0067 U	0.0052 U	0.0053 U	0.005 U	0.0054 UJ	0.65 UJ	0.0037 UJ	0.0038 UJ	0.0044 UJ	0.0042 UJ	0.006 U	0.0049 U	0.006 U	0.0061 U	48

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-1 - 2014-2015 RI Soil Data

Pr # 130097-01D - Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	B-106 FD 7/16/14 (20-22 ft.)	B-106 7/16/14 (20-22 ft.)	B-107 7/17/14 (5-6.5 ft.)	B-107 7/17/14 (7.5-8.5 ft.)	B-107 7/17/14 (20-22 ft.)	B-108 7/15/14 (1.5-3.5 ft.)	B-108 7/15/14 (6-7 ft.)	B-108 7/15/14 (20-22 ft.)	B-109 7/16/14 (2.5-3.5 ft.)	B-109 7/16/14 (6.5-8 ft.)	B-109 7/16/14 (20-22 ft.)	B-110 7/23/14 (3-4 ft.)	B-110 7/23/14 (7-8 ft.)	B-110 7/23/14 (20-21 ft.)	B-111 7/17/14 (5-6 ft.)	B-111 7/17/14 (8-9 ft.)	B-111 7/17/14 (20-22 ft.)	
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
Gasoline Range Hydrocarbons in mg/kg	30	40 J	10 J	9,700	3,200	6.0 U	5,100	5,000	7.9 U	240	14,000	18	5.1 U	3,900	7.5 U	4.8 U	2,800	5.5 U	
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in mg/kg	2,000	16	25	10,000	5,200	6.0 U	1,700	10,000	6.1 U	3,600	12,000	37	5.2 U	1,100	6.0 U	37	6,300	6.1 U	
Oil Range Hydrocarbons in mg/kg	2,000	12 U	12 U	550 U	1,200 U	12 U	88	750	12 U	4,000	1,500	24	10 U	120 U	12 U	190	200	12 U	
Total TPHs D+O (ND=1/2U) in ug/L	2,000	22.0	31.0	10,300	5,800	ND	1,790	10,800	ND	7,600	13,500	61	ND	1,160	ND	227	6,500	ND	
Metals																			
Lead in mg/kg	1,000			7			2			2 U			2			67			
Conventional Chemistry Parameters																			
Total Organic Carbon in Percent																			
Total Solids in Percent																			
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
1,1,1-Trichloroethane in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
1,1,2 - Trichlorotrifluoroethane in mg/kg		0.0028 U	0.0022 U	1.2 U	1.1 U	0.0022 U	2.2 U	2.4 U	0.0018 U	0.12 U	8.9 U	0.0019 U	0.0024 U	1.3 U	0.0026 U	0.0021 U	1.1 U	0.0022 U	
1,1,2,2-Tetrachloroethane in mg/kg	700	0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
1,1,2-Trichloroethane in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
1,1-Dichloroethane in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
1,1-Dichloroethane in mg/kg	175,000	0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
1,1-Dichloropropene in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
1,2,3-Trichlorobenzene in mg/kg		0.0069 U	0.0056 U	3 U	2.8 U	0.0056 U	5.5 U	5.9 U	0.0045 U	0.3 U	22 U	0.0048 U	0.0061 U	3.4 U	0.0066 U	0.0053 U	2.7 U	0.0054 U	
1,2,3-Trichloropropane in mg/kg		0.0028 U	0.0022 U	1.2 U	1.1 U	0.0022 U	2.2 U	2.4 U	0.0018 U	0.12 U	8.9 U	0.0019 U	0.0024 U	1.3 U	0.0026 U	0.0021 U	1.1 U	0.0022 U	
1,2,4-Trichlorobenzene in mg/kg		0.0069 U	0.0056 U	3 U	2.8 U	0.0056 U	5.5 U	5.9 U	0.0045 U	0.3 U	22 U	0.0048 U	0.0061 U	3.4 U	0.0066 U	0.0053 U	2.7 U	0.0054 U	
1,2,4-Trimethylbenzene in mg/kg		0.11 J	0.0046 J	0.6 U	0.57 U	0.0011 U	75	150	0.0024	0.27	700	0.028	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
1,2-Dibromo-3-chloropropane in mg/kg		0.0069 U	0.0056 U	3 U	2.8 U	0.0056 U	5.5 U	5.9 U	0.0045 U	0.3 U	22 U	0.0048 U	0.0061 U	3.4 U	0.0066 U	0.0053 U	2.7 U	0.0054 U	
1,2-Dibromoethane (EDB) in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
1,2-Dichlorobenzene in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
1,2-Dichloroethane (EDC) in mg/kg	1,000	0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
1,2-Dichloropropane in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
1,3,5-Trimethylbenzene in mg/kg	35,000	0.024 J	0.0011 J	0.6 U	0.57 U	0.0011 U	3.5	19	0.0009 U	0.06 U	75	0.0035	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
1,3-Dichlorobenzene in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
1,3-Dichloropropane in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
1,4-Dichloro-2-Butene in mg/kg		0.0069 U	0.0056 U	3 U	2.8 U	0.0056 U	5.5 U	5.9 U	0.0045 U	0.3 U	22 U	0.0048 U	0.0061 U	3.4 U	0.0066 U	0.0053 U	2.7 U	0.0054 U	
1,4-Dichlorobenzene in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
2,2-Dichloropropane in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
2-Butanone in mg/kg		0.0069 U	0.0056 U	3 U	2.8 U	0.0056 U	5.5 U	5.9 U	0.0045 U	0.3 U	22 U	0.0048 U	0.0061 U	3.4 U	0.0066 U	0.0053 U	2.7 U	0.0054 U	
2-Chloroethyl Vinyl Ether in mg/kg		0.0069 U	0.0056 U	3 U	2.8 U	0.0056 U	5.5 U	5.9 U	0.0045 U	0.3 U	22 U	0.0048 U	0.0061 U	3.4 U	0.0066 U	0.0053 U	2.7 U	0.0054 U	
2-Chlorotoluene in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
2-Hexanone in mg/kg		0.0069 U	0.0056 U	3 U	2.8 U	0.0056 U	5.5 U	5.9 U	0.0045 U	0.3 U	22 U	0.0048 U	0.0061 U	3.4 U	0.0066 U	0.0053 U	2.7 U	0.0054 U	
4-Chlorotoluene in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
4-Methyl-2-pentanone in mg/kg		0.0069 U	0.0056 U	3 U	2.8 U	0.0056 U	5.5 U	5.9 U	0.0045 U	0.3 U	22 U	0.0048 U	0.0061 U	3.4 U	0.0066 U	0.0053 U	2.7 U	0.0054 U	
Acetone in mg/kg	3,150,000	0.0069 U	0.022 U	3 U	2.8 U	0.0098 U	5.5 U	5.9 U	0.018 U	0.3 U	22 U	0.0048 U	0.015 U	3.4 U	0.018 U	0.02 U	2.7 U	0.012 U	
Acrolein in mg/kg		0.069 U	0.056 U	30 U	28 U	0.056 U	55 U	59 U	0.045 U	3 U	220 U	0.048 U	0.061 U	34 U	0.066 U	0.053 U	27 U	0.054 U	
Acrylonitrile in mg/kg	1	0.0069 U	0.0056 U	3 U	2.8 U	0.0056 U	5.5 U	5.9 U	0.0045 U	0.3 U	22 U	0.0048 U	0.0061 U	3.4 U	0.0066 U	0.0053 U	2.7 U	0.0054 U	
Benzene in mg/kg	0.02	0.011	0.0083	7.4	2.6	0.0011 U	4.3	18	0.01	2.4	36	0.012	0.0012 U	0.67 U	0.0071	0.0011 U	0.53 U	0.0011 U	
Bromobenzene in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
Bromochloromethane in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
Bromodichloromethane in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
Bromoethane in mg/kg		0.0028 U	0.0022 U	1.2 U	1.1 U	0.0022 U	2.2 U	2.4 U	0.0018 U	0.12 U	8.9 U	0.0019 U	0.0024 U	1.3 U	0.0026 U	0.0021 U	1.1 U	0.0022 U	
Bromoform in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
Bromomethane in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
Carbon disulfide in mg/kg		0.003	0.004	0.6 U	0.57 U	0.0018	1.1 U	1.2 U	0.0067 J	0.06 U	4.4 U	0.0051	0.0012 U	0.67 U	0.0024	0.0011 U	0.53 U	0.0029 J	
Carbon tetrachloride in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
Chlorobenzene in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
Chloroethane in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
Chloroform in mg/kg	4,000	0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	
Chloromethane in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U	

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Table B-1

Table B-1 - 2014-2015 RI Soil Data

Pr # 130097-01D - Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	B-106 FD 7/16/14 (20-22 ft.)	B-106 7/16/14 (20-22 ft.)	B-107 7/17/14 (5-6.5 ft.)	B-107 7/17/14 (7.5-8.5 ft.)	B-107 7/17/14 (20-22 ft.)	B-108 7/15/14 (1.5-3.5 ft.)	B-108 7/15/14 (6-7 ft.)	B-108 7/15/14 (20-22 ft.)	B-109 7/16/14 (2.5-3.5 ft.)	B-109 7/16/14 (6.5-8 ft.)	B-109 7/16/14 (20-22 ft.)	B-110 7/23/14 (3-4 ft.)	B-110 7/23/14 (7-8 ft.)	B-110 7/23/14 (20-21 ft.)	B-111 7/17/14 (5-6 ft.)	B-111 7/17/14 (8-9 ft.)	B-111 7/17/14 (20-22 ft.)
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U
cis-1,3-Dichloropropene in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U
Dibromochloromethane in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U
Dibromomethane in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U
Ethylbenzene in mg/kg	0.06	0.034 J	0.0022 J	29	4.6	0.0011 U	20	55	0.0009 U	0.28	200	0.013	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U
Hexachlorobutadiene in mg/kg	0.01	0.0069 U	0.0056 U	3 U	2.8 U	0.0056 U	5.5 U	5.9 U	0.0045 U	0.3 U	22 U	0.0048 U	0.0061 U	3.4 U	0.0066 U	0.0053 U	2.7 U	0.0054 U
Isopropylbenzene in mg/kg	350,000	0.006 J	0.0011 UJ	11	2.1	0.0011 U	1.1 U	8.5	0.0009 U	0.06 U	37	0.0026	0.0012 U	0.67 U	0.0013 U	0.0011 U	3.2	0.0011 U
Methylene chloride in mg/kg	20,000	0.0062 U	0.0022 UJ	1.2 U	1.1 U	0.0039 U	2.2 U	2.4 U	0.003 U	0.12 U	8.9 U	0.0032 U	0.0057 UJ	1.3 U	0.0061 U	0.0041 U	1.1 U	0.0048 U
Methylidide in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U
n-Butylbenzene in mg/kg	175,000	0.011 J	0.0011 UJ	14	2.3	0.0011 U	5.5	13	0.0009 U	0.12	56	0.002	0.0012 U	0.67 U	0.0013 U	0.0011 U	2.4	0.0011 U
n-Propylbenzene in mg/kg	350,000	0.016 J	0.0011 UJ	32	5.5	0.0011 U	9.6	21	0.0009 U	0.11	98	0.0046	0.0012 U	0.67 U	0.0013 U	0.0011 U	5.2	0.0011 U
p-Isopropyltoluene in mg/kg		0.0058 J	0.0011 UJ	0.6 U	0.57 U	0.0011 U	4.2	8	0.0009 U	0.18	39	0.0019	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.55	0.0011 U
sec-Butylbenzene in mg/kg	350,000	0.0049 J	0.0011 UJ	7.9	1.4	0.0011 U	3	5.8	0.0009 U	0.082	28	0.0015	0.0012 U	0.67 U	0.0013 U	0.0011 U	2.1	0.0011 U
Styrene in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U
tert-Butylbenzene in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U
Tetrachloroethene (PCE) in mg/kg	0.005	0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U
Toluene in mg/kg	280,000	0.0035 J	0.0011 UJ	0.6 U	0.57 U	0.0011 U	2.7	9.9	0.0009 U	0.46	22	0.0031	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U
trans-1,2-Dichloroethene in mg/kg	70,000	0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U
trans-1,3-Dichloropropene in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U
Trichloroethene (TCE) in mg/kg	0.005	0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U
Trichlorofluoromethane in mg/kg		0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U
Vinyl acetate in mg/kg		0.0069 U	0.0056 U	3 U	2.8 U	0.0056 U	5.5 U	5.9 U	0.0045 U	0.3 U	22 U	0.0048 U	0.0061 U	3.4 U	0.0066 U	0.0053 U	2.7 U	0.0054 U
Vinyl chloride in mg/kg	0.005	0.0014 U	0.0011 U	0.6 U	0.57 U	0.0011 U	1.1 U	1.2 U	0.0009 U	0.06 U	4.4 U	0.001 U	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U
m,p-Xylenes in mg/kg		0.07 J	0.0042 J	0.6 U	0.57 U	0.0011 U	36	110	0.0019	0.21	340	0.018	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U
o-Xylene in mg/kg		0.006 J	0.0011 UJ	0.6 U	0.57 U	0.0011 U	3.6	6.7	0.0009 U	0.086	18	0.0013	0.0012 U	0.67 U	0.0013 U	0.0011 U	0.53 U	0.0011 U
Total Xylenes in mg/kg		0.076 J	0.0048 J	ND	ND	ND	40	120	0.0024	0.3	360	0.019	ND	ND	ND	ND	ND	ND
Naphthalene in mg/kg	6	0.019 J	0.0056 UJ	17	2.8 U	0.0056 U	23	51	0.0045 U	0.3 U	250	0.0061	0.0061 U	3.4 U	0.0066 U	0.0053 U	2.7 U	0.0054 U

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-1 - 2014-2015 RI Soil Data

Pr # 130097-01D - Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Table with columns for Chemical Name, Soil Potential Cleanup Level (mg/kg), and 18 sampling locations (B-112 FD through B-117) with their respective depths. Rows include Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup, Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup, Metals (Lead), Conventional Chemistry Parameters (Total Organic Carbon, Total Solids), Volatile Organic Compounds (VOC), and a comprehensive list of 51 specific organic chemicals.

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Table B-1 - 2014-2015 RI Soil Data

Pr # 130097-01D - Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	B-112 FD 7/21/14 (4-5 ft.)	B-112 7/21/14 (4-5 ft.)	B-112 7/21/14 (8.5-9.5 ft.)	B-112 7/21/14 (22.5-23.5 ft.)	B-113 7/18/14 (2-4 ft.)	B-113 7/18/14 (8-9 ft.)	B-113 7/18/14 (20-22 ft.)	B-114 7/18/14 (2.5-3.5 ft.)	B-114 7/18/14 (9-10 ft.)	B-114 7/18/14 (20-22 ft.)	B-115 7/18/14 (2-3 ft.)	B-115 7/18/14 (10-11 ft.)	B-116 7/18/14 (1-2 ft.)	B-116 7/18/14 (10-11 ft.)	B-117 7/22/14 (3-4 ft.)	B-117 7/22/14 (9-10 ft.)	B-117 7/22/14 (21-23.5 ft.)
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.0009 U	0.0009 U	0.0009 U	0.0078	0.001 U	0.0012 U	0.0012	0.0008 U	0.0011 U	0.0028	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
cis-1,3-Dichloropropene in mg/kg		0.0009 U	0.0009 U	0.0009 U	0.0005 U	0.001 U	0.0012 U	0.0009 U	0.0008 U	0.0011 U	0.001 U	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
Dibromochloromethane in mg/kg		0.0009 U	0.0009 U	0.0009 U	0.0005 U	0.001 U	0.0012 U	0.0009 U	0.0008 U	0.0011 U	0.001 U	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
Dibromomethane in mg/kg		0.0009 U	0.0009 U	0.0009 U	0.0005 U	0.001 U	0.0012 U	0.0009 U	0.0008 U	0.0011 U	0.001 U	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
Ethylbenzene in mg/kg	0.06	0.0009 U	0.0009 U	0.0009 U	0.0008	0.001 U	0.0012 U	0.0009 U	0.0008 U	0.0011 U	0.002	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
Hexachlorobutadiene in mg/kg	0.01	0.0043 U	0.0045 U	0.0043 U	0.0027 U	0.0052 U	0.0059 U	0.0047 U	0.0041 U	0.0056 U	0.0049 U	0.0046 U	0.0045 U	0.005 U	0.0047 U	0.0039 U	0.0032 U	0.0039 U
Isopropylbenzene in mg/kg	350,000	0.0009 U	0.0009 U	0.0009 U	0.0005 U	0.001 U	0.0033	0.0009 U	0.0008 U	0.0011 U	0.001 U	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
Methylene chloride in mg/kg	20,000	0.0045 U	0.0044 U	0.0045 U	0.0021 U	0.004 U	0.0057 U	0.0037 U	0.0028 U	0.0022 U	0.002 U	0.0038 U	0.0018 U	0.0038 U	0.0036 U	0.0029 U	0.0024 U	0.0033 U
Methylidide in mg/kg		0.0009 U	0.0009 U	0.0009 U	0.0005 U	0.001 U	0.0012 U	0.0009 U	0.0008 U	0.0011 U	0.001 U	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
n-Butylbenzene in mg/kg	175,000	0.0009 U	0.0009 U	0.0009 U	0.0005 U	0.001 U	0.003	0.0009 U	0.0008 U	0.0011 U	0.001 U	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
n-Propylbenzene in mg/kg	350,000	0.0009 U	0.0009 U	0.0009 U	0.0005 U	0.001 U	0.013	0.0009 U	0.0008 U	0.0011 U	0.001 U	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
p-Isopropyltoluene in mg/kg		0.0009 U	0.0009 U	0.0009 U	0.0005 U	0.001 U	0.0012 U	0.0009 U	0.0008 U	0.0011 U	0.001 U	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
sec-Butylbenzene in mg/kg	350,000	0.0009 U	0.0009 U	0.0009 U	0.0005 U	0.001 U	0.0032	0.0009 U	0.0008 U	0.0011 U	0.001 U	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
Styrene in mg/kg		0.0009 U	0.0009 U	0.0009 U	0.0005 U	0.001 U	0.0012 U	0.0009 U	0.0008 U	0.0011 U	0.001 U	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
tert-Butylbenzene in mg/kg		0.0009 U	0.0009 U	0.0009 U	0.0005 U	0.001 U	0.0012 U	0.0009 U	0.0008 U	0.0011 U	0.001 U	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
Tetrachloroethene (PCE) in mg/kg	0.005	0.0009 U	0.0009 U	0.0009 U	0.0008	0.001 U	0.0012 U	0.0009 U	0.012	0.01	0.001 U	0.0063	0.0047	0.0085	0.021	0.0008 U	0.0006 U	0.0008 U
Toluene in mg/kg	280,000	0.0009 U	0.0009 U	0.0009 U	0.0011	0.001 U	0.0012 U	0.0009 U	0.0008 U	0.0037	0.0027	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
trans-1,2-Dichloroethene in mg/kg	70,000	0.0009 U	0.0009 U	0.0009 U	0.0014	0.001 U	0.0012 U	0.0011	0.0008 U	0.0011 U	0.001 U	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
trans-1,3-Dichloropropene in mg/kg		0.0009 U	0.0009 U	0.0009 U	0.0005 U	0.001 U	0.0012 U	0.0009 U	0.0008 U	0.0011 U	0.001 U	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
Trichloroethene (TCE) in mg/kg	0.005	0.0009 U	0.0009 U	0.0009 U	0.0037	0.001 U	0.0012 U	0.0016	0.0016	0.0019	0.001 U	0.0009 U	0.0009 U	0.0029	0.0054	0.0008 U	0.0006 U	0.0008 U
Trichlorofluoromethane in mg/kg		0.0009 U	0.0009 U	0.0009 U	0.0005 U	0.001 U	0.0012 U	0.0009 U	0.0008 U	0.0011 U	0.001 U	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
Vinyl acetate in mg/kg		0.0043 U	0.0045 U	0.0043 U	0.0027 U	0.0052 U	0.0059 U	0.0047 U	0.0041 U	0.0056 U	0.0049 U	0.0046 U	0.0045 U	0.005 U	0.0047 U	0.0039 U	0.0032 U	0.0039 U
Vinyl chloride in mg/kg	0.005	0.0009 U	0.0009 U	0.0009 U	0.0005 U	0.001 U	0.0012 U	0.0009 U	0.0008 U	0.0011 U	0.001 U	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
m,p-Xylenes in mg/kg		0.0009 U	0.0009 U	0.0009 U	0.0005 U	0.001 U	0.0012 U	0.0009 U	0.0008 U	0.0011 U	0.001	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
o-Xylene in mg/kg		0.0009 U	0.0009 U	0.0009 U	0.0007	0.001 U	0.0012 U	0.0009 U	0.0008 U	0.0011 U	0.0013	0.0009 U	0.0009 U	0.001 U	0.0009 U	0.0008 U	0.0006 U	0.0008 U
Total Xylenes in mg/kg		ND	ND	ND	0.00095	ND	ND	ND	ND	ND	0.0023	ND	ND	ND	ND	ND	ND	ND
Naphthalene in mg/kg	6	0.0043 U	0.0045 U	0.0043 U	0.0027 U	0.0052 U	0.0059 U	0.0047 U	0.0041 U	0.0056 U	0.0049 U	0.0046 U	0.0045 U	0.005 U	0.0047 U	0.0039 U	0.0032 U	0.0039 U

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-1 - 2014-2015 RI Soil Data

Pr # 130097-01D - Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	B-118 7/22/14 (3-4 ft.)	B-118 7/22/14 (9-10 ft.)	B-118 FD 7/22/14 (21-23 ft.)	B-118 7/22/14 (21-23 ft.)	B-119 8/26/14 (7-9 ft.)	B-119 8/26/14 (22-24 ft.)	B-120 8/26/14 (6.5-7.5 ft.)	B-120 8/26/14 (22-24 ft.)	B-121 8/26/14 (6-7 ft.)	B-121 8/26/14 (22-24 ft.)	B-122 7/22/14 (3-4 ft.)	B-122 7/22/14 (9-10 ft.)	B-122 7/22/14 (21-22.5 ft.)	B-123 7/21/14 (4-5 ft.)	B-123 FD 7/21/14 (8-10 ft.)	B-123 7/21/14 (8-10 ft.)	B-123 7/21/14 (23-24 ft.)
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.32 U	0.0007 U	0.5 U	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0024
cis-1,3-Dichloropropene in mg/kg		0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.32 U	0.0007 U	0.5 U	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
Dibromochloromethane in mg/kg		0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.32 U	0.0007 U	0.5 U	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
Dibromomethane in mg/kg		0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.32 U	0.0007 U	0.5 U	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
Ethylbenzene in mg/kg	0.06	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	16	0.0007 U	25	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
Hexachlorobutadiene in mg/kg	0.01	0.0036 U	0.0034 U	0.0038 U	0.0042 U	0.0035 U	0.0039 U	1.6 U	0.0036 U	2.5 U	0.0044 U	0.0034 U	0.0029 U	0.0037 U	0.0041 U	0.0032 U	0.0031 U	0.0038 U
Isopropylbenzene in mg/kg	350,000	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	8.2	0.0007 U	3.3	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
Methylene chloride in mg/kg	20,000	0.0035 U	0.0026 U	0.0043 U	0.0037 U	0.003 U	0.0025 U	1.1 U	0.0028 U	0.99 U	0.0041 U	0.0024 U	0.0017 U	0.0041 U	0.0035 U	0.0032 U	0.0017 U	0.0021 U
Methylidide in mg/kg		0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.32 U	0.0007 U	0.5 U	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
n-Butylbenzene in mg/kg	175,000	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	9.4	0.0007 U	4.9	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
n-Propylbenzene in mg/kg	350,000	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	20	0.0007 U	11	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
p-Isopropyltoluene in mg/kg		0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	2.6	0.0007 U	1.7	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
sec-Butylbenzene in mg/kg	350,000	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	6	0.0007 U	2.2	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
Styrene in mg/kg		0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.32 U	0.0007 U	0.5 U	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
tert-Butylbenzene in mg/kg		0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.32 U	0.0007 U	0.5 U	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
Tetrachloroethene (PCE) in mg/kg	0.005	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.32 U	0.0007 U	0.5 U	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
Toluene in mg/kg	280,000	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.48	0.0007 U	0.52	0.0013	0.0007 U	0.0006 U	0.0009	0.0008 U	0.0006 U	0.0006 U	0.0008 U
trans-1,2-Dichloroethene in mg/kg	70,000	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.32 U	0.0007 U	0.5 U	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
trans-1,3-Dichloropropene in mg/kg		0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.32 U	0.0007 U	0.5 U	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
Trichloroethene (TCE) in mg/kg	0.005	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.32 U	0.0007 U	0.5 U	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
Trichlorofluoromethane in mg/kg		0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.32 U	0.0007 U	0.5 U	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
Vinyl acetate in mg/kg		0.0036 U	0.0034 U	0.0038 U	0.0042 U	0.0035 U	0.0039 U	1.6 U	0.0036 U	2.5 U	0.0044 U	0.0034 U	0.0029 U	0.0037 U	0.0041 U	0.0032 U	0.0031 U	0.0038 U
Vinyl chloride in mg/kg	0.005	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.32 U	0.0007 U	0.5 U	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.073
m,p-Xylenes in mg/kg		0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.71	0.0007 U	2	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
o-Xylene in mg/kg		0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.57	0.0007 U	0.5 U	0.0009 U	0.0007 U	0.0006 U	0.0007 U	0.0008 U	0.0006 U	0.0006 U	0.0008 U
Total Xylenes in mg/kg		ND	ND	ND	ND	ND	ND	1.3	ND	2.2	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene in mg/kg	6	0.0036 U	0.0034 U	0.0038 U	0.0042 U	0.0035 U	0.0039 U	1.6 U	0.0036 U	2.5 U	0.0044 U	0.0034 U	0.0029 U	0.0037 U	0.0041 U	0.0032 U	0.0031 U	0.0038 U

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-1 - 2014-2015 RI Soil Data

Pr # 130097-01D - Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Table with 19 columns: Chemical Name, Soil Potential Cleanup Level (mg/kg), and 18 sampling locations (B-124, B-125, B-126, B-127, B-128, B-129) with their respective dates and depths. Rows include Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup, Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup, Metals, Conventional Chemistry Parameters, and Volatile Organic Compounds (VOC).

Table B-1 - 2014-2015 RI Soil Data

Pr # 130097-01D - Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	B-124 7/21/14 (4-5 ft.)	B-124 7/21/14 (9-10 ft.)	B-124 7/21/14 (22-23 ft.)	B-125 7/21/14 (3-4 ft.)	B-125 7/21/14 (8-9 ft.)	B-125 7/21/14 (23-24 ft.)	B-126 7/22/14 (3.5-4.5 ft.)	B-126 7/22/14 (10-12 ft.)	B-126 7/22/14 (23-24 ft.)	B-126 7/22/14 (27-29 ft.)	B-127 7/15/14 (1.5-3.5 ft.)	B-127 7/15/14 (6.5-8.5 ft.)	B-128 7/15/14 (0-3 ft.)	B-128 7/15/14 (6-8 ft.)	B-129 8/25/14 (3-5 ft.)	B-129 8/25/14 (12-14 ft.)	B-129 8/25/14 (21-23 ft.)
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.0007 U	1 U	0.89 U	0.18 U	0.77 U	0.001 U	0.0008 U	0.0009 U
cis-1,3-Dichloropropene in mg/kg		0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.0007 U	1 U	0.89 U	0.18 U	0.77 U	0.001 U	0.0008 U	0.0009 U
Dibromochloromethane in mg/kg		0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.0007 U	1 U	0.89 U	0.18 U	0.77 U	0.001 U	0.0008 U	0.0009 U
Dibromomethane in mg/kg		0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.0007 U	1 U	0.89 U	0.18 U	0.77 U	0.001 U	0.0008 U	0.0009 U
Ethylbenzene in mg/kg	0.06	0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0022	0.0016	0.0007 U	26	37	6.6	18	0.001 U	0.0008 U	0.0009 U
Hexachlorobutadiene in mg/kg	0.01	0.0035 U	0.0032 U	0.0038 U	0.0033 U	0.0036 U	0.0042 U	0.004 U	0.0035 U	0.0041 U	0.0035 U	5.2 U	4.4 U	0.91 U	3.8 U	0.0048 U	0.0042 U	0.0044 U
Isopropylbenzene in mg/kg	350,000	0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0071	0.0008 U	0.0007 U	3.4	5	1.1	2.8	0.001 U	0.0008 U	0.0009 U
Methylene chloride in mg/kg	20,000	0.0026 U	0.0033 U	0.0026 U	0.0024 U	0.0029 U	0.0031 U	0.0039 U	0.003 U	0.0025 U	0.002 U	2.1 U	1.8 U	0.36 U	1.5 U	0.0021 U	0.002 U	0.003 U
Methylidide in mg/kg		0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.0007 U	1 U	0.89 U	0.18 U	0.77 U	0.001 U	0.0008 U	0.0009 U
n-Butylbenzene in mg/kg	175,000	0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0012	0.0008 U	0.0007 U	7.1	9.5	1.6	3.4	0.001 U	0.0008 U	0.0009 U
n-Propylbenzene in mg/kg	350,000	0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.016	0.0008 U	0.0007 U	9.1	13	2.8	6.6	0.001 U	0.0072	0.0009 U
p-Isopropyltoluene in mg/kg		0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.0007 U	2.7	2.9	0.93	1.5	0.001 U	0.0008 U	0.0009 U
sec-Butylbenzene in mg/kg	350,000	0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0018	0.0008 U	0.0007 U	2.4	3.6	0.9	1.9	0.001 U	0.0008 U	0.0009 U
Styrene in mg/kg		0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.0007 U	1 U	0.89 U	0.18 U	0.77 U	0.001 U	0.0008 U	0.0009 U
tert-Butylbenzene in mg/kg		0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.0007 U	1 U	0.89 U	0.18 U	0.77 U	0.001 U	0.0008 U	0.0009 U
Tetrachloroethene (PCE) in mg/kg	0.005	0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.0007 U	1 U	0.89 U	0.18 U	0.77 U	0.001 U	0.0008 U	0.0009 U
Toluene in mg/kg	280,000	0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0025	0.0058	0.0007 U	3.4	5.1	0.41	1.9	0.0011	0.0022	0.0013
trans-1,2-Dichloroethene in mg/kg	70,000	0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.0007 U	1 U	0.89 U	0.18 U	0.77 U	0.001 U	0.0008 U	0.0009 U
trans-1,3-Dichloropropene in mg/kg		0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.0007 U	1 U	0.89 U	0.18 U	0.77 U	0.001 U	0.0008 U	0.0009 U
Trichloroethene (TCE) in mg/kg	0.005	0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.0007 U	1 U	0.89 U	0.18 U	0.77 U	0.001 U	0.0008 U	0.0009 U
Trichlorofluoromethane in mg/kg		0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.0007 U	1 U	0.89 U	0.18 U	0.77 U	0.001 U	0.0008 U	0.0009 U
Vinyl acetate in mg/kg		0.0035 U	0.0032 U	0.0038 U	0.0033 U	0.0036 U	0.0042 U	0.004 U	0.0035 U	0.0041 U	0.0035 U	5.2 U	4.4 U	0.91 U	3.8 U	0.0048 U	0.0042 U	0.0044 U
Vinyl chloride in mg/kg	0.005	0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.0007 U	1 U	0.89 U	0.18 U	0.77 U	0.001 U	0.0008 U	0.0009 U
m,p-Xylenes in mg/kg		0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0072	0.0014	0.0007 U	91	55	3.8	6.9	0.001 U	0.0081	0.0009 U
o-Xylene in mg/kg		0.0007 U	0.0006 U	0.0008 U	0.0007 U	0.0007 U	0.0008 U	0.0008 U	0.0007 U	0.0008 U	0.0007 U	19	3.2	0.65	1.6	0.001 U	0.0008 U	0.0009 U
Total Xylenes in mg/kg		ND	ND	ND	ND	ND	ND	ND	0.0076	0.0022	ND	110	58	4.4	8.5	ND	0.0085	ND
Naphthalene in mg/kg	6	0.0035 U	0.0032 U	0.0038 U	0.0033 U	0.0036 U	0.0042 U	0.004 U	0.0035 U	0.0041 U	0.0035 U	27	58	5	23	0.0048 U	0.0042 U	0.0044 U

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-1 - 2014-2015 RI Soil Data

Pr # 130097-01D - Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	B-130 8/25/14 (3-5 ft.)	B-130 8/25/14 (8-10 ft.)	B-130 8/25/14 (13-15 ft.)	B-130 8/25/14 (22-24 ft.)	B-131 9/10/14 (20-21 ft.)	B-132 9/10/14 (20-21 ft.)	B-133 9/10/14 (21-22 ft.)	B-134 9/10/14 (21-22 ft.)	B-135 9/19/14 (22-24 ft.)	B-136 9/19/14 (22-24 ft.)	B-137 9/19/14 (22-24 ft.)	B-138 9/19/14 (22-24 ft.)	B-139 9/19/14 (22-24 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup														
Gasoline Range Hydrocarbons in mg/kg	30	4.6 U	12	26	6.1 U	7.6 U	6.8 U	8.4 U	5.1 U	8.3 U	7.2 U	6.6 U	6.9 U	7.8 U
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup														
Diesel Range Hydrocarbons in mg/kg	2,000	5.3 U	6.2 U	6.3 U	6.2 U	6.4 U	6.0 U	6.5	6.2 U	6.1 U	6.8	6.2 U	6.3 U	6.8
Oil Range Hydrocarbons in mg/kg	2,000	11 U	12 U	13 U	12 U	13 U	12 U	13 U	12 U	12 U	12 U	12 U	12 U	13 U
Total TPHs D+O (ND=1/2U) in ug/L	2,000	ND	ND	ND	ND	ND	ND	13.0	ND	ND	12.8	ND	ND	13.3
Metals														
Lead in mg/kg	1,000													
Conventional Chemistry Parameters														
Total Organic Carbon in Percent														
Total Solids in Percent														
Volatile Organic Compounds (VOC)														
1,1,1,2-Tetrachloroethane in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
1,1,1-Trichloroethane in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
1,1,2 - Trichlorotrifluoroethane in mg/kg		0.0015 U	0.0016 U	0.0016 U	0.0016 U	0.0022 U	0.0021 U	0.0027 U	0.0019 U	0.002 U	0.0023 U	0.0024 U	0.0026 U	0.0024 U
1,1,2,2-Tetrachloroethane in mg/kg	700	0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
1,1,2-Trichloroethane in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
1,1-Dichloroethane in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
1,1-Dichloroethene in mg/kg	175,000	0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
1,1-Dichloropropene in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
1,2,3-Trichlorobenzene in mg/kg		0.0037 UJ	0.0041 UJ	0.0041 UJ	0.0041 UJ	0.0056 U	0.0052 U	0.0067 U	0.0047 U	0.0051 U	0.0058 U	0.0059 U	0.0065 U	0.0061 U
1,2,3-Trichloropropane in mg/kg		0.0015 U	0.0016 U	0.0016 U	0.0016 U	0.0022 U	0.0021 U	0.0027 U	0.0019 U	0.002 U	0.0023 U	0.0024 U	0.0026 U	0.0024 U
1,2,4-Trichlorobenzene in mg/kg		0.0037 UJ	0.0041 UJ	0.0041 UJ	0.0041 UJ	0.0056 U	0.0052 U	0.0067 U	0.0047 U	0.0051 U	0.0058 U	0.0059 U	0.0065 U	0.0061 U
1,2,4-Trimethylbenzene in mg/kg		0.0007 U	0.0008 U	0.0011	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
1,2-Dibromo-3-chloropropane in mg/kg		0.0037 U	0.0041 U	0.0041 U	0.0041 U	0.0056 U	0.0052 U	0.0067 U	0.0047 U	0.0051 U	0.0058 U	0.0059 U	0.0065 U	0.0061 U
1,2-Dibromoethane (EDB) in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
1,2-Dichlorobenzene in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
1,2-Dichloroethane (EDC) in mg/kg	1,000	0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
1,2-Dichloropropane in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
1,3,5-Trimethylbenzene in mg/kg	35,000	0.0007 U	0.0008 U	0.0041	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
1,3-Dichlorobenzene in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
1,3-Dichloropropane in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
1,4-Dichloro-2-Butene in mg/kg		0.0037 U	0.0041 U	0.0041 U	0.0041 U	0.0056 U	0.0052 U	0.0067 U	0.0047 U	0.0051 U	0.0058 U	0.0059 U	0.0065 U	0.0061 U
1,4-Dichlorobenzene in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
2,2-Dichloropropane in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
2-Butanone in mg/kg		0.0037 U	0.0041 U	0.0041 U	0.0041 U	0.0056 U	0.0052 U	0.0067 U	0.0047 U	0.0051 U	0.0058 U	0.0059 U	0.0065 U	0.0061 U
2-Chloroethyl Vinyl Ether in mg/kg		0.0037 U	0.0041 U	0.0041 U	0.0041 U	0.0056 U	0.0052 U	0.0067 U	0.0047 U	0.0051 U	0.0058 U	0.0059 U	0.0065 U	0.0061 U
2-Chlorotoluene in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
2-Hexanone in mg/kg		0.0037 U	0.0041 U	0.0041 U	0.0041 U	0.0056 U	0.0052 U	0.0067 U	0.0047 U	0.0051 U	0.0058 U	0.0059 U	0.0065 U	0.0061 U
4-Chlorotoluene in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
4-Methyl-2-pentanone in mg/kg		0.0037 U	0.0041 U	0.0041 U	0.0041 U	0.0056 U	0.0052 U	0.0067 U	0.0047 U	0.0051 U	0.0058 U	0.0059 U	0.0065 U	0.0061 U
Acetone in mg/kg	3,150,000	0.011 U	0.016 U	0.0041 U	0.03	0.024 U	0.024 U	0.038	0.0047 U	0.0096 UJ	0.009 UJ	0.0059 UJ	0.0065 UJ	0.0061 UJ
Acrolein in mg/kg		0.037 U	0.041 U	0.041 U	0.041 U	0.056 U	0.052 U	0.067 U	0.047 U	0.051 UJ	0.058 UJ	0.059 UJ	0.065 UJ	0.061 UJ
Acrylonitrile in mg/kg	1	0.0037 U	0.0041 U	0.0041 U	0.0041 U	0.0056 U	0.0052 U	0.0067 U	0.0047 U	0.0051 U	0.0058 U	0.0059 U	0.0065 U	0.0061 U
Benzene in mg/kg	0.02	0.0007 U	0.0008 U	0.06	0.33	0.22	0.0019	1.5	0.0009 U	0.001 U	0.0024	0.097	0.0043	0.0012 U
Bromobenzene in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Bromochloromethane in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Bromodichloromethane in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Bromoethane in mg/kg		0.0015 U	0.0016 U	0.0016 U	0.0016 U	0.0022 U	0.0021 U	0.0027 U	0.0019 U	0.002 U	0.0023 U	0.0024 U	0.0026 U	0.0024 U
Bromoform in mg/kg		0.0007 UJ	0.0008 UJ	0.0008 UJ	0.0008 UJ	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Bromomethane in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0018	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Carbon disulfide in mg/kg		0.0007 U	0.0034 J	0.0015 J	0.0058 J	0.0042 J	0.01 J	0.0075 J	0.0089	0.0023	0.0033	0.0031	0.0021	0.0042
Carbon tetrachloride in mg/kg		0.0007 UJ	0.0008 UJ	0.0008 UJ	0.0008 UJ	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Chlorobenzene in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Chloroethane in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Chloroform in mg/kg	4,000	0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Chloromethane in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U

Aspect Consulting

2/26/2016

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Table B-1

RI

Table B-1 - 2014-2015 RI Soil Data

Pr # 130097-01D - Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	B-130 8/25/14 (3-5 ft.)	B-130 8/25/14 (8-10 ft.)	B-130 8/25/14 (13-15 ft.)	B-130 8/25/14 (22-24 ft.)	B-131 9/10/14 (20-21 ft.)	B-132 9/10/14 (20-21 ft.)	B-133 9/10/14 (21-22 ft.)	B-134 9/10/14 (21-22 ft.)	B-135 9/19/14 (22-24 ft.)	B-136 9/19/14 (22-24 ft.)	B-137 9/19/14 (22-24 ft.)	B-138 9/19/14 (22-24 ft.)	B-139 9/19/14 (22-24 ft.)
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
cis-1,3-Dichloropropene in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Dibromochloromethane in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Dibromomethane in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Ethylbenzene in mg/kg	0.06	0.0007 U	0.0008 U	0.0026	0.002	0.0011 U	0.001 U	0.0019	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Hexachlorobutadiene in mg/kg	0.01	0.0037 U	0.0041 U	0.0041 U	0.0041 U	0.0056 U	0.0052 U	0.0067 U	0.0047 U	0.0051 U	0.0058 U	0.0059 U	0.0065 U	0.0061 U
Isopropylbenzene in mg/kg	350,000	0.0007 U	0.0008 U	0.0035	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Methylene chloride in mg/kg	20,000	0.0024 U	0.0019 U	0.0024 U	0.0032 U	0.0066 U	0.0055 U	0.0081 U	0.0037 U	0.0024 UJ	0.0037 UJ	0.0034 UJ	0.0037 UJ	0.004 UJ
Methyl iodide in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
n-Butylbenzene in mg/kg	175,000	0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
n-Propylbenzene in mg/kg	350,000	0.0007 U	0.0008 U	0.018	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
p-Isopropyltoluene in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
sec-Butylbenzene in mg/kg	350,000	0.0007 U	0.0008 U	0.0017	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Styrene in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
tert-Butylbenzene in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Tetrachloroethene (PCE) in mg/kg	0.005	0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Toluene in mg/kg	280,000	0.0007 U	0.0015	0.0036	0.0055	0.0011 U	0.001 U	0.0042	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
trans-1,2-Dichloroethene in mg/kg	70,000	0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 UJ	0.0012 UJ	0.0012 UJ	0.0013 UJ	0.0012 UJ
trans-1,3-Dichloropropene in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Trichloroethene (TCE) in mg/kg	0.005	0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Trichlorofluoromethane in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Vinyl acetate in mg/kg		0.0037 U	0.0041 U	0.0041 U	0.0041 U	0.0056 U	0.0052 U	0.0067 U	0.0047 U	0.0051 UJ	0.0058 UJ	0.0059 UJ	0.0065 UJ	0.0061 UJ
Vinyl chloride in mg/kg	0.005	0.0007 U	0.0008 U	0.0008 U	0.0008 U	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
m,p-Xylenes in mg/kg		0.0007 U	0.0008 U	0.016	0.0014	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
o-Xylene in mg/kg		0.0007 U	0.0008 U	0.0008 U	0.001	0.0011 U	0.001 U	0.0013 U	0.0009 U	0.001 U	0.0012 U	0.0012 U	0.0013 U	0.0012 U
Total Xylenes in mg/kg		ND	ND	0.016	0.0024	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene in mg/kg	6	0.0037 UJ	0.0041 UJ	0.0041 UJ	0.0041 UJ	0.0056 U	0.0052 U	0.0067 U	0.0047 U	0.0051 U	0.0058 U	0.0059 U	0.0065 U	0.0061 U

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-2 - 2014-2015 RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	29-14 10/17/14	29-14 12/8/15	95-15 10/15/14	95-15 1/27/15	95-15 5/18/15	95-15 8/28/15	95-15 8/28/15 FD	95-15 12/8/15	709-MW-03-15 10/17/14	709-MW-03-15 5/20/15	709-MW-09-15 10/16/14	709-MW-09-15 5/20/15	709-MW-09-15 12/8/15	709-MW-09-15 12/9/15	709-MW-11-15 12/8/15	709-MW-11-15 12/9/15	709-MW-15-15 10/17/14	709-MW-15-15 10/17/14 FD
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
Gasoline Range Hydrocarbons in ug/L	800	250 U		1,500	1,800	1,500	1,900	2,000	250 U	250 U	250 U	7,300	7,400	4,400		940		250 U	250 U
Diesel Range Hydrocarbons in ug/L	500		100 U		3,300	2,900	2,600	2,600	3,600		250		10,000		14,000		4,900		
Oil Range Hydrocarbons in ug/L	500		200 U		820	750	670	640	870		220		1,400		2,600		4,200		
Total TPHs D+O (ND=0U) in ug/L	500		ND		4,100	3,600	3,300	3,200	4,470		470		11,000		16,600		9,100		
Total TPHs D+O (ND=1/2U) in ug/L	500		ND		4,100	3,700	3,300	3,200	4,470		470		11,400		16,600		9,100		
Total TPHs G+D+O (ND=0U) in ug/L	720				5,900	5,200	5,200	5,200	4,470		470		19,000		21,000		10,040		
Total TPHs G+D+O (ND=1/2U) in ug/L	720				5,900	5,200	5,200	5,200	4,595		600		19,000		21,000		10,040		
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in ug/L	500	100 U	100 U	140	270	200	510	490	100 U	100 U	100 U	810	540		470		890	100 U	100 U
Oil Range Hydrocarbons in ug/L	500	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U		200 U		1,200	200 U	200 U
Total TPHs D+O (ND=0U) in ug/L	500	ND	ND	140	270	200	510	490	ND	ND	ND	810	540		470		2,090	ND	ND
Total TPHs D+O (ND=1/2U) in ug/L	500	ND	ND	140	370	300	610	590	ND	ND	ND	810	640		570		2,090	ND	ND
Total TPHs G+D+O (ND=0U) in ug/L	720	ND	ND	1,600	2,100	1,700	2,400	2,500	ND	ND	ND	8,100	7,900		4,870		3,030	ND	ND
Total TPHs G+D+O (ND=1/2U) in ug/L	720	ND	ND	1,700	2,200	1,800	2,500	2,600	ND	ND	ND	8,200	8,000		4,970		3,030	ND	ND
Dissolved Metals																			
Lead in ug/L	8.1	0.1 U		0.4						1.0		0.8						0.1 U	0.1 U
Manganese in ug/L												510							
Total Metals																			
Lead in ug/L	8.1																		
Conventional Chemistry Parameters																			
Alkalinity (Total) in mg/L as CaCO3												374							
Ethane in ug/L												7.7							
Ethene in ug/L												1.1 U							
Methane in ug/L												9,670							
Nitrate as Nitrogen in mg-N/L												0.5 U							
Nitrite as Nitrogen in mg-N/L												0.5 U							
Sulfate in mg/L												0.5 U							
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
1,1,1-Trichloroethane in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
1,1,2 - Trichlorotrifluoroethane in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
1,1,2,2-Tetrachloroethane in ug/l	3	0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
1,1,2-Trichloroethane in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
1,1-Dichloroethane in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
1,1-Dichloroethene in ug/l	3.2	0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
1,1-Dichloropropene in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
1,2,3-Trichlorobenzene in ug/l		0.50 U		2.5 U	0.50 U	0.50 U	2.5 U	2.5 U	0.5 U	0.50 U	0.50 U	5 U	0.50 U	0.5 U		0.5 U		1.0 U	2.5 U
1,2,3-Trichloropropane in ug/l		0.50 U		2.5 U	0.50 U	0.50 U	2.5 U	2.5 U	0.5 U	0.50 U	0.50 U	5 U	0.50 U	0.5 U		0.5 U		1.0 U	2.5 U
1,2,4-Trichlorobenzene in ug/l		1.2		2.5 U	0.50 U	0.50 U	2.5 U	2.5 U	0.5 U	0.50 U	0.50 U	5 U	0.50 U	0.5 U		0.5 U		1.0 U	2.5 U
1,2,4-Trimethylbenzene in ug/l	63	0.20 U		2	2.3	1.8	1.6	1.6	0.2 U	0.20 U	0.20 U	58	61	23 J		6.4		0.40 U	1.0 U
1,2-Dibromo-3-chloropropane in ug/l		0.50 U		2.5 U	0.50 U	0.50 U	2.5 U	2.5 U	0.5 U	0.50 U	0.50 U	5 U	0.50 U	0.5 U		0.5 U		1.0 U	2.5 U
1,2-Dibromoethane (EDB) in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
1,2-Dichlorobenzene in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
1,2-Dichloroethane (EDC) in ug/l	42	0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
1,2-Dichloropropane in ug/l		0.20 U		1 U	0.20 U	0.57 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
1,3,5-Trimethylbenzene in ug/l		0.20 U		2.7	0.48	0.40	1 U	1 U	0.2 U	0.20 U	0.20 U	46	52	13 J		5.6		0.40 U	1.0 U
1,3-Dichlorobenzene in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
1,3-Dichloropropane in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
1,4-Dichloro-2-Butene in ug/l		1.0 U		5 U	1.0 U	1.0 U	5 U	5 U	1 U	1.0 U	1.0 U	10 U	1.0 U	1 U		1 U		2.0 U	5.0 U
1,4-Dichlorobenzene in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
2,2-Dichloropropane in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
2-Butanone in ug/l		5.0 U		25 U	5.0 U	5.0 U	25 U	25 U	5 U	5.0 U	5.0 U	50 U	13	5 U		5 U		10 U	25 U
2-Chloroethyl Vinyl Ether in ug/l					1.0 U	5 U	5 U	5 U	1 U		1.0 U		1.0 U	1 U		1 U			
2-Chlorotoluene in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
2-Hexanone in ug/l		5.0 U		25 U	5.0 U	5.0 U	25 U	25 U	5 U	5.0 U	5.0 U	50 U	5.0 U	5 U		5 U		10 U	25 U
4-Chlorotoluene in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
4-Methyl-2-pentanone in ug/l		5.0 U		25 U	5.0 U	5.0 U	25 U	25 U	5 U	5.0 U	5.0 U	50 U	5.0 U	5 U		5 U		10 U	25 U
Acetone in ug/l	31,896,900	5.0 U		25 U	5.0 U	5.0 U	43 U	43 U	5 U	5.0 U	5.0 U	50 U	5.0 U	5 U		5 U		10 U	25 U
Acrolein in ug/l		5.0 U		25 U	5.0 U	5.0 U	25 U	76 J	5 U	5.0 U	5.0 U	50 U	140 U	5 U		5 U		10 U	25 U

Aspect Consulting

2/25/2016

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Table B-2

RI

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Table B-2 - 2014-2015 RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	29-14 10/17/14	29-14 12/8/15	95-15 10/15/14	95-15 1/27/15	95-15 5/18/15	95-15 8/28/15	95-15 8/28/15 FD	95-15 12/8/15	709-MW-03-15 10/17/14	709-MW-03-15 5/20/15	709-MW-09-15 10/16/14	709-MW-09-15 5/20/15	709-MW-09-15 12/8/15	709-MW-09-15 12/9/15	709-MW-11-15 12/8/15	709-MW-11-15 12/9/15	709-MW-15-15 10/17/14	709-MW-15-15 10/17/14 FD
Acrylonitrile in ug/l	0.7	1.0 U		5 U	1.0 UJ	1.0 U	5 U	5 U	1 U	1.0 U	1.0 U	10 U	96 U	1 U		1 U		2.0 U	5.0 U
Benzene in ug/l	24	0.20 U		16	15	13	13	13	17	0.20 U	0.20 U	14	17	5.1 J		1.1		0.40 U	1.0 U
Bromobenzene in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
Bromochloromethane in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
Bromodichloromethane in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
Bromoethane in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
Bromoform in ug/l		0.20 U		1 U	0.20 UJ	0.20 U	1 UJ	1 UJ	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
Bromomethane in ug/l		1.0 U		5 U	1.0 U	1.0 UJ	5 U	5 U	1 U	1.0 U	1.0 UJ	10 U	1.0 UJ	1 U		1 U		2.0 U	5.0 U
Carbon disulfide in ug/l		0.20 U		1 U	0.20 UJ	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	1.4	0.2 U		0.2 U		0.40 U	1.0 U
Carbon tetrachloride in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 UJ	1 UJ	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
Chlorobenzene in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
Chloroethane in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
Chloroform in ug/l	12	0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
Chloromethane in ug/l		0.50 U		2.5 U	0.50 U	0.50 U	2.5 UJ	2.5 UJ	0.5 U	0.50 U	0.50 UJ	5 U	0.50 UJ	0.5 U		0.5 U		1.0 U	2.5 U
cis-1,2-Dichloroethene (DCE) in ug/l		0.20 U		1 U	0.20 U	0.32 J	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.36 J		0.2 U		3.2	3.6
cis-1,3-Dichloropropene in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
Dibromochloromethane in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
Dibromomethane in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
Ethylbenzene in ug/l	130	0.20 U		2.8	3.1	3.1	2.4	2.4	0.2 U	0.20 U	0.20 U	21	400	180		9.9		0.40 U	1.0 U
Hexachlorobutadiene in ug/l	0.2	0.50 U		2.5 U	0.50 U	0.50 U	2.5 U	2.5 U	0.5 U	0.50 U	0.50 U	5 U	0.50 U	0.5 U		0.5 U		1.0 U	2.5 U
Isopropylbenzene in ug/l	1,614	0.20 U		26	31	23	23	23	1.1	0.20 U	0.20 U	2 U	23	18 J		0.35		0.40 U	1.0 U
Methylene chloride in ug/l	1,000	1.0 U		5 U	1.0 U	1.0 U	5 U	5 U	1 U	1.0 U	1.0 U	10 U	1.0 U	1 U		1 U		2.0 U	5.0 U
Methyl iodide in ug/l		1.0 U		5 U	1.0 U	1.0 U	5 U	5 U	1 U	1.0 U	1.0 U	10 U	1.0 U	1 U		1 U		2.0 U	5.0 U
n-Butylbenzene in ug/l		0.20 U		2.3	3.4 J	2.6	2.4	2.3	0.2 U	0.20 U	0.20 U	2 U	4.5	3.2 J		0.2 U		0.40 U	1.0 U
n-Propylbenzene in ug/l	5,200	0.20 U		24	29	20	23	22	0.97	0.20 U	0.20 U	2 U	36	25 J		0.44		0.40 U	1.0 U
p-Isopropyltoluene in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	4.6	4.2	3 J		0.54		0.40 U	1.0 U
sec-Butylbenzene in ug/l		0.20 U		3.6	5.0 J	4.1	3.6	3.4	0.22	0.20 U	0.20 U	2 U	4.7	3.8 J		0.2 U		0.40 U	1.0 U
Styrene in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
tert-Butylbenzene in ug/l		0.20 U		1 U	0.43	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.47 J		0.2 U		0.40 U	1.0 U
Tetrachloroethene (PCE) in ug/l	8.9	2.8		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	8.5	6.4	2 U	0.20 U	0.2 U		0.2 U		10	10
Toluene in ug/l	520	0.20 U		3	2.5	2.4	2.2	2.2	0.32	0.20 U	0.20 U	68	47	18 J		0.34		0.40 U	1.0 U
trans-1,2-Dichloroethene in ug/l	4,000	0.20 U		1 U	0.41	0.48	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
trans-1,3-Dichloropropene in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
Trichloroethene (TCE) in ug/l	7	0.97		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	2.0	1.4	2 U	0.20 U	0.2 U		0.2 U		10	11
Trichlorofluoromethane in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 U	1.0 U
Vinyl acetate in ug/l		0.20 U		1 U	0.20 U	0.20 U	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.2 U		0.2 U		0.40 UJ	1.0 U
Vinyl chloride in ug/l	1.6	0.20 U		1 U	0.50	0.41	1 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	1.4 J		0.2 U		0.40 U	1.0 U
m,p-Xylenes in ug/l		0.40 U		7.2	7.9	7.2	6.2	6.2	0.41	0.40 U	0.40 U	330	260	68 J		2.1		0.80 U	2.0 U
o-Xylene in ug/l		0.20 U		2.2	2.7	2.3	2	2	0.2 U	0.20 U	0.20 U	23	31	14 J		0.3		0.40 U	1.0 U
Total Xylenes in ug/L		ND		9.4	11	9.5				ND	ND	350	290					ND	ND
Naphthalene in ug/l	90	0.50 U		3.6	3.5	2.5	3	3	0.5 U	0.50 U	0.50 U	20	55	5.9 J		3.3 J		1.0 U	2.5 U
Field Parameters																			
Dissolved Oxygen in mg/L		0.1	1.21	0.63	0.16	0.09	0.05		0.11	2.62	3.09	1.6	0.14	0.57	0.57	0.34	0.34	0.69	
ORP in mVolts		-32.9	-60.5	-124.4	-12.1	-118.6	-135.4		-162.8	84.6	57.4	-49.5	29.9	-116.7	-116.7	10.9	10.9	-61.8	
pH in pH Units		7.71	7.81	7.39	7.17	7.37	7.23		7.79	10.7	10.58	6.48	6.44	7.00	7.00	6.24	6.24	7.57	
Specific Conductance in us/cm		337.4	2,921	898	1,264	1,342	1,404		11,988	938	718	697	645	882	882	391.0	391.0	307.5	
Temperature in deg C		16.5	15.1	18.3	14.9	15.4	18.8		15.3	16.6	13.6	17.2	14.1	15.3	15.3	14.2	14.2	16	
Turbidity in NTU		6.93	3.16	2.28	7.53	31.7	2.71		5.26	7.15	17.0	8.22	2.47	6.50	6.50	20.8	20.8	9.44	

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-2 - 2014-2015 RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	709-MW-17-15 10/17/14	709-MW-17-15 12/8/15	709-MW-17-15 12/9/15	709-MW-18-15 12/9/15	709-MW20-15 10/17/14	709-MW20-15 12/8/15	721-MW2 10/16/14	721-MW2 12/9/15	721-MW3 10/16/14	721-MW3 1/26/15	721-MW3 5/19/15	721-MW3 12/9/15	721-MW3 12/9/15 FD	721-MW5-15 10/15/14	721-MW5-15 10/15/14 FD	721-MW6-15 12/9/15	721-MW8-15 10/15/14	721-MW8-15 5/19/15
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
Gasoline Range Hydrocarbons in ug/L	800	1,300	2,000			250 U		2,400	3,200	1,300		1,900	1,200	1,200	890	910	3,900	1,100	860
Diesel Range Hydrocarbons in ug/L	500			27,000 J	140 U		110		9,400		8,800	14,000	5,200	5,100			8,000		870
Oil Range Hydrocarbons in ug/L	500			3,000 J	200 U		200 U		1,400		390	1,200	420	420			1,400		290
Total TPHs D+O (ND=0U) in ug/L	500			30,000	140		110		10,800		9,200	15,000	5,620	5,520			9,400		1,200
Total TPHs D+O (ND=1/2U) in ug/L	500			30,000	240		210		10,800		9,200	15,200	5,620	5,520			9,400		1,200
Total TPHs G+D+O (ND=0U) in ug/L	720			32,000					14,000			17,000	6,820	6,720			13,300		2,000
Total TPHs G+D+O (ND=1/2U) in ug/L	720			32,000					14,000			17,000	6,820	6,720			13,300		2,000
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in ug/L	500	5,700		1,700	100 U	100 U	100 U	1,600	1,400 J	260	210	250	100 U	100 U	100 U	100 U	430 J	100 U	100 U
Oil Range Hydrocarbons in ug/L	500	270		200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Total TPHs D+O (ND=0U) in ug/L	500	6,000		1,700	ND	ND	ND	1,600	1,400	260	210	250	ND	ND	ND	ND	430	ND	ND
Total TPHs D+O (ND=1/2U) in ug/L	500	5,700		1,800	ND	ND	ND	1,600	1,500	260	310	350	ND	ND	ND	ND	530	ND	ND
Total TPHs G+D+O (ND=0U) in ug/L	720	7,300		3,700	ND	ND	ND	4,000	4,600	1,600		2,200	1,200	1,200	890	910	4,330	1,100	860
Total TPHs G+D+O (ND=1/2U) in ug/L	720	7,300		3,800	ND	ND	ND	4,100	4,700	1,700		2,200	1,350	1,350	1,000	1,100	4,430	1,200	1,000
Dissolved Metals																			
Lead in ug/L	8.1	1.7				10.0		0.1		0.1 U					0.3	0.1		0.1 U	
Manganese in ug/L						0.9													
Total Metals																			
Lead in ug/L	8.1					12.9													
Conventional Chemistry Parameters																			
Alkalinity (Total) in mg/L as CaCO3						175													
Ethane in ug/L						1.2 U													
Ethene in ug/L						1.1 U													
Methane in ug/L						0.7 U													
Nitrate as Nitrogen in mg-N/L						1.0 U													
Nitrite as Nitrogen in mg-N/L						1.0 U													
Sulfate in mg/L						1,650													
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
1,1,1-Trichloroethane in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
1,1,2 - Trichlorotrifluoroethane in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
1,1,2,2-Tetrachloroethane in ug/l	3	1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
1,1,2-Trichloroethane in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		1.5 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
1,1-Dichloroethane in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
1,1-Dichloroethene in ug/l	3.2	1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
1,1-Dichloropropene in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		10	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
1,2,3-Trichlorobenzene in ug/l		2.5 U	0.5 U			2.5 U		10 U	0.5 U	2.5 U		0.50 U	0.5 U	0.5 U	2.5 U	2.5 U	0.5 U	2.5 U	0.50 U
1,2,3-Trichloropropane in ug/l		2.5 U	0.5 U			2.5 U		10 U	0.5 U	2.5 U		0.50 U	0.5 U	0.5 U	2.5 U	2.5 U	0.5 U	2.5 U	0.50 U
1,2,4-Trichlorobenzene in ug/l		2.5 U	0.5 U			2.5 U		10 U	0.5 U	2.5 U		0.50 U	0.5 U	0.5 U	2.5 U	2.5 U	0.5 U	2.5 U	0.50 U
1,2,4-Trimethylbenzene in ug/l	63	1.0 U	0.32			1.0 U		4 U	0.99	1 U		0.24	0.2 U	0.2 U	1.2	1.6	3.8	1 U	0.20 U
1,2-Dibromo-3-chloropropane in ug/l		2.5 U	0.5 U			2.5 U		10 U	0.5 U	2.5 U		0.50 U	0.5 U	0.5 U	2.5 U	2.5 U	0.5 U	2.5 U	0.50 U
1,2-Dibromoethane (EDB) in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
1,2-Dichlorobenzene in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
1,2-Dichloroethane (EDC) in ug/l	42	1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
1,2-Dichloropropane in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.33 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
1,3,5-Trimethylbenzene in ug/l		1.0 U	0.2 U			1.0 U		4.8	6.1	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	2.5	1 U	0.20 U
1,3-Dichlorobenzene in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
1,3-Dichloropropane in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
1,4-Dichloro-2-Butene in ug/l		5.0 U	1 U			5.0 U		20 U	1 U	5 U		1.0 U	1 U	1 U	5 U	5 U	1 U	5 U	1.0 U
1,4-Dichlorobenzene in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
2,2-Dichloropropane in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
2-Butanone in ug/l		25 U	81			25 U		100 U	5 U	25 U		5.0 U	5 U	5 U	25 U	25 U	5 U	25 U	5.0 U
2-Chloroethyl Vinyl Ether in ug/l			1 UJ						1 UJ			1.0 U	1 UJ	1 UJ			1 UJ		1.0 U
2-Chlorotoluene in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
2-Hexanone in ug/l		25 U	5 U			25 U		100 U	5 U	25 U		5.0 U	5 U	5 U	25 U	25 U	5 U	25 U	5.0 U
4-Chlorotoluene in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
4-Methyl-2-pentanone in ug/l		25 U	5 U			25 U		100 U	5 U	25 U		5.0 U	5 U	5 U	25 U	25 U	5 U	25 U	5.0 U
Acetone in ug/l	31,896,900	25 U	250 J			25 U		100 U	5 U	25 U		5.0 U	5 UJ	5 UJ	25 U	25 U	5 U	25 U	5.0 U
Acrolein in ug/l		25 U	5 U			25 U		100 U	5 U	25 U		13 U	5 U	5 U	27 U	33 U	5 U	25 U	49 U

Aspect Consulting

2/25/2016

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Table B-2

RI

Table B-2 - 2014-2015 RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	709-MW-17-15 10/17/14	709-MW-17-15 12/8/15	709-MW-17-15 12/9/15	709-MW-18-15 12/9/15	709-MW20-15 10/17/14	709-MW20-15 12/8/15	721-MW2 10/16/14	721-MW2 12/9/15	721-MW3 10/16/14	721-MW3 1/26/15	721-MW3 5/19/15	721-MW3 12/9/15	721-MW3 12/9/15 FD	721-MW5-15 10/15/14	721-MW5-15 10/15/14 FD	721-MW6-15 12/9/15	721-MW8-15 10/15/14	721-MW8-15 5/19/15
Acrylonitrile in ug/l	0.7	5.0 U	1 U			5.0 U		20 U	1 U	5 U		9.7 U	1 U	1 U	5 U	5 U	1 U	5 U	15 U
Benzene in ug/l	24	1.0 U	0.46			1.0 U		1,300	530 J	11		180	3.3	3.2	8.4	8.9	880 J	3	3.0
Bromobenzene in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
Bromochloromethane in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
Bromodichloromethane in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
Bromoethane in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
Bromoform in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
Bromomethane in ug/l		5.0 U	1 U			5.0 U		20 U	1 U	5 U		1.0 U	1 U	1 U	5 U	5 U	1 U	5 U	1.0 U
Carbon disulfide in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
Carbon tetrachloride in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
Chlorobenzene in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
Chloroethane in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
Chloroform in ug/l	12	1.0 U	0.2 U			11		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
Chloromethane in ug/l		2.5 U	0.5 U			2.5 U		10 U	0.5 U	2.5 U		0.50 U	0.5 U	0.5 U	2.5 U	2.5 U	0.5 U	2.5 U	0.50 U
cis-1,2-Dichloroethene (DCE) in ug/l		1.0 U	0.49			3.6		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	4.8	5.1	0.2 U	1 U	0.63
cis-1,3-Dichloropropene in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
Dibromochloromethane in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
Dibromomethane in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
Ethylbenzene in ug/l	130	5.0 U	2.4			1.0 U		35	19	1 U		1.8	0.29	0.3	6.6	8.3	9.8	1 U	0.58
Hexachlorobutadiene in ug/l	0.2	2.5 U	0.5 U			2.5 U		10 U	0.5 U	2.5 U		0.50 U	0.5 U	0.5 U	2.5 U	2.5 U	0.5 U	2.5 U	0.50 U
Isopropylbenzene in ug/l	1,614	3.8	1.5			1.0 U		16	20	6.4		12	7.4	7.2	9.4	10	26	19	18
Methylene chloride in ug/l	1,000	5.0 U	1 U			5.0 U		20 U	1 U	5 U		1.0 U	1 U	1 U	5 U	5 U	1 U	5 U	1.0 U
Methyliodide in ug/l		5.0 U	1 U			5.0 U		20 U	1 U	5 U		1.0 U	1 U	1 U	5 U	5 U	1 U	5 U	1.0 U
n-Butylbenzene in ug/l		1.8	0.7			1.0 U		4 U	3.1	1.4		2.3	0.7	0.74	1.3	1.3	2.8	2.4	2.0
n-Propylbenzene in ug/l	5,200	8.3	3.3			1.0 U		25	29	8.2		15	6.3	6.2	10	11	30	20	19
p-Isopropyltoluene in ug/l		1.0 U	0.2 U			1.0 U		4 U	4.7	1.6		3.3	0.67	0.7	1 U	1 U	2	1 U	0.20 U
sec-Butylbenzene in ug/l		1.8	0.69			1.0 U		4 U	3.4	1.9		3.0	2.2	2.1	1.8	1.8	4.5	4	4.3
Styrene in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
tert-Butylbenzene in ug/l		1.0 U	0.25			1.0 U		4 U	0.48	1 U		0.49	0.46	0.45	1 U	1 U	0.38	1 U	0.45
Tetrachloroethene (PCE) in ug/l	8.9	1.0 U	0.2 U			71		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
Toluene in ug/l	520	1.0 U	0.2			1.0 U		33	25	1 U		2.0	0.79	0.76	1.3	1.4	32	1 U	0.34
trans-1,2-Dichloroethene in ug/l	4,000	1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	5.2	5.8	0.2 U	1 U	0.55
trans-1,3-Dichloropropene in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
Trichloroethene (TCE) in ug/l	7	1.0 U	0.2 U			8.9		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	5.2	6.4	0.2 U	1 U	0.35
Trichlorofluoromethane in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
Vinyl acetate in ug/l		1.0 U	0.2 U			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	0.20 U
Vinyl chloride in ug/l	1.6	2.0	1.9			1.0 U		4 U	0.2 U	1 U		0.20 U	0.2 U	0.2 U	2.2	2.6	0.2 U	1 U	1.3
m,p-Xylenes in ug/l		2.0 U	0.52			2.0 U		93	100	2 U		1.1	1.4	1.4	7.6	8	81	2 U	1.2
o-Xylene in ug/l		1.0 U	0.2 U			1.0 U		4.4	3.9	1 U		0.21	0.26	0.25	1.5	1.8	11	1 U	0.21
Total Xylenes in ug/L		ND				ND		97		ND		1.3			9.1	9.8		ND	1.4
Naphthalene in ug/l	90	3.4	3.5 J			2.5 U		10 U	1.1 U	2.5 U		0.89 U	0.5 U	0.5 U	2.5 U	2.5 U	3.7 J	2.5 U	0.60
Field Parameters																			
Dissolved Oxygen in mg/L		0.07	0.28	0.28	4.9	2.76	2.53	0.75	0.46	0.6	0.35	0.11	0.59		0.25		0.50	0.54	0.12
ORP in mVolts		-133.4	-65.7	-65.7	23.6	203.7	-3.7	-97.8	-133.3	-104.1	-026.0	-74.2	-104.7		-320.3		-127.1	-137.7	-0104.0
pH in pH Units		6.87	6.82	6.82	7.34	7.29	7.46	6.65	8.86	6.71	6.67	6.80	8.80		9.19		8.76	7.51	7.46
Specific Conductance in us/cm		763	927	927	629	34,701	19,636	645	787	603	953	1,113	758		899		846	470	450.6
Temperature in deg C		17.2	15.9	15.9	14.5	16.4	13.7	16.9	16.4	18.2	15.0	14.5	16.7		16.3		17.0	17.6	15.4
Turbidity in NTU		12.8	18.3	18.3	4.33	0.44	0.38	55.3	1.83	53.3	23.6	9.64	5.34		5.85		1.76	0.67	1.05

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-2 - 2014-2015 RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	721-MW8-15 12/9/15	721-MW9-15 10/16/14	721-MW9-15 1/27/15	721-MW9-15 5/19/15	721-MW9-15 8/28/15	721-MW9-15 12/9/15	721-MW9-15 10/15/14	721-MW10-15 1/26/15	721-MW10-15 5/18/15	721-MW10-15 8/27/15	721-MW10-15 12/9/15	721-MW11-15 10/16/14	721-MW12-15 1/27/15	721-MW12-15 12/9/15	721-MW12-15 10/17/14	721-MW13-15 5/19/15	721-MW13-15 12/9/15	721-MW14-15 10/17/14	721-MW15-15 10/17/14
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																				
Gasoline Range Hydrocarbons in ug/L	800	1,000	840	1,100	1,000	1,000	1,100	540	700	670	1,200 U	1,100	4,400		4,700	250 U	250 U	4,200	3,600	
Diesel Range Hydrocarbons in ug/L	500	330			1,900	2,000	880			2,400	1,400	4,400		12,000	8,400		110	6,900		
Oil Range Hydrocarbons in ug/L	500	200 U			400	490	200 U			460	310	850		1,200	840		200 U	970		
Total TPHs D+O (ND=0U) in ug/L	500	330			2,300	2,500	880			2,900	1,700	5,250		13,000	9,240		110	7,870		
Total TPHs D+O (ND=1/2U) in ug/L	500	430			2,300	2,500	980			2,900	1,700	5,250		13,000	9,240		210	7,870		
Total TPHs G+D+O (ND=0U) in ug/L	720	1,330			3,300	3,500	1,980			3,500	1,700	6,350			13,940		110	12,070		
Total TPHs G+D+O (ND=1/2U) in ug/L	720	1,430			3,300	3,500	2,080			3,500	2,300	6,350			13,940		340	12,070		
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																				
Diesel Range Hydrocarbons in ug/L	500	100 UJ	100 U	100 U	100 U	1,000	100 UJ	100 U	100	100 U	130	270 J	1,400	1,200	1,300 J	100 U	100 U	1,400 J	1,700	
Oil Range Hydrocarbons in ug/L	500	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	
Total TPHs D+O (ND=0U) in ug/L	500	ND	ND	ND	ND	1,000	ND	ND	100	ND	130	270	1,400	1,200	1,300	ND	ND	1,400	1,700	
Total TPHs D+O (ND=1/2U) in ug/L	500	ND	ND	ND	ND	1,100	ND	ND	200	ND	230	370	1,400	1,300	1,400	ND	ND	1,500	1,700	
Total TPHs G+D+O (ND=0U) in ug/L	720	1,000	840	1,100	1,000	2,000	1,100	540	800	670	130	1,370	5,800	6,000	6,000	ND	ND	5,600	5,300	
Total TPHs G+D+O (ND=1/2U) in ug/L	720	1,150	990	1,200	1,200	2,100	1,250	690	900	820	830	1,470	5,900	6,100	6,100	ND	ND	5,700	5,400	
Dissolved Metals																				
Lead in ug/L	8.1		0.3					2.07						0.1			0.1 U		0.1 U	
Manganese in ug/L														576						
Total Metals																				
Lead in ug/L	8.1		0.5					2.53												
Conventional Chemistry Parameters																				
Alkalinity (Total) in mg/L as CaCO3														379						
Ethane in ug/L														1.2 U						
Ethene in ug/L														1.1 U						
Methane in ug/L														10,400						
Nitrate as Nitrogen in mg-N/L														0.5 U						
Nitrite as Nitrogen in mg-N/L														0.5 U						
Sulfate in mg/L														0.5 U						
Volatile Organic Compounds (VOC)																				
1,1,1,2-Tetrachloroethane in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U	
1,1,1-Trichloroethane in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U	
1,1,2-Trichloroethane in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U	
1,1,2,2-Tetrachloroethane in ug/l	3	0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.32 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U	
1,1,2-Trichloroethane in ug/l		0.2 U	0.2 UJ	0.20 U	6.9 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U	
1,1-Dichloroethane in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U	
1,1-Dichloroethene in ug/l	3.2	0.23	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U	
1,1-Dichloropropene in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U	
1,2,3-Trichlorobenzene in ug/l		0.5 U	0.5 UJ	0.50 U	0.50 U	0.5 U	0.5 U	2.5 U	0.50 U	0.50 U	2.5 U	0.5 UJ	5 U		0.5 U	0.50 U	0.50 U	0.5 U	25 U	
1,2,3-Trichloropropane in ug/l		0.5 U	0.5 UJ	0.50 U	0.50 U	0.5 U	0.5 U	2.5 U	0.50 U	0.50 U	2.5 U	0.5 UJ	5 U		0.5 U	0.50 U	0.50 U	0.5 U	25 U	
1,2,4-Trichlorobenzene in ug/l		0.5 U	0.5 UJ	0.50 U	0.50 U	0.5 U	0.5 U	2.5 U	0.50 U	0.50 U	2.5 U	0.5 UJ	5 U		0.5 U	0.50 U	0.50 U	0.5 U	25 U	
1,2,4-Trimethylbenzene in ug/l	63	4.4	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.34 J	2 U		41	0.20 U	0.20 U	1 J	10 U	
1,2-Dibromo-3-chloropropane in ug/l		0.5 U	0.5 UJ	0.50 U	3.0 U	0.5 U	0.5 U	2.5 U	0.50 U	1.4 U	2.5 U	0.5 UJ	5 U		0.5 U	0.50 U	0.50 U	0.5 U	25 U	
1,2-Dibromoethane (EDB) in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U	
1,2-Dichlorobenzene in ug/l		0.2 U	0.2 UJ	0.20 U	0.61 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U	
1,2-Dichloroethane (EDC) in ug/l	42	0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U	
1,2-Dichloropropane in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U	
1,3,5-Trimethylbenzene in ug/l	1	0.2 UJ	0.2 U	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.34 J	31		15	0.20 U	0.20 U	18 J	10 U	
1,3-Dichlorobenzene in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U	
1,3-Dichloropropane in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U	
1,4-Dichloro-2-Butene in ug/l	1 U	1 UJ	1.0 U	1.0 U	1 U	1 U	5 U	1.0 U	1.0 U	5 U	1 UJ	10 U		1 U	1.0 U	1.0 U	1 U	50 U		
1,4-Dichlorobenzene in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U	
2,2-Dichloropropane in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U	
2-Butanone in ug/l	5 U	5 UJ	5.0 U	8.3 J	5 U	5 U	25 U	5.0 U	5.0 U	25 U	5 UJ	50 U		5 U	5.0 U	5.0 U	5 U	250 U		
2-Chloroethyl Vinyl Ether in ug/l	1 UJ	1 UJ		1.0 U	1 U	1 UJ				1.0 U	5 U	1 UJ			1 UJ		1.0 U	1 UJ		
2-Chlorotoluene in ug/l	0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U		
2-Hexanone in ug/l	5 U	5 UJ	5.0 U	5.0 U	5 U	5 U	25 U	5.0 U	5.0 U	25 U	5 UJ	50 U		5 U	5.0 U	5.0 U	5 U	250 U		
4-Chlorotoluene in ug/l	0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U		
4-Methyl-2-pentanone in ug/l	5 U	5 UJ	5.0 U	5.0 U	5 U	5 U	25 U	5.0 U	5.0 U	25 U	5 UJ	50 U		5 U	5.0 U	5.0 U	5 U	250 U		
Acetone in ug/l	31,896,900	5 U	5 UJ	5.0 U	5.0 U	5 U	5 U	25 U	5.0 U	5.0 U	36 U	5 UJ	50 U		5 U	5.0 U	5.0 U	5 U	250 U	
Acrolein in ug/l		5 U	5 UJ	5.0 UJ	44 U	5 U	5 U	36 U	5.0 UJ	5.0 UJ	25 U	5 UJ	50 U		5 U	5.0 U	5.0 U	5 U	250 U	

Table B-2

Table B-2 - 2014-2015 RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	721-MW8-15 12/9/15	721-MW9-15 10/16/14	721-MW9-15 1/27/15	721-MW9-15 5/19/15	721-MW9-15 8/28/15	721-MW9-15 12/9/15	721-MW9-15 10/15/14	721-MW9-15 1/26/15	721-MW9-15 5/18/15	721-MW9-15 8/27/15	721-MW11-15 12/9/15	721-MW12-15 10/16/14	721-MW12-15 1/27/15	721-MW12-15 12/9/15	721-MW13-15 10/17/14	721-MW13-15 5/19/15	721-MW14-15 12/9/15	721-MW15-15 10/17/14
Acrylonitrile in ug/l	0.7	1 U	1 UJ	1.0 UJ	18 U	1 U	1 U	5 U	1.0 UJ	1.0 U	5 U	1 UJ	10 U		1 U	1.0 U	1.0 U	1 U	50 U
Benzene in ug/l	24	4.8 J	0.43 J	0.48	0.26	0.2 U	0.66 J	1 U	0.28	1.7	1 U	140 J	560		150 J	0.20 U	0.25	16 J	1,900
Bromobenzene in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
Bromochloromethane in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
Bromodichloromethane in ug/l		0.2 U	0.2 UJ	0.20 U	0.25 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
Bromoethane in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
Bromoform in ug/l		0.2 U	0.2 UJ	0.20 UJ	0.20 U	0.2 UJ	0.2 U	1 U	0.20 UJ	0.20 U	1 UJ	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
Bromomethane in ug/l		1 U	1 UJ	1.0 U	1.0 U	1 U	1 U	5 U	1.0 U	1.0 UJ	5 U	1 UJ	10 U		1 U	1.0 U	1.0 U	1 U	50 U
Carbon disulfide in ug/l		0.2 U	0.2 UJ	0.20 UJ	0.20 U	0.2 U	0.2 U	1 U	0.20 UJ	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
Carbon tetrachloride in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 UJ	0.2 U	1 U	0.20 U	0.20 U	1 UJ	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
Chlorobenzene in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
Chloroethane in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
Chloroform in ug/l	12	0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
Chloromethane in ug/l		0.5 U	0.5 UJ	0.50 U	0.50 U	0.5 UJ	0.5 U	2.5 U	0.50 U	0.50 U	2.5 U	0.5 UJ	5 U		0.5 U	0.50 U	0.50 UJ	0.5 U	25 U
cis-1,2-Dichloroethene (DCE) in ug/l	16	0.2 UJ	0.20 U	0.20 U	0.20 U	0.2 U	1.1	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
cis-1,3-Dichloropropene in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
Dibromochloromethane in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
Dibromomethane in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
Ethylbenzene in ug/l	130	5.3	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.75	1 U	0.77 J	180		53	0.20 U	0.20 U	59 J	56
Hexachlorobutadiene in ug/l	0.2	0.5 U	0.5 UJ	0.50 U	0.50 U	0.5 U	0.5 U	2.5 U	0.50 U	0.50 U	2.5 U	0.5 UJ	5 U		0.5 U	0.50 U	0.50 U	0.5 U	25 U
Isopropylbenzene in ug/l	1,614	5.2	5.5 J	7.6	8.9	6.1	7.1	11	15	19	3.3	13 J	19		24	0.20 U	0.20 U	31 J	30
Methylene chloride in ug/l	1,000	1 U	1 UJ	1.0 U	1.0 U	1 U	1 U	5 U	1.0 U	1.0 U	5 U	1 UJ	10 U		1 U	1.0 U	1.0 U	1 U	50 U
Methyliodide in ug/l		1 U	1 UJ	1.0 U	1.0 U	1 U	1 U	5 U	1.0 U	1.0 U	5 U	1 UJ	10 U		1 U	1.0 U	1.0 U	1 U	50 U
n-Butylbenzene in ug/l		1.7	0.99 J	1.6 J	1.9	1.1	1.6	1 U	0.31 J	0.50	1 U	0.68 J	3.9		4	0.20 U	0.20 U	5.2 J	10 U
n-Propylbenzene in ug/l	5,200	11	6.3 J	9.5	12	6.6	9.2	2.2	0.82	10	1 U	9 J	32		32	0.20 U	0.20 U	58 J	36
p-Isopropyltoluene in ug/l		0.96	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		1.2	0.20 U	0.20 U	5.2 J	10 U
sec-Butylbenzene in ug/l		2.3	1.9 J	2.8 J	3.1	2	2.8	3	3.9 J	3.7	1.4	2 J	2 U		6.4	0.20 U	0.20 U	5.1 J	10 U
Styrene in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
tert-Butylbenzene in ug/l		0.2 U	0.76 J	0.76	0.71	0.75	0.66	1 U	0.44	0.20 U	1 U	0.21 J	2 U		0.91	0.20 U	0.20 U	0.7 J	10 U
Tetrachloroethene (PCE) in ug/l	8.9	9.7	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
Toluene in ug/l	520	1.3	0.2 UJ	0.28	0.28	0.2 U	0.2 U	1 U	0.20 U	0.98	1 U	1.9 J	75		24	0.20 U	0.20 U	8.9 J	39
trans-1,2-Dichloroethene in ug/l	4,000	4.6	0.2 UJ	0.20 U	0.20 U	0.2 U	0.22	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
trans-1,3-Dichloropropene in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
Trichloroethene (TCE) in ug/l	7	18	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
Trichlorofluoromethane in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
Vinyl acetate in ug/l		0.2 U	0.2 UJ	0.20 U	0.20 U	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
Vinyl chloride in ug/l	1.6	1.8	0.2 UJ	0.20 U	0.20 U	0.2 U	1.1	1 U	0.20 U	0.20 U	1 U	0.2 UJ	2 U		0.2 U	0.20 U	0.20 U	0.2 U	10 U
m,p-Xylenes in ug/l		4.9	0.4 UJ	0.40 U	0.40 U	0.4 U	0.4 U	2 U	0.40 U	1.8	2 U	3.6 J	200		180	0.40 U	0.40 U	49 J	80
o-Xylene in ug/l		1.6	0.2 UJ	0.20 U	1.9	0.2 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.77 J	14		13	0.20 U	0.20 U	2.2 J	10 U
Total Xylenes in ug/L			ND	ND	2.1			ND	ND	1.9			210			ND	ND		85
Naphthalene in ug/l	90	3.2 J	0.5 UJ	0.50 U	0.50 U	0.5 U	0.5 UJ	2.5 U	0.50 U	0.50 U	2.5 U	0.96 J	32		23 J	0.50 U	0.50 U	1.8 UJ	25 U
Field Parameters																			
Dissolved Oxygen in mg/L		0.18	0.84	0.2	0.09	0.41	0.41	0.54	0.06	0.07	1.03	0.46	2.78	0.21	0.24	1.89	0.14	0.34	0.45
ORP in mVolts		-242.5	-106.6	-2.5	34.5	31.3	-100.2	-46.6	-17.3	-4.5	20.5	-138.9	-97.6	-9.9	-124.2	-12.9	16.9	-0112.0	67.4
pH in pH Units		11.19	7.07	7.15	7.21	6.92	8.84	6.49	6.10	6.72	6.52	9.36	6.53	6.67	7.10	6.47	6.28	7.04	6.82
Specific Conductance in us/cm		1,309	334.9	389.5	437.2	533.0	6,222	27,391	25,272	25,686	59,832	1,227	810	728	735	317.6	402.7	824	708
Temperature in deg C		16.8	15.8	14.1	13.9	11.2	16.1	18.3	13.4	15.8	19.9	15.9	17.1	13.7	16.1	17.7	13.7	15.5	17
Turbidity in NTU		7.55	0.85	7.53	2.39	2.26	1.37	0.84	0.76	0.76	1.90	57.2	4.01	12.1	6.66	14.8	5.76	7.40	11.2

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-2 - 2014-2015 RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	721-MW15-15 12/9/15	721-MW15-15 12/9/15 FD	HC-N11-6 10/15/14	HC-N11-6 1/27/15	HC-N11-6 12/8/15	MW-102-15 10/16/14	MW-102-15 5/18/15	MW-104-15 10/15/14	MW-104-15 1/26/15	MW-104-15 5/18/15	MW-104-15 8/28/15	MW-104-15 12/8/15	MW-105-15 10/17/14	MW-105-15 5/18/15	MW-106-15 10/16/14	MW-106-15 5/20/15	MW-106-15 5/20/15 FD	MW-106-15 12/9/15	
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																				
Gasoline Range Hydrocarbons in ug/L	800	4,800	4,900	2,800		3,900	250 U	250 U	590	250 U	1,600	1,200 U	250 U	250 U	250 U	5,400	7,600	7,600	2,500	
Diesel Range Hydrocarbons in ug/L	500	18,000	15,000		4,900	4,900		430		2,900	5,700	4,800	100 U	100 U	100 U		9,500	9,100	7,200	
Oil Range Hydrocarbons in ug/L	500	2,500	2,400		740	780		200 U		780	1,600	1,400	200 U		200 U		1,400	1,400	1,100	
Total TPHs D+O (ND=0U) in ug/L	500	20,500	17,400		5,600	5,680		430		3,700	7,300	6,200	ND		ND		11,000	10,000	8,300	
Total TPHs D+O (ND=1/2U) in ug/L	500	20,500	17,400		5,600	5,680		530		3,700	7,300	6,200	ND		ND		10,900	10,500	8,300	
Total TPHs G+D+O (ND=0U) in ug/L	720	25,300	22,300			9,580		430		3,700	8,900	6,200	ND		ND		18,000	18,000	10,800	
Total TPHs G+D+O (ND=1/2U) in ug/L	720	25,300	22,300			9,580		660		3,800	8,900	6,800	ND		ND		18,000	18,000	10,800	
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																				
Diesel Range Hydrocarbons in ug/L	500	7,000 J	8,300 J	440	460	550	100 U	100 U	100 U	100 U	100 U	100 U	820	100 U	130	100 U	710	730	730	340 J
Oil Range Hydrocarbons in ug/L	500	250	270	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Total TPHs D+O (ND=0U) in ug/L	500	7,250	8,570	440	460	550	ND	ND	ND	ND	ND	ND	820	ND	130	ND	710	730	730	340
Total TPHs D+O (ND=1/2U) in ug/L	500	7,250	8,570	440	560	650	ND	ND	ND	ND	ND	920	ND	130	ND	710	830	830	440	
Total TPHs G+D+O (ND=0U) in ug/L	720	12,050	13,470	3,200		4,450	ND	ND	590	ND	1,600	820	ND	130	ND	6,100	8,300	8,300	2,840	
Total TPHs G+D+O (ND=1/2U) in ug/L	720	12,050	13,470	3,300		4,550	ND	ND	740	ND	1,800	1,500	ND	360	ND	6,200	8,400	8,400	2,940	
Dissolved Metals																				
Lead in ug/L	8.1			0.1 U			0.1 U		0.0152 U					0.1 U		0.2				
Manganese in ug/L				419																
Total Metals																				
Lead in ug/L	8.1																			
Conventional Chemistry Parameters																				
Alkalinity (Total) in mg/L as CaCO3				326																
Ethane in ug/L				1.2 U																
Ethene in ug/L				1.1 U																
Methane in ug/L				5,850																
Nitrate as Nitrogen in mg-N/L				0.1 U																
Nitrite as Nitrogen in mg-N/L				0.1 U																
Sulfate in mg/L				0.1 U																
Volatile Organic Compounds (VOC)																				
1,1,1,2-Tetrachloroethane in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 U	
1,1,1-Trichloroethane in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 U	
1,1,2-Trichlorotrifluoroethane in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 U	
1,1,2,2-Tetrachloroethane in ug/l	3	0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 U	
1,1,2-Trichloroethane in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 U	
1,1-Dichloroethane in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 U	
1,1-Dichloroethene in ug/l	3.2	0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 U	
1,1-Dichloropropene in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 U	
1,2,3-Trichlorobenzene in ug/l		0.5 U	0.5 U	2.5 U		0.5 U	0.5 U	0.50 U	5 U	0.50 U	0.50 U	2.5 U	0.5 U	0.50 U	0.50 U	5 U	0.50 U	0.50 U	0.5 U	
1,2,3-Trichloropropane in ug/l		0.5 U	0.5 U	2.5 U		0.5 U	0.5 U	0.50 U	5 U	0.50 U	0.50 U	2.5 U	0.5 U	0.50 U	0.50 U	5 U	0.50 U	0.50 U	0.5 U	
1,2,4-Trichlorobenzene in ug/l		0.5 U	0.5 U	2.5 U		0.5 U	0.5 U	0.50 U	5 U	0.50 U	0.50 U	2.5 U	0.5 U	0.50 U	0.50 U	5 U	0.50 U	0.50 U	0.5 U	
1,2,4-Trimethylbenzene in ug/l	63	2.1 J	2.1 J	1.4		5.4 J	0.2 U	0.20 U	2 U	0.20 U	0.58	1 U	0.2 U	0.20 U	0.20 U	23	64	67	53 J	
1,2-Dibromo-3-chloropropane in ug/l		0.5 U	0.5 U	2.5 U		0.5 U	0.5 U	0.50 U	5 U	0.50 U	0.50 U	2.5 U	0.5 U	0.50 U	0.50 U	5 U	0.50 U	0.50 U	0.5 U	
1,2-Dibromoethane (EDB) in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 U	
1,2-Dichlorobenzene in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 U	
1,2-Dichloroethane (EDC) in ug/l	42	0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 U	
1,2-Dichloropropane in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 U	
1,3,5-Trimethylbenzene in ug/l		6.1 J	6.3 J	4.1		5 J	0.2 U	0.20 U	2 U	0.20 U	0.47	1 U	0.2 U	0.20 U	0.20 U	6.9	14	15	9.7 J	
1,3-Dichlorobenzene in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 U	
1,3-Dichloropropane in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 U	
1,4-Dichloro-2-Butene in ug/l		1 U	1 U	5 U		1 U	1 U	1.0 U	10 U	1.0 U	1.0 U	5 U	1 U	1.0 U	1.0 U	10 U	1.0 U	1.0 U	1 U	
1,4-Dichlorobenzene in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 U	
2,2-Dichloropropane in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 U	
2-Butanone in ug/l		5 U	5 U	25 U		5 U	5 U	5.0 U	50 U	5.0 U	5.0 U	25 U	5 U	5.0 U	5.0 U	50 U	5.0 U	5.0 U	5 U	
2-Chloroethyl Vinyl Ether in ug/l		1 U	1 U			1 U		1.0 U			1.0 U	5 U	1 U		1.0 U		1.0 U	1.0 U	1 U	
2-Chlorotoluene in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 U	
2-Hexanone in ug/l		5 U	5 U	25 U		5 U	5 U	5.0 U	50 U	5.0 U	5.0 U	25 U	5 U	5.0 U	5.0 U	50 U	5.0 U	5.0 U	5 U	
4-Chlorotoluene in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 U	
4-Methyl-2-pentanone in ug/l		5 U	5 U	25 U		5 U	5 U	5.0 U	50 U	5.0 U	5.0 U	25 U	5 U	5.0 U	5.0 U	50 U	5.0 U	5.0 U	5 U	
Acetone in ug/l	31,896,900	5 U	5 U	25 U		5 U	5 U	5.0 U	50 U	5.0 U	5.0 U	25 U	5 U	5.0 U	5.0 U	50 U	5.0 U	5.0 U	5 U	
Acrolein in ug/l		5 U	5 U	25 U		5 U	5 U	5.0 U	50 U	5.0 U	5.0 U	25 U	5 U	5.0 U	5.0 U	50 U	5.0 U	5.0 U	5 U	

Table B-2

Aspect Consulting

2/25/2016

I:\seastore2.aspect.local\projects\Port of Tacoma\Alexander Avenue Petroleum Tank Facilities\Draft Reports\RIFS\Appendices\Appendix B - Data Tables\B-1 to B-6 RI Data 2014-2015.xlsx

RI

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Table B-2 - 2014-2015 RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	721-MW15-15 12/9/15	721-MW15-15 12/9/15 FD	HC-N11-6 10/15/14	HC-N11-6 1/27/15	HC-N11-6 12/8/15	MW-102-15 10/16/14	MW-102-15 5/18/15	MW-104-15 10/15/14	MW-104-15 1/26/15	MW-104-15 5/18/15	MW-104-15 8/28/15	MW-104-15 12/8/15	MW-105-15 10/17/14	MW-105-15 5/18/15	MW-106-15 10/16/14	MW-106-15 5/20/15	MW-106-15 5/20/15 FD	MW-106-15 12/9/15
Acrylonitrile in ug/l	0.7	1 U	1 U	5 U		1 U	1 U	1.0 U	10 U	1.0 UJ	1.0 U	5 U	1 U	1.0 U	1.0 U	10 U	120 U	110 U	1 UJ
Benzene in ug/l	24	1,400 J	1,400 J	170		360	1.4	7.5	250	170	510	340	0.2 U	0.20 U	0.25	610	510	480	150 J
Bromobenzene in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
Bromochloromethane in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
Bromodichloromethane in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
Bromoethane in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
Bromoform in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 UJ	0.20 U	1 UJ	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
Bromomethane in ug/l		1 U	1 U	5 U		1 U	1 U	1.0 UJ	10 U	1.0 UJ	1.0 UJ	5 U	1 U	1.0 U	1.0 UJ	10 U	1.0 UJ	1.0 UJ	1 UJ
Carbon disulfide in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 UJ	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
Carbon tetrachloride in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 UJ	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
Chlorobenzene in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
Chloroethane in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
Chloroform in ug/l	12	0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
Chloromethane in ug/l		0.5 U	0.5 U	2.5 U		0.5 U	0.5 U	0.50 U	5 U	0.50 U	0.50 U	2.5 UJ	0.5 U	0.50 U	0.50 U	5 U	0.50 UJ	0.50 UJ	0.5 UJ
cis-1,2-Dichloroethene (DCE) in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
cis-1,3-Dichloropropene in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
Dibromochloromethane in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
Dibromomethane in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
Ethylbenzene in ug/l	130	49 J	49 J	10		7.1 J	0.2 U	0.20 U	2 U	0.27	1.8	1.1	0.2 U	0.20 U	0.20 U	380	430	410	99
Hexachlorobutadiene in ug/l	0.2	0.5 U	0.5 U	2.5 U		0.5 U	0.5 U	0.50 U	5 U	0.50 U	0.50 U	2.5 U	0.5 U	0.50 U	0.50 U	5 U	0.50 U	0.50 U	0.5 UJ
Isopropylbenzene in ug/l	1,614	29 J	29 J	22		26 J	0.38	0.76	8.3	1.4	18	11	0.2 U	0.20 U	0.20 U	28	31	36	18 J
Methylene chloride in ug/l	1,000	1 U	1 U	5 U		1 U	1 U	1.0 U	10 U	1.0 U	1.0 U	5 U	1 U	1.0 U	1.0 U	10 U	1.0 U	1.0 U	1 UJ
Methyliodide in ug/l		1 U	1 U	5 U		1 U	1 U	1.0 U	10 U	1.0 U	1.0 U	5 U	1 U	1.0 U	1.0 U	10 U	1.0 U	1.0 U	1 UJ
n-Butylbenzene in ug/l		4.2 J	4.5 J	3.3		3 J	0.2 U	0.20 U	2 U	0.20 U	0.78	1 U	0.2 U	0.20 U	0.20 U	4.5	5.5	5.4	2.4 J
n-Propylbenzene in ug/l	5,200	38 J	39 J	45		48 J	0.23	0.23	7.4	0.45	16	9.4	0.2 U	0.20 U	0.20 U	32	35	40	22 J
p-Isopropyltoluene in ug/l		5.5 J	5.7 J	1 U		4.2 J	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	1.7 J
sec-Butylbenzene in ug/l		5.1 J	5.2 J	4.3		4.5 J	0.2 U	0.20 U	2 U	0.20 U	2.5	1.6	0.2 U	0.20 U	0.20 U	4.7	5.8	5.8	3.1 J
Styrene in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
tert-Butylbenzene in ug/l		0.62 J	0.63 J	1 U		0.78 J	0.2 U	0.20 U	2 U	0.20 U	0.31	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.28 J
Tetrachloroethene (PCE) in ug/l	8.9	0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.23	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
Toluene in ug/l	520	33 J	34 J	6		8.9 J	0.2 U	0.20 U	2.9	1.8	9.9	6	0.2 U	0.20 U	0.20 U	70	95	71	21 J
trans-1,2-Dichloroethene in ug/l	4,000	0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
trans-1,3-Dichloropropene in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.37 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
Trichloroethene (TCE) in ug/l	7	0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
Trichlorofluoromethane in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
Vinyl acetate in ug/l		0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
Vinyl chloride in ug/l	1.6	0.2 U	0.2 U	1 U		0.2 U	0.2 U	0.20 U	2 U	0.20 U	0.20 U	1 U	0.2 U	0.20 U	0.20 U	2 U	0.20 U	0.20 U	0.2 UJ
m,p-Xylenes in ug/l		84 J	85 J	21		33 J	0.4 U	0.40 U	4 U	0.52	9.3	3.4	0.4 U	0.40 U	0.40 U	160	210	200	160 J
o-Xylene in ug/l		6.6 J	6.8 J	1 U		1.7 J	0.2 U	0.20 U	2 U	0.20 U	0.95	1 U	0.2 U	0.20 U	0.20 U	15	18	16	7 J
Total Xylenes in ug/L				22			ND	ND	ND	0.62	10			ND	ND	180	230	220	
Naphthalene in ug/l	90	1.8 UJ	2.2 UJ	2.5 U		2 U	0.5 U	0.50 U	5 U	0.50 U	0.58	2.5 U	0.5 U	0.50 U	0.50 U	22	40	44	34 J
Field Parameters																			
Dissolved Oxygen in mg/L		0.59		0.47	0.18	0.19	0.33	0.44	0.18	1.15	0.15	0.57	3.94	0.3	0.06	0.66	0.04		0.20
ORP in mVolts		-106.6		-88.4	-104.3	-93.6	-52.9	64.2	-123.7	17.6	-58.2	-43.7	25.1	-136.4	-73.1	-83.3	-7.9		-131.3
pH in pH Units		6.55		6.89	6.87	7.14	6.99	6.74	6.9	6.83	6.85	6.61	6.91	8.37	7.25	6.62	6.67		7.33
Specific Conductance in us/cm		1,134		620	644	664	391.6	463.6	6,051	8,182	1,108	4,289	7,571	603.9	701	480.1	828		1,031
Temperature in deg C		16.1		18	14.4	16.6	16.7	13.7	18.4	12.9	16.0	21.1	13.8	15.4	16.0	18.5	15.2		16.0
Turbidity in NTU		4.52		1.47	4.58	3.17	6.5	35.4	12	3.04	4.94	2.42	17.5	8.73	81.2	2.98	3.14		7.26

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-2 - 2014-2015 RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	MW-109-15 10/16/14	MW-109-15 1/27/15	MW-109-15 5/19/15	MW-109-15 12/9/15	MW-110-15 10/15/14	MW-110-15 1/26/15	MW-110-15 5/18/15	MW-110-15 8/27/15	MW-130-15 10/15/14	MW-130-15 1/27/15	MW-130-15 5/19/15	MW-130-15 8/27/15	MW-130-15 12/8/15	B-101 7/17/14	B-102 7/17/14	B-103 8/25/14	B-104 8/25/14	B-105 7/23/14
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
Gasoline Range Hydrocarbons in ug/L	800	4,500		5,400	4,500	540	250 U	330	1,200 U	940	1,900	1,900	2,000	2,500	2,200	1,300	2,200	2,500 U	250 U
Diesel Range Hydrocarbons in ug/L	500		7,900	8,800	6,300			1,300	700			5,900	5,000	4,800					
Oil Range Hydrocarbons in ug/L	500		2,000	3,000	1,100			330	200 U			630	530	720					
Total TPHs D+O (ND=0U) in ug/L	500		9,900	12,000	7,400			1,600	700			6,500	5,500	5,520					
Total TPHs D+O (ND=1/2U) in ug/L	500		9,900	11,800	7,400			1,600	800			6,500	5,500	5,520					
Total TPHs G+D+O (ND=0U) in ug/L	720			17,000	11,900			2,000	700			8,400	7,500	8,020					
Total TPHs G+D+O (ND=1/2U) in ug/L	720			17,000	11,900			2,000	1,400			8,400	7,500	8,020					
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in ug/L	500	570	450	360	460 J	100 U	100 U	100 U	130	100 U	130	100	740	100 U					
Oil Range Hydrocarbons in ug/L	500	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U					
Total TPHs D+O (ND=0U) in ug/L	500	570	450	360	460	ND	ND	ND	130	ND	130	100	740	ND					
Total TPHs D+O (ND=1/2U) in ug/L	500	570	550	460	560	ND	ND	ND	230	ND	230	200	840	ND					
Total TPHs G+D+O (ND=0U) in ug/L	720	5,100		5,800	4,960	540	ND	330	130	940	2,000	2,000	2,700	2,500					
Total TPHs G+D+O (ND=1/2U) in ug/L	720	5,200		5,900	5,060	690	ND	480	830	1,100	2,100	2,100	2,800	2,650					
Dissolved Metals																			
Lead in ug/L	8.1	1.4				0.843				0.1 U									
Manganese in ug/L		625				34													
Total Metals																			
Lead in ug/L	8.1					1.04													
Conventional Chemistry Parameters																			
Alkalinity (Total) in mg/L as CaCO3		453				198													
Ethane in ug/L		6.8				1.2 U													
Ethene in ug/L		1.1 U				1.1 U													
Methane in ug/L		14,500				31.4													
Nitrate as Nitrogen in mg-N/L		0.5 U				0.5 U													
Nitrite as Nitrogen in mg-N/L		0.5 U				0.5 U													
Sulfate in mg/L		0.5 U				670													
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
1,1,1-Trichloroethane in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
1,1,2 - Trichlorotrifluoroethane in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
1,1,2,2-Tetrachloroethane in ug/l	3	10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
1,1,2-Trichloroethane in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
1,1-Dichloroethane in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
1,1-Dichloroethene in ug/l	3.2	10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
1,1-Dichloropropene in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
1,2,3-Trichlorobenzene in ug/l		25 UJ		25 U	0.5 U	2.5 U	0.50 U	0.50 U	2.5 U	2.5 U	0.50 U	2.5 U	2.5 U	0.5 U	0.50 U	5.0 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane in ug/l		25 UJ		25 U	0.5 U	2.5 U	0.50 U	0.50 U	2.5 U	2.5 U	0.50 U	2.5 U	2.5 U	0.5 U	0.50 U	5.0 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene in ug/l		25 UJ		25 U	0.5 U	2.5 U	0.50 U	0.50 U	2.5 U	2.5 U	0.50 U	2.5 U	2.5 U	0.5 U	0.50 U	5.0 U	0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene in ug/l	63	10 UJ		10 U	7.9 J	1 U	0.20 U	0.20 U	1 U	1	1.1	1.6	1.4	2.4 J	0.35	2.0 U	0.45	0.59	0.20 U
1,2-Dibromo-3-chloropropane in ug/l		25 UJ		25 U	0.5 U	2.5 U	0.50 U	0.50 U	2.5 U	2.5 U	0.50 U	2.5 U	2.5 U	0.5 U	0.50 U	5.0 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (EDB) in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
1,2-Dichlorobenzene in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
1,2-Dichloroethane (EDC) in ug/l	42	10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
1,2-Dichloropropane in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
1,3,5-Trimethylbenzene in ug/l		10 UJ		10 U	8.4 J	1 U	0.20 U	0.20 U	1 U	4	7.1	5.6	3.1	5.1 J	0.20 U	2.0 U	3.3	0.66	0.20 U
1,3-Dichlorobenzene in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
1,3-Dichloropropane in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
1,4-Dichloro-2-Butene in ug/l		50 UJ		50 U	1 U	5 U	1.0 U	1.0 U	5 U	5 U	1.0 U	5.0 U	5 U	1 U	1.0 U	10 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
2,2-Dichloropropane in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
2-Butanone in ug/l	250 UJ			250 U	5 U	25 U	5.0 U	5.0 U	25 U	25 U	5.0 U	29 J	25 U	5 U	5.0 U	50 U	5.0 U	5.0 U	5.0 U
2-Chloroethyl Vinyl Ether in ug/l		50 UJ		50 U	1 UJ			1.0 U	5 U			5.0 U	5 U	1 UJ					
2-Chlorotoluene in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
2-Hexanone in ug/l		250 UJ		250 U	5 U	25 U	5.0 U	5.0 U	25 U	25 U	5.0 U	25 U	25 U	5 U	5.0 U	50 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
4-Methyl-2-pentanone in ug/l		250 UJ		250 U	5 U	25 U	5.0 U	5.0 U	25 U	25 U	5.0 U	25 U	25 U	5 U	5.0 U	50 U	5.0 U	5.0 U	5.0 U
Acetone in ug/l	31,896,900	250 UJ		250 U	5 U	25 U	5.0 U	5.0 U	35 U	25 U	5.0 U	25 U	39 U	5 UJ	5.0 U	50 U	6.6 U	5.4 U	5.0 UJ
Acrolein in ug/l		250 UJ		250 U	5 U	25 U	5.0 U	5.0 U	25 U	25 U	5.0 U	92 U	25 U	5 U	5.0 U	50 U	5.0 U	5.0 U	5.0 U

Table B-2 - 2014-2015 RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	MW-109-15 10/16/14	MW-109-15 1/27/15	MW-109-15 5/19/15	MW-109-15 12/9/15	MW-110-15 10/15/14	MW-110-15 1/26/15	MW-110-15 5/18/15	MW-110-15 8/27/15	MW-130-15 10/15/14	MW-130-15 1/27/15	MW-130-15 5/19/15	MW-130-15 8/27/15	MW-130-15 12/8/15	B-101 7/17/14	B-102 7/17/14	B-103 8/25/14	B-104 8/25/14	B-105 7/23/14
Acrylonitrile in ug/l	0.7	50 UJ		130 U	1 U	5 U	1.0 UJ	1.0 U	5 U	5 U	1.0 UJ	55 U	5 U	1 U	1.0 U	10 U	1.0 U	1.0 U	1.0 U
Benzene in ug/l	24	1,900 J		1,500	790 J	1 U	0.20 U	0.61	1 U	110	170	140	87	150	25	770	24	1,400	0.20 U
Bromobenzene in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
Bromochloromethane in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
Bromodichloromethane in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
Bromoethane in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
Bromoform in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 UJ	0.20 U	1 UJ	1 U	0.20 UJ	1.0 U	1 UJ	0.2 U	0.20 UJ	2.0 UJ	0.20 U	0.20 U	0.20 U
Bromomethane in ug/l		50 UJ		50 U	1 U	5 U	1.0 U	1.0 UJ	5 U	5 U	1.0 U	5.0 U	5 U	1 U	1.0 U	10 U	1.0 U	1.0 U	1.0 U
Carbon disulfide in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 UJ	0.20 U	1	1 U	0.20 UJ	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
Carbon tetrachloride in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 UJ	1 U	0.20 U	1.0 U	1 UJ	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
Chlorobenzene in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
Chloroethane in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
Chloroform in ug/l	12	10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
Chloromethane in ug/l		25 UJ		25 U	0.5 U	2.5 U	0.50 U	0.50 U	2.5 U	2.5 U	0.50 U	2.5 U	2.5 U	0.5 U	0.50 U	5.0 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene (DCE) in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
cis-1,3-Dichloropropene in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
Dibromochloromethane in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
Dibromomethane in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
Ethylbenzene in ug/l	130	140 J		140	92	1 U	0.20 U	0.20 U	1 U	1.8	3.2	2.7	1.4	3.5 J	0.42	4.8	23	2.8	0.20 U
Hexachlorobutadiene in ug/l	0.2	25 UJ		25 U	0.5 U	2.5 U	0.50 U	0.50 U	2.5 U	2.5 U	0.50 U	2.5 U	2.5 U	0.5 U	0.50 U	5.0 U	0.50 U	0.50 U	0.50 U
Isopropylbenzene in ug/l	1,614	25 J		32	26 J	3	2.0	8.6	3.6	9	19	20	9	21 J	12	19	15	28	0.20 U
Methylene chloride in ug/l	1,000	50 UJ		50 U	1 U	5 U	1.0 U	1.0 U	5 U	5 U	1.0 U	5.0 U	5 U	1 U	1.0 U	10 U	1.0 U	1.0 U	1.0 U
Methyl iodide in ug/l		50 UJ		50 U	1 U	5 U	1.0 U	1.0 U	5 U	5 U	1.0 U	5.0 U	5 U	1 U	1.0 U	10 U	1.0 U	1.0 U	1.0 U
n-Butylbenzene in ug/l		10 UJ		10 U	4.2 J	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	3.3	2.0 U	2.9	0.20 U
n-Propylbenzene in ug/l	5,200	34 J		47	41 J	1 U	0.20 U	0.37	1 U	12	29 J	32	12	34 J	14	19	28	27	0.20 U
p-Isopropyltoluene in ug/l		10 UJ		10 U	3.6 J	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.76 J	0.28	2.0 U	0.79	0.20 U	0.20 U
sec-Butylbenzene in ug/l		10 UJ		10 U	5.9 J	1 U	0.64 J	1.6	1.6	1 U	2.5 J	2.4	1.3	2.7 J	4.0	2.0	2.8	3.3	0.20 U
Styrene in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
tert-Butylbenzene in ug/l		10 UJ		10 U	0.59 J	1 U	0.20 U	0.25	1 U	1 U	0.41	1.0 U	1 U	0.46 J	0.48	2.0 U	0.44	0.36	0.20 U
Tetrachloroethene (PCE) in ug/l	8.9	10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
Toluene in ug/l	520	81 J		75	58 J	1 U	0.20 U	0.20 U	1 U	3.5	5.5	5.8	4.3	6.3 J	1.2	6.5	4.1	12	0.20 U
trans-1,2-Dichloroethene in ug/l	4,000	10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
trans-1,3-Dichloropropene in ug/l		10 UJ		10 U	1.6 J	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
Trichloroethene (TCE) in ug/l	7	10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
Trichlorofluoromethane in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
Vinyl acetate in ug/l		10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
Vinyl chloride in ug/l	1.6	10 UJ		10 U	0.2 U	1 U	0.20 U	0.20 U	1 U	1 U	0.20 U	1.0 U	1 U	0.2 U	0.20 U	2.0 U	0.20 U	0.20 U	0.20 U
m,p-Xylenes in ug/l		140 J		130	140 J	2 U	0.40 U	0.40 U	2 U	18	16	23	17	28 J	1.9	8.5	6.3	12	0.40 U
o-Xylene in ug/l		16 J		14	10 J	1 U	0.20 U	0.20 U	1 U	1 U	1.5	1.2	1	1.5 J	0.41	2.0 U	0.64	1.3	0.20 U
Total Xylenes in ug/L		160 J		140		ND	ND	ND		18	18	24		2.3	9.5	6.9	13	ND	
Naphthalene in ug/l	90	25 UJ		25 U	22 J	2.5 U	0.50 U	0.50 U	2.5 U	2.5 U	0.50 U	2.5 U	2.5 U	0.9 U	0.50 U	5.0 U	2.0	1.6	0.50 U
Field Parameters																			
Dissolved Oxygen in mg/L		0.69	0.35	0.05	0.47	0.19	1.53	0.02	0.10	0.71	0.08	0.37	0.14	0.17	0.31	0.71	0.45	0.2	0.32
ORP in mVolts		-110.9	-21.2	61.5	-121.7	-246.5	-77.8	-293.8	295.9	-34.9	-80.5	-41.3	-84.2	76.0	-71.6	-22	-36.4	-80.3	-23.8
pH in pH Units		6.61	6.68	6.90	8.82	6.76	6.47	6.69	6.66	7.03	6.97	6.76	6.95	7.11	6.71	6.47	6.78	6.63	6.93
Specific Conductance in us/cm		952	860	929	887	17,089	9,075	11,577	26,620	802	755	765	781	834	969	1,031	741	1,091	393.3
Temperature in deg C		17.1	14.3	15.0	16.1	18	11.5	15.8	21.3	18.8	15.1	16.1	20.0	17.0	19.3	17	18.1	22.6	17.7
Turbidity in NTU		10.4	6.18	3.71	2.69	42.4	2.04	4.63	2.25	0.84	7.11	8.25	13.4	10.5	120	76.3	33.1	509	237

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-2 - 2014-2015 RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	B-106 7/16/14	B-106 7/16/14 FD	B-107 7/17/14	B-108 7/15/14	B-109 7/16/14	B-110 7/23/14	B-111 7/17/14	B-112 7/21/14	B-113 7/18/14	B-114 7/18/14	B-114 7/18/14 FD	B-115 7/18/14	B-116 7/18/14	B-117 7/22/14	B-118 7/22/14	B-119 8/26/14	B-120 8/26/14	B-121 8/26/14
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
Gasoline Range Hydrocarbons in ug/L	800	8,100	8,100	3,500	9,100	8,400	1,200	4,500	250 U	960	250 U	250 U	250 U	250 U	250 U	250 U	250 U	3,000	4,400
Diesel Range Hydrocarbons in ug/L	500																		
Oil Range Hydrocarbons in ug/L	500																		
Total TPHs D+O (ND=0U) in ug/L	500																		
Total TPHs D+O (ND=1/2U) in ug/L	500																		
Total TPHs G+D+O (ND=0U) in ug/L	720																		
Total TPHs G+D+O (ND=1/2U) in ug/L	720																		
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in ug/L	500																		
Oil Range Hydrocarbons in ug/L	500																		
Total TPHs D+O (ND=0U) in ug/L	500																		
Total TPHs D+O (ND=1/2U) in ug/L	500																		
Total TPHs G+D+O (ND=0U) in ug/L	720																		
Total TPHs G+D+O (ND=1/2U) in ug/L	720																		
Dissolved Metals																			
Lead in ug/L	8.1								20 U	20 U	20 U	20 U							
Manganese in ug/L																			
Total Metals																			
Lead in ug/L	8.1																		
Conventional Chemistry Parameters																			
Alkalinity (Total) in mg/L as CaCO3																			
Ethane in ug/L																			
Ethene in ug/L																			
Methane in ug/L																			
Nitrate as Nitrogen in mg-N/L																			
Nitrite as Nitrogen in mg-N/L																			
Sulfate in mg/L																			
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1,1-Trichloroethane in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1,2 - Trichlorotrifluoroethane in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1,2,2-Tetrachloroethane in ug/l	3	10 U	10 U	4.0 U	2.0 U	1.0 U	1.1 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1,2-Trichloroethane in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1-Dichloroethane in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1-Dichloroethene in ug/l	3.2	10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1-Dichloropropene in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2,3-Trichlorobenzene in ug/l		25 U	25 U	10 U	5.0 U	2.5 U	0.50 U	2.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane in ug/l		25 U	25 U	10 U	5.0 U	2.5 U	0.50 U	2.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene in ug/l		25 U	25 U	10 U	5.0 U	2.5 U	0.50 U	2.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.86	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene in ug/l	63	120	110	4.0 U	180	140	0.20 U	1.0 U	0.27	3.1	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.43	1.6
1,2-Dibromo-3-chloropropane in ug/l		25 U	25 U	10 U	5.0 U	2.5 U	0.50 U	2.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (EDB) in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2-Dichlorobenzene in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2-Dichloroethane (EDC) in ug/l	42	10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2-Dichloropropane in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,3,5-Trimethylbenzene in ug/l	27	24	4.0 U	28	20	0.20 U	1.0 U	0.20 U	0.21	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.2	19
1,3-Dichlorobenzene in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,3-Dichloropropane in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,4-Dichloro-2-Butene in ug/l		50 U	50 U	20 U	10 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.31	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2,2-Dichloropropane in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Butanone in ug/l	250 U	250 U	100 U	50 U	25 U	5.0 U	25 U	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 U	5.0 U	5.0 U	5.0 U
2-Chloroethyl Vinyl Ether in ug/l																			
2-Chlorotoluene in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Hexanone in ug/l		250 U	250 U	100 U	50 U	25 U	5.0 U	25 U	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 U	5.0 U	5.0 U
4-Chlorotoluene in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
4-Methyl-2-pentanone in ug/l		250 U	250 U	100 U	50 U	25 U	5.0 U	25 U	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 U	5.0 U	5.0 U
Acetone in ug/l	31,896,900	250 U	250 U	100 U	50 U	25 U	5.0 U	25 U	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 U	5.0 U	5.0 U
Acrolein in ug/l		250 U	250 U	100 U	50 U	25 U	5.0 U	25 U	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 U	5.0 U	5.0 U

Aspect Consulting

2/25/2016

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Table B-2

RI

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Table B-2 - 2014-2015 RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	B-106 7/16/14	B-106 7/16/14 FD	B-107 7/17/14	B-108 7/15/14	B-109 7/16/14	B-110 7/23/14	B-111 7/17/14	B-112 7/21/14	B-113 7/18/14	B-114 7/18/14	B-114 7/18/14 FD	B-115 7/18/14	B-116 7/18/14	B-117 7/22/14	B-118 7/22/14	B-119 8/26/14	B-120 8/26/14	B-121 8/26/14
Acrylonitrile in ug/l	0.7	50 U	50 U	20 U	10 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzene in ug/l	24	1,700	1,800	1,300	790	1,700	0.20 U	1.0 U	0.28	0.20 U	0.61	0.57	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	650	440
Bromobenzene in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromochloromethane in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromodichloromethane in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromoethane in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromoform in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromomethane in ug/l		50 U	50 U	20 U	10 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon disulfide in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Carbon tetrachloride in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chlorobenzene in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloroethane in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloroform in ug/l	12	10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloromethane in ug/l		25 U	25 U	10 U	5.0 U	2.5 U	0.50 U	2.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene (DCE) in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.32	1.1	1.4	1.4	0.20 U	5.7	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,3-Dichloropropene in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibromochloromethane in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibromomethane in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Ethylbenzene in ug/l	130	440	460	160	460	350	0.20 U	1.0 U	1.0	0.29	0.20 U	0.22	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	28	230
Hexachlorobutadiene in ug/l	0.2	25 U	25 U	10 U	5.0 U	2.5 U	0.50 U	2.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Isopropylbenzene in ug/l	1,614	20	19	26	26	22	0.20 U	16	0.61	3.6	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	23	33
Methylene chloride in ug/l	1,000	50 U	50 U	20 U	10 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methyl iodide in ug/l		50 U	50 U	20 U	10 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
n-Butylbenzene in ug/l		10 U	10 U	4.4	5.6	4.7	0.20 U	3.0	0.30	3.3	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	5.3	6.6
n-Propylbenzene in ug/l	5,200	42	41	43	43	37	0.20 U	20	1.5	14	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	34	58
p-Isopropyltoluene in ug/l		10 U	10 U	4.0 U	4.7	5.4	0.20 U	1.0 U	0.20 U	1.4	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.8	3.4
sec-Butylbenzene in ug/l		10 U	10 U	4.2	4.8	3.8	0.25	4.0	0.34	4.5	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	4.9	6.2
Styrene in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
tert-Butylbenzene in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.87	0.81
Tetrachloroethene (PCE) in ug/l	8.9	10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.23	3.8	20	20	3.7	2.8	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Toluene in ug/l	520	210	210	21	200	150	0.20 U	1.0 U	0.20	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	10	21
trans-1,2-Dichloroethene in ug/l	4,000	10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.81	0.92	1.3	1.3	0.20 U	0.82	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
trans-1,3-Dichloropropene in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene (TCE) in ug/l	7	10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	1.5	7.3	6.8	1.3	3.4	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichlorofluoromethane in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Vinyl acetate in ug/l		10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Vinyl chloride in ug/l	1.6	10 U	10 U	4.0 U	2.0 U	1.0 U	0.20 U	1.0 U	0.86	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
m,p-Xylenes in ug/l		440	420	8.0 U	470	290	0.40 U	2.0 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	11	34
o-Xylene in ug/l		43	42	4.2	35	25	0.20 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	2.0	4.5
Total Xylenes in ug/L		480	460	8.2	500	320	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13	38
Naphthalene in ug/l	90	90	80	12	240	130	0.50 U	12	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	5.2	8.2
Field Parameters																			
Dissolved Oxygen in mg/L		0.57		0.52	0.37	0.5	0.17	0.21	0.54	0.29	0.33		1.09	0.26	2.66	4.25	0.8	0.17	0.5
ORP in mVolts		-55.7		-75	-65.4	-83.3	-103.1	-39.5	-13.7	-61.9	-37		-52	-78	-19.6	-18.6	-86.4	-105.6	-107.1
pH in pH Units		6.49		6.46	6.53	6.62	6.4	6.87	6.94	6.91	9.29		8.98	7.82	7.4	7.52	7.81	6.7	6.6
Specific Conductance in us/cm		983		1,154	751	861	18,345	1,400	350.3	426	720		393.1	372.5	288.1	275.7	365.2	982	1,080
Temperature in deg C		19.3		18.4	18.9	19.5	17	19.4	16.7	18.4	20.5		18.3	19	18	17.4	20.9	20.2	20.2
Turbidity in NTU		82		38.1	127	127	21	1,000 U	112	1,000 U	693		64.9	556	215	108	324	83.2	73.3

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-2 - 2014-2015 RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	B-122 7/22/14	B-123 7/21/14	B-124 7/21/14	B-125 7/21/14	B-126 7/22/14	B-127 7/15/14	B-128 7/15/14	B-129 8/25/14	B-130 8/25/14
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup										
Gasoline Range Hydrocarbons in ug/L	800	250 U	250 U	250 U	520	1,500	6,000	4,100	280	890
Diesel Range Hydrocarbons in ug/L	500									
Oil Range Hydrocarbons in ug/L	500									
Total TPHs D+O (ND=0U) in ug/L	500									
Total TPHs D+O (ND=1/2U) in ug/L	500									
Total TPHs G+D+O (ND=0U) in ug/L	720									
Total TPHs G+D+O (ND=1/2U) in ug/L	720									
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup										
Diesel Range Hydrocarbons in ug/L	500									
Oil Range Hydrocarbons in ug/L	500									
Total TPHs D+O (ND=0U) in ug/L	500									
Total TPHs D+O (ND=1/2U) in ug/L	500									
Total TPHs G+D+O (ND=0U) in ug/L	720									
Total TPHs G+D+O (ND=1/2U) in ug/L	720									
Dissolved Metals										
Lead in ug/L	8.1									
Manganese in ug/L										
Total Metals										
Lead in ug/L	8.1									
Conventional Chemistry Parameters										
Alkalinity (Total) in mg/L as CaCO3										
Ethane in ug/L										
Ethene in ug/L										
Methane in ug/L										
Nitrate as Nitrogen in mg-N/L										
Nitrite as Nitrogen in mg-N/L										
Sulfate in mg/L										
Volatile Organic Compounds (VOC)										
1,1,1,2-Tetrachloroethane in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
1,1,1-Trichloroethane in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
1,1,2 - Trichlorotrifluoroethane in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
1,1,2,2-Tetrachloroethane in ug/l	3	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
1,1,2-Trichloroethane in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
1,1-Dichloroethane in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
1,1-Dichloroethene in ug/l	3.2	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
1,1-Dichloropropene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
1,2,3-Trichlorobenzene in ug/l		0.50 U	0.50 U	0.50 U	0.50 U	1.0 U	10 U	10 U	0.5 U	0.5 U
1,2,3-Trichloropropane in ug/l		0.50 U	0.50 U	0.50 U	0.50 U	1.0 U	10 U	10 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene in ug/l		0.50 U	0.50 U	0.50 U	0.50 U	1.0 U	10 U	10 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene in ug/l	63	0.20 U	0.20 U	0.20 U	0.20 U	0.84 U	7.6 U	4.0 U	0.2 U	0.46 U
1,2-Dibromo-3-chloropropane in ug/l		0.50 U	0.50 U	0.50 U	0.50 U	1.0 U	10 U	10 U	0.5 U	0.5 U
1,2-Dibromoethane (EDB) in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
1,2-Dichlorobenzene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
1,2-Dichloroethane (EDC) in ug/l	42	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
1,2-Dichloropropane in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
1,3,5-Trimethylbenzene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	2.3 U	36 U	9.4 U	0.2 U	1.8 U
1,3-Dichlorobenzene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
1,3-Dichloropropane in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
1,4-Dichloro-2-Butene in ug/l		1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	20 U	20 U	1 U	1 U
1,4-Dichlorobenzene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
2,2-Dichloropropane in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
2-Butanone in ug/l		5.0 U	5.0 U	5.0 U	5.0 U	10 U	100 U	100 U	5 U	5 U
2-Chloroethyl Vinyl Ether in ug/l										
2-Chlorotoluene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
2-Hexanone in ug/l		5.0 U	5.0 U	5.0 U	5.0 U	10 U	100 U	100 U	5 U	5 U
4-Chlorotoluene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
4-Methyl-2-pentanone in ug/l		5.0 U	5.0 U	5.0 U	5.0 U	10 U	100 U	100 U	5 U	5 U
Acetone in ug/l	31,896,900	5.0 U	5.0 U	5.0 U	5.0 U	10 U	100 U	100 U	5 U	5 U
Acrolein in ug/l		5.0 U	5.0 U	5.0 U	5.0 U	10 U	100 U	100 U	5 U	5 U

Aspect Consulting

2/25/2016

\\seastore2.aspect.local\projects\Port of Tacoma\Alexander Avenue Petroleum Tank Facilities\Draft Reports\RI\Appendices\Appendix B - Data Tables\B-1 to B-6 RI Data 2014-2015.xlsx

Table B-2

RI

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Table B-2 - 2014-2015 RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	B-122 7/22/14	B-123 7/21/14	B-124 7/21/14	B-125 7/21/14	B-126 7/22/14	B-127 7/15/14	B-128 7/15/14	B-129 8/25/14	B-130 8/25/14
Acrylonitrile in ug/l	0.7	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	20 U	20 U	1 U	1 U
Benzene in ug/l	24	0.20 U	0.20 U	0.20 U	2.4	120	1,200	1,000	0.2 U	23
Bromobenzene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
Bromochloromethane in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
Bromodichloromethane in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
Bromoethane in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
Bromoform in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
Bromomethane in ug/l		1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	20 U	20 U	1 U	1 U
Carbon disulfide in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
Carbon tetrachloride in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
Chlorobenzene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
Chloroethane in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
Chloroform in ug/l	12	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
Chloromethane in ug/l		0.50 U	0.50 U	0.50 U	0.50 U	1.0 U	10 U	10 U	0.5 U	0.5 U
cis-1,2-Dichloroethene (DCE) in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
cis-1,3-Dichloropropene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
Dibromochloromethane in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
Dibromomethane in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
Ethylbenzene in ug/l	130	0.20 U	0.20 U	0.20 U	0.20 U	3.7	180	120	0.2 U	1.2
Hexachlorobutadiene in ug/l	0.2	0.50 U	0.50 U	0.50 U	0.50 U	1.0 U	10 U	10 U	0.5 U	0.5 U
Isopropylbenzene in ug/l	1,614	0.20 U	0.20 U	0.72	3.3	15	21	15	2.5	8.2
Methylene chloride in ug/l	1,000	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	20 U	20 U	1 U	1 U
Methyl iodide in ug/l		1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	20 U	20 U	1 U	1 U
n-Butylbenzene in ug/l		0.20 U	0.20 U	0.20 U	0.36	1.2	5.4	5.0	0.2 U	0.45
n-Propylbenzene in ug/l	5,200	0.20 U	0.27	1.7	7.3	25	40	26	3.2	13
p-Isopropyltoluene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.72	4.0 U	5.2	0.2 U	0.27
sec-Butylbenzene in ug/l		0.20 U	0.22	0.51	0.86	2.5	4.8	4.2	0.65	1.5
Styrene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
tert-Butylbenzene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.48	4.0 U	4.0 U	0.2 U	0.28
Tetrachloroethene (PCE) in ug/l	8.9	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
Toluene in ug/l	520	0.20 U	0.20 U	0.20 U	0.32	4.3	120	73	0.21	1.7
trans-1,2-Dichloroethene in ug/l	4,000	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
trans-1,3-Dichloropropene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
Trichloroethene (TCE) in ug/l	7	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
Trichlorofluoromethane in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
Vinyl acetate in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
Vinyl chloride in ug/l	1.6	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	4.0 U	4.0 U	0.2 U	0.2 U
m,p-Xylenes in ug/l		0.40 U	0.40 U	0.40 U	0.40 U	12	260	120	0.8	7.5
o-Xylene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.62	19	18	0.2 U	0.51
Total Xylenes in ug/L		ND	ND	ND	ND	13	280	140	0.9	8.0
Naphthalene in ug/l	90	0.50 U	0.50 U	0.50 U	0.50 U	1.2	110	69	0.5 U	0.5 U
Field Parameters										
Dissolved Oxygen in mg/L		0.19	1.24	0.27	0.23	0.47	0.7	0.38	0.23	0.26
ORP in mVolts		2.3	-91.8	-109.4	-114.21	-57.5	-96.3	-85.4	-102.1	-120.4
pH in pH Units		7.33	8.29	6.98	6.81	6.66	6.56	6.67	6.85	6.92
Specific Conductance in us/cm		356.7	372.9	778	1,144	873	1,027	843	970	1,000
Temperature in deg C		18.5	16.9	19.1	19.8	18.7	17.8	18	20.1	19.8
Turbidity in NTU		543	95.2	22	9.22	36.9	387	350	20.6	15.1

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-3 - 2014-2015 RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	95C-25 10/15/14	95C-25 1/27/15	95C-25 5/20/15	95C-25 8/28/15	709-MW9-25 10/16/14	709-MW9-25 5/20/15	709-MW16-25 10/16/14	709-MW18-25 10/17/14	709-MW20-25 10/17/14	709-MW21-25 10/17/14	709-MW21-25 5/20/15	721-MW9-25 10/16/14	721-MW9-25 5/19/15	721-MW10-25 10/15/14	721-MW10-25 1/26/15	721-MW10-25 5/18/15	721-MW10-25 8/28/15	721-MW10-25 12/9/15
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
Gasoline Range Hydrocarbons in ug/L	800	250 U	250 U	250 U	250 U	250 U	320	250 U	250 U	250 U	250 U	2,000	1,200	2,500 U	350	250 U	250 U	250 U	250 U
Diesel Range Hydrocarbons in ug/L	500			3,800	3,600		6,100						3,500	2,500 J			6,100	3,600	3,400
Oil Range Hydrocarbons in ug/L	500			750	650		1,000					400		860 J			1,100	510	600
Total TPHs D+O (ND=0U) in ug/L	500			4,600	4,200		7,100					3,900		3,400			7,200	4,100	4,000
Total TPHs D+O (ND=1/2U) in ug/L	500			4,600	4,200		7,100					3,900		3,400			7,200	4,100	4,000
Total TPHs G+D+O (ND=0U) in ug/L	720			4,600	4,200		7,400					5,100		3,700			7,200	4,100	4,000
Total TPHs G+D+O (ND=1/2U) in ug/L	720			4,700	4,400		7,400					5,100		3,700			7,300	4,200	4,125
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in ug/L	500	100 U	100 U	100 U	350	100 U	100 U	100 U	100 U	100 U	100 U	210	180	100 U	100 U	100 U	100 U	100 U	350
Oil Range Hydrocarbons in ug/L	500	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Total TPHs D+O (ND=0U) in ug/L	500	ND	ND	ND	350	ND	ND	ND	ND	ND	ND	210	180	ND	ND	ND	ND	350	ND
Total TPHs D+O (ND=1/2U) in ug/L	500	ND	ND	ND	450	ND	ND	ND	ND	ND	ND	210	280	ND	ND	ND	ND	450	ND
Total TPHs G+D+O (ND=0U) in ug/L	720	ND	ND	ND	350	ND	320	ND	ND	ND	ND	2,200	1,400	ND	350	ND	ND	350	ND
Total TPHs G+D+O (ND=1/2U) in ug/L	720	ND	ND	ND	580	ND	470	ND	ND	ND	ND	2,300	1,500	ND	500	ND	ND	580	ND
Dissolved Metals																			
Lead in ug/L	8.1	0.273				0.0223 J		0.1	0.1 U	0.1 U	0.1 U		15		0.0261 J				
Manganese in ug/L								12		184									
Total Metals																			
Lead in ug/L	8.1													20	0.0373 J				
Conventional Chemistry Parameters																			
Alkalinity (Total) in mg/L as CaCO3								312		218									
Ethane in ug/L								1.2 U		1.2 U									
Ethene in ug/L								1.1 U		43.1									
Methane in ug/L								2,500		7,120									
Nitrate as Nitrogen in mg-N/L								0.5 U		0.5 U									
Nitrite as Nitrogen in mg-N/L								0.5 U		0.5 U									
Sulfate in mg/L								0.5 U		198									
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
1,1,1-Trichloroethane in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
1,1,2 - Trichlorotrifluoroethane in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
1,1,2,2-Tetrachloroethane in ug/L	3	1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
1,1,2-Trichloroethane in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
1,1-Dichloroethane in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
1,1-Dichloroethene in ug/L	3.2	1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	1.7	1.0 U	1.0 U	0.20 U	3 J	3.8	1 U	0.20 U	0.20 U	0.2 U	0.2 U
1,1-Dichloropropene in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
1,2,3-Trichlorobenzene in ug/L		2.5 U	0.50 U	0.50 U	2.5 U	5 U	0.50 U	2.5 U	1.0 U	2.5 U	2.5 U	0.50 U	5 U	5.0 U	2.5 U	0.50 U	0.50 U	0.5 U	0.5 U
1,2,3-Trichloropropane in ug/L		2.5 U	0.50 U	0.50 U	2.5 U	5 U	0.50 U	2.5 U	1.0 U	2.5 U	2.5 U	0.50 U	5 U	5.0 U	2.5 U	0.50 U	0.50 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene in ug/L		2.5 U	0.50 U	0.50 U	2.5 U	5 U	0.50 U	2.5 U	1.0 U	2.5 U	2.5 U	0.50 U	5 U	5.0 U	2.5 U	0.50 U	0.50 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.85	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
1,2-Dibromo-3-chloropropane in ug/L		2.5 U	0.50 U	0.50 U	2.5 U	5 U	0.50 U	2.5 U	1.0 U	2.5 U	2.5 U	0.50 U	5 U	5.0 U	2.5 U	0.50 U	0.50 U	0.5 U	0.5 U
1,2-Dibromoethane (EDB) in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
1,2-Dichlorobenzene in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
1,2-Dichloroethane (EDC) in ug/L	99	1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
1,2-Dichloropropane in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
1,3,5-Trimethylbenzene in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.31	1 U	0.40 U	1.0 U	5.4	2.3	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
1,3-Dichlorobenzene in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
1,3-Dichloropropane in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
1,4-Dichloro-2-Butene in ug/L		5 U	1.0 U	1.0 U	5 U	10 U	1.0 U	5 U	2.0 U	5.0 U	5.0 U	1.0 U	10 U	10 U	5 U	1.0 U	1.0 U	1 U	1 U
1,4-Dichlorobenzene in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
2,2-Dichloropropane in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
2-Butanone in ug/L		25 U	5.0 U	5.0 U	25 U	50 U	5.0 U	25 U	10 U	25 U	25 U	5.0 U	50 U	50 U	25 U	5.0 U	5.0 U	5 U	5 U
2-Chloroethyl Vinyl Ether in ug/L				1.0 U	5 U		1.0 U					1.0 U	10 U	10 U			1.0 U	1 U	1 U
2-Chlorotoluene in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
2-Hexanone in ug/L		25 U	5.0 U	5.0 U	25 U	50 U	5.0 U	25 U	10 U	25 U	25 U	5.0 U	50 U	50 U	25 U	5.0 U	5.0 U	5 U	5 U
4-Chlorotoluene in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 U	2.0 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U
4-Methyl-2-pentanone in ug/L		25 U	5.0 U	5.0 U	25 U	50 U	5.0 U	25 U	10 U	25 U	25 U	5.0 U	50 U	50 U	25 U	5.0 U	5.0 U	5 U	5 U
Acetone in ug/L		25 U	5.0 U	5.0 U	45 U	50 U	5.0 U	25 U	10 U	25 U	25 U	5.0 U	67 J	66 U	25 U	5.0 U	5.0 U	5 U	5 U
Acrolein in ug/L		25 U	5.0 U	8.2 U	25 U	50 U	25 U	25 U	10 U	25 U	25 U	24 U	50 U	50 U	25 U	5.0 U	5.0 U	0 U	5 U

Table B-3 - 2014-2015 RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	95C-25 10/15/14	95C-25 1/27/15	95C-25 5/20/15	95C-25 8/28/15	709-MW9-25 10/16/14	709-MW9-25 5/20/15	709-MW16-25 10/16/14	709-MW18-25 10/17/14	709-MW20-25 10/17/14	709-MW21-25 10/17/14	709-MW21-25 5/20/15	721-MW9-25 10/16/14	721-MW9-25 5/19/15	721-MW10-25 10/15/14	721-MW10-25 1/26/15	721-MW10-25 5/18/15	721-MW10-25 8/28/15	721-MW10-25 12/9/15
Acrylonitrile in ug/L	0.7	5 U	1.0 UJ	2.1 U	5 U	10 U	13 U	5 U	2.0 U	5.0 U	5.0 U	16 U	10 UJ	13 U	5 U	1.0 UJ	1.0 U	1 U	1 U
Benzene in ug/L	58	28	29	22	20	280	340	1 U	7.0	1.0 U	55	130	200 J	190	140	160	43	69	150 J
Bromobenzene in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromochloromethane in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromodichloromethane in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromoethane in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromoform in ug/l		1 U	0.20 UJ	0.20 U	1 UJ	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 UJ	0.20 U	0.20 UJ	0.20 U
Bromomethane in ug/L		5 U	1.0 U	1.0 UJ	5 U	10 U	1.0 UJ	5 U	2.0 U	5.0 U	5.0 U	1.0 UJ	10 UJ	10 U	5 U	1.0 U	1.0 UJ	1 U	1 U
Carbon disulfide in ug/L		1 U	0.20 UJ	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	4.9	1 U	0.20 UJ	0.20 U	0.20 U	0.20 U
Carbon tetrachloride in ug/l		1 U	0.20 U	0.20 U	1 UJ	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 UJ	0.20 U
Chlorobenzene in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloroethane in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloroform in ug/L	470	1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloromethane in ug/L		2.5 U	0.50 U	0.50 UJ	2.5 UJ	5 U	0.50 UJ	2.5 U	1.0 U	2.5 U	2.5 U	0.50 UJ	5 UJ	5.0 U	2.5 U	0.50 U	0.50 U	0.50 UJ	0.50 U
cis-1,2-Dichloroethene (DCE) in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.48	15	670	85	1.0 U	0.20 U	45 J	48	1 U	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,3-Dichloropropene in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibromochloromethane in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibromomethane in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Ethylbenzene in ug/L	130	1 U	0.20 U	0.28	1 U	2.3	2.5	1 U	0.40 U	1.0 U	2.4	1.0	3 J	3.2	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Hexachlorobutadiene in ug/L	0.2	2.5 U	0.50 U	0.50 U	2.5 U	5 U	0.50 U	2.5 U	1.0 U	2.5 U	2.5 U	0.50 U	5 UJ	5.0 U	2.5 U	0.50 U	0.50 U	0.50 U	0.50 U
Isopropylbenzene in ug/L		1.2	1.4	1.5	1 U	2 U	0.93	1 U	0.40 U	1.0 U	15	10	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Methylene chloride in ug/L	1,000	5 U	1.0 U	1.0 U	5 U	10 U	1.0 U	5 U	2.0 U	5.0 U	5.0 U	1.0 U	10 UJ	10 U	5 U	1.0 U	1.0 U	1 U	1 U
Methyl iodide in ug/L		5 U	1.0 U	1.0 U	5 U	10 U	1.0 U	5 U	2.0 U	5.0 U	5.0 U	1.0 U	10 UJ	10 U	5 U	1.0 U	1.0 U	1 U	1 U
n-Butylbenzene in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
n-Propylbenzene in ug/L		1	1.3	1.2	1 U	2 U	0.26	1 U	0.40 U	1.0 U	17	6.0	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
p-Isopropyltoluene in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.2	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
sec-Butylbenzene in ug/L		1 U	0.32 J	0.28	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	2.7	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Styrene in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
tert-Butylbenzene in ug/l		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.33	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Tetrachloroethene (PCE) in ug/L	8.9	1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Toluene in ug/L	520	1 U	0.36	0.38	1 U	3.2	4.1	1 U	0.40 U	1.0 U	6.4	6.2	2.6 J	2.8	2.9	3.3	1.5	2.4	2.8
trans-1,2-Dichloroethene in ug/L	4,000	1 U	0.20 U	0.20 U	1 U	2 U	0.31	1 U	20	36	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
trans-1,3-Dichloropropene in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene (TCE) in ug/L	7	1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.2	1.0 U	0.20 U	2.6 J	4.6	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichlorofluoromethane in ug/l		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Vinyl acetate in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	0.20 U	1 U	0.40 U	1.0 U	1.0 U	0.20 U	2 UJ	2.0 U	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Vinyl chloride in ug/L	1.6	1 U	0.20 U	0.20 U	1 U	2 U	2.5	1 U	68	95	1.0 U	0.20 U	2.6 J	3.3	1 U	0.20 U	0.20 U	0.20 U	0.20 U
m,p-Xylenes in ug/L		2 U	0.54	0.53	2 U	4 U	1.9	2 U	0.80 U	2.0 U	22	12	4 UJ	4.0 U	2 U	0.40 U	0.40 U	0.40 U	0.40 U
o-Xylene in ug/L		1 U	0.20 U	0.20 U	1 U	2 U	1.8	1 U	0.40 U	1.0 U	4.2	3.7	2.2 J	2.2	1 U	0.20 U	0.20 U	0.20 U	0.20 U
Total Xylenes in ug/L		ND	0.64	0.63		ND	3.7	ND	ND	ND	26	16	4.2 J	4.2	ND	ND	ND		
Naphthalene in ug/L	4,710	2.5 U	0.50 U	0.50 U	2.5 U	5 U	1.7	2.5 U	1.0 U	2.5 U	2.5 U	0.64	5 UJ	5.0 U	2.5 U	0.50 U	0.50 U	0.50 U	0.50 U
Field Parameters																			
Dissolved Oxygen in mg/L		0.57	0.06	0.1	0.12	1.6	0.21	0.08	2.7	0.65	0.06	0.14	0.66	0.06	0.53	0.05	0.1	0.58	0.18
ORP in mVolts		-159.5	-33.3	-157.8	88.3	-133.5	135.1	-155.2	78.7	-112.7	-75	99.7	-306.1	-347.4	126.9	22.1	-179.4	45.4	-66.4
pH in pH Units		7.43	7.61	7.61	7.42	7.84	8.01	8.98	8.5	7.85	7.44	7.08	9.85	10.40	8.31	8.63	8.26	8.17	8.56
Specific Conductance in us/cm		10,301	12,998	9,840	12,771	1,300	1,430	621	488.7	4,126	500.3	541.2	5,292	8,022	1,339	1,901	2,987	2,227	2,315
Temperature in deg C		15.7	15.1	15.7	16.6	15.2	14.3	15.1	14	14.5	15.1	14.8	14.6	15.2	15.2	14.6	15.1	16.2	14.8
Turbidity in NTU		2.52	3.04	4.73	26.0	14.5	3.52	24.7	48.3	3.67	10.8	14.7	5.11	7.67	6.97	7.86	1.01	2.65	3.02

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-3 - 2014-2015 RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW11-25 10/14/14	721-MW11-25 10/14/14 FD	721-MW12-25 10/16/14	721-MW13-25 10/17/14	721-MW15-25 10/17/14	721-MW15-25 5/19/15	MW-102-25 10/16/14	MW-102-25 1/26/15	MW-102-25 5/18/15	MW-102-25 8/27/15	MW-104-25 10/15/14	MW-104-25 1/26/15	MW-104-25 5/18/15	MW-104-25 8/28/15	MW-104-25 12/8/15	MW-105-25 10/17/14	MW-105-25 1/26/15	MW-105-25 1/26/15 FD
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
Gasoline Range Hydrocarbons in ug/L	800	250 U	250 U	710	250 U	1,700	2,200	250 U	250 U	250 UJ	2,500 U	470	250 U	660	250 U	250 U	250 U	250 U	250 U
Diesel Range Hydrocarbons in ug/L	500						8,100				4,500	4,200		7,400	2,400	1,300			
Oil Range Hydrocarbons in ug/L	500						2,500				570	570		2,100	580	400			
Total TPHs D+O (ND=0U) in ug/L	500						11,000				5,100	4,800		9,500	3,000	1,700			
Total TPHs D+O (ND=1/2U) in ug/L	500						10,600				5,100	4,800		9,500	3,000	1,700			
Total TPHs G+D+O (ND=0U) in ug/L	720						13,000				5,100	4,800		10,000	3,000	1,700			
Total TPHs G+D+O (ND=1/2U) in ug/L	720						13,000				5,200	6,000		10,000	3,100	1,825			
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in ug/L	500	110	110	120	100 U	230	170	100 U	100 U	100 U	210	100 U	100 U	100 U	260	100 U	100 U	100 U	100 U
Oil Range Hydrocarbons in ug/L	500	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Total TPHs D+O (ND=0U) in ug/L	500	110	110	120	ND	230	170	ND	ND	ND	210	ND	ND	ND	260	ND	ND	ND	ND
Total TPHs D+O (ND=1/2U) in ug/L	500	110	110	120	ND	230	270	ND	ND	ND	310	ND	ND	ND	360	ND	ND	ND	ND
Total TPHs G+D+O (ND=0U) in ug/L	720	110	110	830	ND	1,900	2,400	ND	ND	ND	210	470	ND	660	260	ND	ND	ND	ND
Total TPHs G+D+O (ND=1/2U) in ug/L	720	340	340	930	ND	2,000	2,500	ND	ND	ND	1,600	620	ND	810	480	ND	ND	ND	ND
Dissolved Metals																			
Lead in ug/L	8.1	0.0920 J	0.0152 U	0.1 U	0.1 U	0.1 U		0.1 U					0.0152 U				0.1 U		
Manganese in ug/L				470															
Total Metals																			
Lead in ug/L	8.1																		
Conventional Chemistry Parameters																			
Alkalinity (Total) in mg/L as CaCO3				502															
Ethane in ug/L				6.7															
Ethene in ug/L				1.1 U															
Methane in ug/L				17,100															
Nitrate as Nitrogen in mg-N/L				0.5 U															
Nitrite as Nitrogen in mg-N/L				0.5 U															
Sulfate in mg/L				0.5 U															
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
1,1,1-Trichloroethane in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
1,1,2 - Trichlorotrifluoroethane in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
1,1,2,2-Tetrachloroethane in ug/L	3	1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.29 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
1,1,2-Trichloroethane in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
1,1-Dichloroethane in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
1,1-Dichloroethene in ug/L	3.2	1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
1,1-Dichloropropene in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
1,2,3-Trichlorobenzene in ug/L		2.5 U	2.5 U	5 U	2.5 U	25 U	25 U	5 U	0.50 U	5.0 U	5 U	2.5 U	0.50 U	0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U
1,2,3-Trichloropropane in ug/L		2.5 U	2.5 U	5 U	2.5 U	25 U	25 U	5 U	0.50 U	5.0 U	5 U	2.5 U	0.50 U	0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene in ug/L		2.5 U	2.5 U	5 U	2.5 U	25 U	25 U	5 U	0.50 U	5.0 U	5 U	2.5 U	0.50 U	0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene in ug/l		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.35	1 U	0.2 U	1.0 U	0.20 U	0.20 U
1,2-Dibromo-3-chloropropane in ug/L		2.5 U	2.5 U	5 U	2.5 U	25 U	25 U	5 U	0.50 U	5.0 U	5 U	2.5 U	0.50 U	0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U
1,2-Dibromoethane (EDB) in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
1,2-Dichlorobenzene in ug/l		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
1,2-Dichloroethane (EDC) in ug/L	99	1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
1,2-Dichloropropane in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
1,3,5-Trimethylbenzene in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.23	1 U	0.2 U	1.0 U	0.20 U	0.20 U
1,3-Dichlorobenzene in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
1,3-Dichloropropane in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
1,4-Dichloro-2-Butene in ug/L		5 U	5 U	10 U	5.0 U	50 U	50 U	10 U	1.0 U	10 U	10 U	5 U	1.0 U	1.0 U	5 U	1 U	5.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
2,2-Dichloropropane in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
2-Butanone in ug/L		25 U	25 U	50 U	25 U	250 U	250 U	50 U	5.0 U	50 U	50 U	25 U	5.0 U	5.0 U	25 U	5 U	25 U	5.0 U	5.0 U
2-Chloroethyl Vinyl Ether in ug/L							50 U			10 U	10 U			1.0 U	5 U	1 UJ			
2-Chlorotoluene in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
2-Hexanone in ug/L		25 U	25 U	50 U	25 U	250 U	250 U	50 U	5.0 U	50 U	50 U	25 U	5.0 U	5.0 U	25 U	5 U	25 U	5.0 U	5.0 U
4-Chlorotoluene in ug/l		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
4-Methyl-2-pentanone in ug/L		25 U	25 U	50 U	25 U	250 U	250 U	50 U	5.0 U	50 U	50 U	25 U	5.0 U	5.0 U	25 U	5 U	25 U	5.0 U	5.0 U
Acetone in ug/l		25 U	25 U	50 U	25 U	250 U	250 U	50 U	5.0 U	50 U	76 U	25 U	5.0 U	6.8 U	41 U	5 UJ	25 U	5.0 U	5.0 U
Acrolein in ug/l		25 U	25 U	50 U	25 U	250 U	250 U	50 U	5.0 UJ	50 U	50 U	25 U	5.0 UJ	5.0 UJ	25 U	5 U	25 U	5.0 UJ	5.0 UJ

Aspect Consulting

2/25/2016

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Table B-3

RI

Table B-3 - 2014-2015 RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW11-25 10/14/14	721-MW11-25 10/14/14 FD	721-MW12-25 10/16/14	721-MW13-25 10/17/14	721-MW15-25 10/17/14	721-MW15-25 5/19/15	MW-102-25 10/16/14	MW-102-25 1/26/15	MW-102-25 5/18/15	MW-102-25 8/27/15	MW-104-25 10/15/14	MW-104-25 1/26/15	MW-104-25 5/18/15	MW-104-25 8/28/15	MW-104-25 12/8/15	MW-105-25 10/17/14	MW-105-25 1/26/15	MW-105-25 1/26/15 FD
Acrylonitrile in ug/L	0.7	5 U	5 U	10 U	5.0 U	50 U	71 U	10 U	1.0 UJ	10 U	10 U	5 U	1.0 UJ	1.0 U	5 U	1 U	5.0 U	1.0 UJ	1.0 UJ
Benzene in ug/L	58	13	13	360	120	1,400	1,200	330	400	310	280	51	8.2	390	73	25	140	170	160
Bromobenzene in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
Bromochloromethane in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
Bromodichloromethane in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
Bromoethane in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
Bromoform in ug/l		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 UJ	2.0 U	2 UJ	1 U	0.20 UJ	0.20 U	1 UJ	0.2 U	1.0 U	0.20 UJ	0.20 UJ
Bromomethane in ug/L		5 U	5 U	10 U	5.0 U	50 U	50 U	10 U	1.0 U	10 U	10 U	5 U	1.0 U	1.0 UJ	5 U	1 U	5.0 U	1.0 U	1.0 U
Carbon disulfide in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 UJ	2.0 U	2 U	1 U	0.20 UJ	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 UJ
Carbon tetrachloride in ug/l		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 UJ	1 U	0.20 U	0.20 U	1 UJ	0.2 U	1.0 U	0.20 U	0.20 U
Chlorobenzene in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
Chloroethane in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
Chloroform in ug/L	470	1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
Chloromethane in ug/L		2.5 U	2.5 U	5 U	2.5 U	25 U	25 U	5 U	0.50 U	5.0 U	5 U	2.5 U	0.50 U	0.50 U	2.5 UJ	0.5 U	2.5 U	0.50 U	0.50 U
cis-1,2-Dichloroethene (DCE) in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
cis-1,3-Dichloropropene in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
Dibromochloromethane in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
Dibromomethane in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
Ethylbenzene in ug/L	130	1 U	1 U	2 U	1.0 U	11	10 U	2 U	2.2	2.0 U	2 U	1 U	0.20 U	0.67	1 U	0.2 U	1.2	1.4	1.3
Hexachlorobutadiene in ug/L	0.2	2.5 U	2.5 U	5 U	2.5 U	25 U	25 U	5 U	0.50 U	5.0 U	5 U	2.5 U	0.50 U	0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U
Isopropylbenzene in ug/L		1 U	1 U	4.8	1.2	16	15	2 U	0.40	2.0 U	2 U	5.6	0.20 U	9.7	3.2	0.2 U	1.0 U	0.20 U	0.20 U
Methylene chloride in ug/L	1,000	5 U	5 U	10 U	5.0 U	50 U	50 U	10 U	1.0 U	10 U	10 U	5 U	1.0 U	1.0 U	5 U	1 U	5.0 U	1.0 U	1.0 U
Methyliodide in ug/L		5 U	5 U	10 U	5.0 U	50 U	50 U	10 U	1.0 U	10 U	10 U	5 U	1.0 U	1.0 U	5 U	1 U	5.0 U	1.0 U	1.0 U
n-Butylbenzene in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
n-Propylbenzene in ug/L		1 U	1 U	2 U	1.0 U	12	10 U	2 U	0.20 U	2.0 U	2 U	2	0.20 U	5.0	1.2	0.2 U	1.0 U	0.20 U	0.20 U
p-Isopropyltoluene in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
sec-Butylbenzene in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.87	1 U	0.2 U	1.0 U	0.20 U	0.20 U
Styrene in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
tert-Butylbenzene in ug/l		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20	1 U	0.2 U	1.0 U	0.20 U	0.20 U
Tetrachloroethene (PCE) in ug/L	8.9	1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
Toluene in ug/L	520	1 U	1 U	4.3	1.5	31	28	2.5	3.0	2.8	2.7	1.8	0.20 U	5.8	1 U	0.2 U	1.1	1.2	1.2
trans-1,2-Dichloroethene in ug/L	4,000	1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
trans-1,3-Dichloropropene in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.31	1 U	0.2 U	1.0 U	0.20 U	0.20 U
Trichloroethene (TCE) in ug/L	7	1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
Trichlorofluoromethane in ug/l		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
Vinyl acetate in ug/L		1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
Vinyl chloride in ug/L	1.6	1 U	1 U	2 U	1.0 U	10 U	10 U	2 U	0.20 U	2.0 U	2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1.0 U	0.20 U	0.20 U
m,p-Xylenes in ug/L		2 U	2 U	13	3.4	96	78	4 U	1.7	4.0 U	4 U	2 U	0.40 U	4.9	2 U	0.4 U	2.0 U	2.1	2.0
o-Xylene in ug/L		1 U	1 U	3.2	1.0 U	10 U	10 U	2 U	1.3	2.0 U	2 U	1 U	0.20 U	0.53	1 U	0.2 U	1.0 U	1.1	1.0
Total Xylenes in ug/L		ND	ND	16	3.9	100	83	ND	3.0	ND		ND	ND	5.4			ND	3.2	3.0
Naphthalene in ug/L	4,710	2.5 U	2.5 U	5 U	2.5 U	25 U	25 U	5 U	0.50 U	5.0 U	5 U	2.5 U	0.50 U	0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U
Field Parameters																			
Dissolved Oxygen in mg/L		0.13		0.13	2.34	0.59	0.12	0.15	0.38	0.14	1.48	0.1	0.24	0.06	0.10	0.12	0.52	0.21	
ORP in mVolts		134.1		-127.3	-11	-66.7	-95.5	-182.8	-28.2	116.6	95.0	-119.8	-6.1	-122.4	-90.3	-148.8	-86.1	87.0	
pH in pH Units		7.24		7.15	7	6.86	6.75	7.88	7.90	7.89	7.83	6.88	6.95	7.08	6.84	7.54	7.49	8.41	
Specific Conductance in us/cm		1,856		961	734	618	914	1,010	1,007	1,032	2,060	9,697	18,663	3,025	11,869	21,485	522.3	953	
Temperature in deg C		15.3		15.7	15.9	15.6	15.6	14.6	14.1	14.0	19.8	15.8	14.6	15.7	17.9	16.2	18	15.4	
Turbidity in NTU		37		4.34	5.81	12.5	0.96	11.5	10.2	32.5	1.41	8.72	16.3	2.58	9.97	5.11	7.68	13.7	

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-3 - 2014-2015 RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	MW-105-25 5/18/15	MW-105-25 8/27/15	MW-105-25 12/8/15	MW-110-25 10/15/14	MW-110-25 1/26/15	MW-110-25 5/18/15	MW-110-25 8/27/15	MW-110-25 12/8/15	MW-110-25 10/15/14	MW-137-25 1/27/15	MW-137-25 5/19/15	MW-137-25 8/27/15	MW-137-25 12/8/15	B-101 7/17/14	B-101 7/17/14 FD	B-102 7/17/14	B-103 8/25/14	B-104 8/25/14
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
Gasoline Range Hydrocarbons in ug/L	800	250 U	1,200 U	250 U	250 U	250 U	250 U	1,200 U	250 U	250 U	250 U	250 U	250 U	250 U	430	600	250 U	250 U	250 U
Diesel Range Hydrocarbons in ug/L	500	2,600	1,800	1,800			6,800	4,200	4,800			660	410	950					
Oil Range Hydrocarbons in ug/L	500	550	360	490			1,400	880	1,100			200 U	200 U	230					
Total TPHs D+O (ND=0U) in ug/L	500	3,200	2,200	2,290			8,200	5,100	5,900			660	410	1,180					
Total TPHs D+O (ND=1/2U) in ug/L	500	3,200	2,200	2,290			8,200	5,100	5,900			760	510	1,180					
Total TPHs G+D+O (ND=0U) in ug/L	720	3,200	2,200	2,290			8,200	5,100	5,900			660	410	1,180					
Total TPHs G+D+O (ND=1/2U) in ug/L	720	3,300	2,800	2,415			8,300	5,700	6,025			880	640	1,305					
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in ug/L	500	100 U	210	100 U	100 U	100 U	100 U	420	100 U	100 U	100 U	100 U	100 U	100 U					
Oil Range Hydrocarbons in ug/L	500	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U					
Total TPHs D+O (ND=0U) in ug/L	500	ND	210	ND	ND	ND	ND	420	ND	ND	ND	ND	ND	ND					
Total TPHs D+O (ND=1/2U) in ug/L	500	ND	310	ND	ND	ND	ND	520	ND	ND	ND	ND	ND	ND					
Total TPHs G+D+O (ND=0U) in ug/L	720	ND	210	ND	ND	ND	ND	420	ND	ND	ND	ND	ND	ND					
Total TPHs G+D+O (ND=1/2U) in ug/L	720	ND	910	ND	ND	ND	ND	1,100	ND	ND	ND	ND	ND	ND					
Dissolved Metals																			
Lead in ug/L	8.1				0.0152 U						0.0152 U								
Manganese in ug/L					361														
Total Metals																			
Lead in ug/L	8.1				0.0228 J														
Conventional Chemistry Parameters																			
Alkalinity (Total) in mg/L as CaCO3					614														
Ethane in ug/L					9.7														
Ethene in ug/L					1.1 U														
Methane in ug/L					9,130														
Nitrate as Nitrogen in mg-N/L					0.1 U														
Nitrite as Nitrogen in mg-N/L					0.1 U														
Sulfate in mg/L					6.5														
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1,1-Trichloroethane in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1,2 - Trichlorotrifluoroethane in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1,2,2-Tetrachloroethane in ug/L	3	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1,2-Trichloroethane in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1-Dichloroethane in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1-Dichloroethene in ug/L	3.2	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1-Dichloropropene in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2,3-Trichlorobenzene in ug/L		0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U	0.5 U	0.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane in ug/L		0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U	0.5 U	0.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene in ug/L		0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U	0.5 U	0.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene in ug/l		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.27
1,2-Dibromo-3-chloropropane in ug/L		0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U	0.5 U	0.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (EDB) in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2-Dichlorobenzene in ug/l		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2-Dichloroethane (EDC) in ug/L	99	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2-Dichloropropane in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,3,5-Trimethylbenzene in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,3-Dichlorobenzene in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,3-Dichloropropane in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,4-Dichloro-2-Butene in ug/L		1.0 U	5 U	1 U	5 U	1.0 U	1.0 U	5 U	1 U	5 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2,2-Dichloropropane in ug/L		0.39	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Butanone in ug/L		5.0 U	25 U	5 U	25 U	5.0 U	5.0 U	25 U	5 U	25 U	5.0 U	5.0 U	5 U	5 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chloroethyl Vinyl Ether in ug/L		1.0 U	5 U	1 U			1.0 U	5 U	1 U			1.0 U	1 U	1 U					
2-Chlorotoluene in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Hexanone in ug/L		5.0 U	25 U	5 U	25 U	5.0 U	5.0 U	25 U	5 U	25 U	5.0 U	5.0 U	5 U	5 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene in ug/l		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
4-Methyl-2-pentanone in ug/L		5.0 U	25 U	5 U	25 U	5.0 U	5.0 U	25 U	5 U	25 U	5.0 U	5.0 U	5 U	5 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone in ug/l		5.0 U	34 U	5 U	25 U	5.0 U	5.0 U	36 U	5 U	25 U	5.0 U	5.0 U	5 U	5 U	5.0 U	5.0 U	5.0 U	41	5.0 U
Acrolein in ug/l		5.0 U	25 U	5 U	25 U	5.0 U	5.0 U	25 U	5 U	25 U	5.0 U	5.0 U	5 U	5 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

Table B-3

Aspect Consulting

2/25/2016

Table B-3 - 2014-2015 RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	MW-105-25 5/18/15	MW-105-25 8/27/15	MW-105-25 12/8/15	MW-110-25 10/15/14	MW-110-25 1/26/15	MW-110-25 5/18/15	MW-110-25 8/27/15	MW-110-25 12/8/15	MW-110-25 10/15/14	MW-137-25 1/27/15	MW-137-25 5/19/15	MW-137-25 8/27/15	MW-137-25 12/8/15	B-101 7/17/14	B-101 7/17/14 FD	B-102 7/17/14	B-103 8/25/14	B-104 8/25/14
Acrylonitrile in ug/L	0.7	1.0 U	5 U	1 U	5 U	1.0 U	1.0 U	5 U	1 U	5 U	1.0 UJ	1.0 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzene in ug/L	58	67	96	210	4.2	2.2	1.8	2	1.9	48	61	9.5	3.5	34	0.54	0.45	21	780	120
Bromobenzene in ug/L		0.20 U	1 UJ	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromochloromethane in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromodichloromethane in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromoethane in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromoform in ug/l		0.20 U	1 UJ	0.2 U	1 U	0.20 U	0.20 U	1 UJ	0.2 U	1 U	0.20 UJ	0.20 U	0.2 UJ	0.2 U	0.20 UJ	0.20 UJ	0.20 UJ	0.20 U	0.20 U
Bromomethane in ug/L		1.0 UJ	5 U	1 U	5 U	1.0 UJ	1.0 UJ	5 U	1 U	5 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon disulfide in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 UJ	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.29
Carbon tetrachloride in ug/l		0.20 U	1 UJ	0.2 U	1 U	0.20 U	0.20 U	1 UJ	0.2 U	1 U	0.20 U	0.20 U	0.2 UJ	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chlorobenzene in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloroethane in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloroform in ug/L	470	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloromethane in ug/L		0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U	0.5 U	0.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-Dichloroethene (DCE) in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,3-Dichloropropene in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibromochloromethane in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibromomethane in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Ethylbenzene in ug/L	130	1.2	1 U	1.1	1 U	0.21	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	1.5	0.20 U
Hexachlorobutadiene in ug/L	0.2	0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U	0.5 U	0.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Isopropylbenzene in ug/L		0.20 U	1 U	0.2 U	1 U	0.84	0.20 U	1 U	0.2	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.45	0.51	0.20 U	0.20 U	0.20 U
Methylene chloride in ug/L	1,000	1.0 U	5 U	1 U	5 U	1.0 U	1.0 U	5 U	1 U	5 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methyl iodide in ug/L		1.0 U	5 U	1 U	5 U	1.0 U	1.0 U	5 U	1 U	5 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
n-Butylbenzene in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.26	0.25	0.20 U	0.20 U	0.20 U
n-Propylbenzene in ug/L		0.20 U	1 U	0.2	1 U	0.33	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.63	0.66	0.20 U	0.23	0.20 U
p-Isopropyltoluene in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
sec-Butylbenzene in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.33	0.34	0.20 U	0.20 U	0.20 U
Styrene in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
tert-Butylbenzene in ug/l		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Tetrachloroethene (PCE) in ug/L	8.9	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Toluene in ug/L	520	1.2	1 U	1.3	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	5.8	1.4
trans-1,2-Dichloroethene in ug/L	4,000	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
trans-1,3-Dichloropropene in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene (TCE) in ug/L	7	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichlorofluoromethane in ug/l		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Vinyl acetate in ug/L		0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Vinyl chloride in ug/L	1.6	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
m,p-Xylenes in ug/L		1.9	2 U	2.4	2 U	0.40 U	0.40 U	2 U	0.4 U	2 U	0.40 U	0.40 U	0.4 U	0.4 U	0.40 U	0.40 U	0.40 U	1.9	0.40 U
o-Xylene in ug/L		0.90	1 U	1	1 U	0.20 U	0.20 U	1 U	0.2 U	1 U	0.20 U	0.20 U	0.2 U	0.2 U	0.20 U	0.20 U	0.25	0.77	0.75
Total Xylenes in ug/L		2.8			ND	ND	ND			ND	ND	ND			ND	ND	0.45	2.7	0.95
Naphthalene in ug/L	4,710	0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U	2.5 U	0.5 U	2.5 U	0.50 U	0.50 U	0.5 U	0.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Field Parameters																			
Dissolved Oxygen in mg/L		0.09	0.10	0.49	0.14	0.18	0.03	0.08	0.43	1.8	0.05	0.33	0.13	0.14	0.46		0.45	0.25	0.15
ORP in mVolts		-186.9	29.3	753.4	-211.5	-08.0	-0249.0	185.3	-92.2	-0110	-172.6	-49.7	-99.7	-183.3	29.1		44.4	-99.9	-0190
pH in pH Units		8.30	7.97	8.71	7.8	7.34	7.70	7.84	8.00	7.81	8.01	7.79	7.94	8.14	8.2		7.82	7.16	8.27
Specific Conductance in us/cm		972	932	867	5,192	5,326	4,877	47,724	546.8	26,604	17,832	24,501	27,182	23,401	1,605		1,923	1,160	1,192
Temperature in deg C		16.1	17.2	15.6	15.5	14.0	16.2	17.5	15.5	15.7	13.9	14.0	17.3	14.6	19.9		16.3	17.9	18.4
Turbidity in NTU		3.03	5.16		12.2	1.81	4.46		3.33	3.24	3.96	0.79	0.59	1.71	125		494		

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-3 - 2014-2015 RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	B-105 7/23/14	B-110 7/23/14	B-111 7/17/14	B-112 7/21/14	B-113 7/18/14	B-114 7/18/14	B-117 7/22/14	B-118 7/22/14	B-119 8/26/14	B-120 8/26/14	B-121 8/26/14	B-122 7/22/14	B-123 7/21/14	B-124 7/21/14	B-125 7/21/14	B-126 7/22/14	B-129 8/25/14	B-130 8/25/14
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
Gasoline Range Hydrocarbons in ug/L	800	250 U	330	1,300	2,500 U		260	250 U	250 U	330	2,500 U	440	250 U	250 U	250 U	250 U	680	250 U	250 U
Diesel Range Hydrocarbons in ug/L	500																		
Oil Range Hydrocarbons in ug/L	500																		
Total TPHs D+O (ND=0U) in ug/L	500																		
Total TPHs D+O (ND=1/2U) in ug/L	500																		
Total TPHs G+D+O (ND=0U) in ug/L	720																		
Total TPHs G+D+O (ND=1/2U) in ug/L	720																		
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in ug/L	500																		
Oil Range Hydrocarbons in ug/L	500																		
Total TPHs D+O (ND=0U) in ug/L	500																		
Total TPHs D+O (ND=1/2U) in ug/L	500																		
Total TPHs G+D+O (ND=0U) in ug/L	720																		
Total TPHs G+D+O (ND=1/2U) in ug/L	720																		
Dissolved Metals																			
Lead in ug/L	8.1				40 U		40 U												
Manganese in ug/L																			
Total Metals																			
Lead in ug/L	8.1																		
Conventional Chemistry Parameters																			
Alkalinity (Total) in mg/L as CaCO3																			
Ethane in ug/L																			
Ethene in ug/L																			
Methane in ug/L																			
Nitrate as Nitrogen in mg-N/L																			
Nitrite as Nitrogen in mg-N/L																			
Sulfate in mg/L																			
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
1,1,1-Trichloroethane in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
1,1,2 - Trichlorotrifluoroethane in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
1,1,2,2-Tetrachloroethane in ug/L	3	1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
1,1,2-Trichloroethane in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
1,1-Dichloroethane in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.27	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
1,1-Dichloroethene in ug/L	3.2	1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
1,1-Dichloropropene in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
1,2,3-Trichlorobenzene in ug/L		2.5 U	0.50 U	0.50 U	5.0 U	2.5 U	2.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.0 U	0.50 U	0.50 U	0.50 U	5.0 U	0.5 U	0.5 U
1,2,3-Trichloropropane in ug/L		2.5 U	0.50 U	0.50 U	5.0 U	2.5 U	2.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.0 U	0.50 U	0.50 U	0.50 U	5.0 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene in ug/L		2.5 U	0.50 U	0.50 U	5.0 U	2.5 U	2.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.0 U	0.50 U	0.50 U	0.50 U	5.0 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene in ug/l		1.0 U	0.20 U	0.42	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
1,2-Dibromo-3-chloropropane in ug/L		2.5 U	0.50 U	0.50 U	5.0 U	2.5 U	2.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.0 U	0.50 U	0.50 U	0.50 U	5.0 U	0.5 U	0.5 U
1,2-Dibromoethane (EDB) in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
1,2-Dichlorobenzene in ug/l		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
1,2-Dichloroethane (EDC) in ug/L	99	1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
1,2-Dichloropropane in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
1,3,5-Trimethylbenzene in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.38	0.20 U	1.5	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
1,3-Dichlorobenzene in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
1,3-Dichloropropane in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
1,4-Dichloro-2-Butene in ug/L		5.0 U	1.0 U	1.0 U	10 U	5.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	10 U	1 U	1 U
1,4-Dichlorobenzene in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
2,2-Dichloropropane in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
2-Butanone in ug/L		25 U	5.0 U	7.9	50 U	25 U	25 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	50 U	5 U	5 U
2-Chloroethyl Vinyl Ether in ug/L																			
2-Chlorotoluene in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
2-Hexanone in ug/L		25 U	5.0 U	5.0 U	50 U	25 U	25 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	50 U	5 U	5 U
4-Chlorotoluene in ug/l		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
4-Methyl-2-pentanone in ug/L		25 U	5.0 U	5.0 U	50 U	25 U	25 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	50 U	5 U	5 U
Acetone in ug/l		25 U	5.0 U	5.0 U	50 U	25 U	25 U	5.0 U	5.0 U	5.0 U	76	6.1 U	10 U	5.0 U	5.0 U	5.0 U	100 U	7.4 U	52
Acrolein in ug/l		25 U	5.0 U	5.0 U	50 U	25 U	25 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	50 U	5 U	5 U

Table B-3

Aspect Consulting

2/25/2016

\\seastore2.aspect.local\projects\Port of Tacoma\Alexander Avenue Petroleum Tank Facilities\Draft Reports\RI\Appendices\Appendix B - Data Tables\B-1 to B-6 RI Data 2014-2015.xlsx

RI

Table B-3 - 2014-2015 RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	B-105 7/23/14	B-110 7/23/14	B-111 7/17/14	B-112 7/21/14	B-113 7/18/14	B-114 7/18/14	B-117 7/22/14	B-118 7/22/14	B-119 8/26/14	B-120 8/26/14	B-121 8/26/14	B-122 7/22/14	B-123 7/21/14	B-124 7/21/14	B-125 7/21/14	B-126 7/22/14	B-129 8/25/14	B-130 8/25/14
Acrylonitrile in ug/L	0.7	5.0 U	1.0 U	1.0 U	10 U	5.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	10 U	1 U	1 U
Benzene in ug/L	58	340	35	5.5	120	22	140	0.73	0.20 U	0.41	1,500	130	100	0.45	0.20 U	14	750	200	1,000
Bromobenzene in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Bromochloromethane in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Bromodichloromethane in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Bromoethane in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Bromoform in ug/l		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Bromomethane in ug/L		5.0 U	1.0 U	1.0 U	10 U	5.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	10 U	1 U	1 U
Carbon disulfide in ug/L		1.0 U	1.0	0.24	2.0 U	2.3	1.4	0.53	0.27	0.80	0.20 U	0.20 U	0.40 U	0.20 U	0.20	0.20 U	2.0 U	0.2 U	0.2 U
Carbon tetrachloride in ug/l		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Chlorobenzene in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Chloroethane in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Chloroform in ug/L	470	1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Chloromethane in ug/L		3.5	0.50 U	0.55	5.0 U	2.5 U	2.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.0 U	0.50 U	0.50 U	0.50 U	5.0 U	0.96	0.5 U
cis-1,2-Dichloroethene (DCE) in ug/L		1.0 U	0.20 U	0.20 U	18	3.8	6.5	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	19	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
cis-1,3-Dichloropropene in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Dibromochloromethane in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Dibromomethane in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Ethylbenzene in ug/L	130	1.0 U	0.20 U	0.26	2.0	1.0 U	3.6	0.20 U	0.20 U	1.2	0.73	4.6	0.40 U	0.20 U	0.20 U	0.20 U	27	0.2 U	3
Hexachlorobutadiene in ug/L	0.2	2.5 U	0.50 U	0.50 U	5.0 U	2.5 U	2.5 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	1.0 U	0.50 U	0.50 U	0.50 U	5.0 U	0.5 U	0.5 U
Isopropylbenzene in ug/L		1.0 U	0.30	5.7	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	1.2	0.20 U	0.69	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Methylene chloride in ug/L	1,000	5.0 U	1.0 U	1.0 U	10 U	5.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	10 U	1 U	1 U
Methyl iodide in ug/L		5.0 U	1.0 U	1.0 U	10 U	5.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	10 U	1 U	1 U
n-Butylbenzene in ug/L		1.0 U	0.20 U	2.0	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	1.4	0.20 U	0.52	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
n-Propylbenzene in ug/L		1.0 U	0.20 U	6.7	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	2.8	0.20 U	1.7	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
p-Isopropyltoluene in ug/L		1.0 U	0.20 U	1.6	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.46	0.20 U	0.29	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
sec-Butylbenzene in ug/L		1.0 U	0.20 U	1.9	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	1.0	0.20 U	0.35	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Styrene in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
tert-Butylbenzene in ug/l		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Tetrachloroethene (PCE) in ug/L	8.9	1.0 U	0.20 U	0.20 U	9.1	4.0	2.0	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Toluene in ug/L	520	1.8	0.24	0.20 U	2.0 U	1.0 U	1.8	0.20 U	0.20 U	0.20 U	15	0.79	0.40 U	0.20 U	0.20 U	0.20 U	23	0.37	7.5
trans-1,2-Dichloroethene in ug/L	4,000	1.0 U	0.20 U	0.20 U	2.9	1.8	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
trans-1,3-Dichloropropene in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Trichloroethene (TCE) in ug/L	7	1.0 U	0.20 U	0.20 U	14	2.0	2.2	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Trichlorofluoromethane in ug/l		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Vinyl acetate in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	1.0 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	0.20 U	0.20 U	0.20 U	2.0 U	0.2 U	0.2 U
Vinyl chloride in ug/L	1.6	1.0 U	0.20 U	0.20 U	3.0	1.4	3.2	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.40 U	160	0.42	0.20 U	2.0 U	0.2 U	0.2 U
m,p-Xylenes in ug/L		2.0 U	0.40 U	0.64	4.0 U	2.0 U	2.0 U	0.40 U	0.40 U	0.40 U	2.2	0.61	0.80 U	0.40 U	0.40 U	0.40 U	26	0.4 U	2.3
o-Xylene in ug/L		1.0 U	0.20 U	0.20 U	2.0 U	1.0 U	2.6	0.20 U	0.20 U	0.20 U	1.1	0.24	0.40 U	0.20 U	0.20 U	0.20 U	8.6	0.2 U	1.6
Total Xylenes in ug/L		ND	ND	0.74	ND	ND	3.6	ND	ND	ND	3.3	0.85	ND	ND	ND	ND	35	ND	3.9
Naphthalene in ug/L	4,710	2.5 U	0.50 U	15	5.0 U	2.5 U	2.5 U	0.50 U	0.50 U	1.0	0.50 U	0.96	1.0 U	0.50 U	0.50 U	0.50 U	5.0 U	0.5 U	0.5 U
Field Parameters																			
Dissolved Oxygen in mg/L		0.18	0.014	0.15	0.15		0.07	0.13	0.15	2.23	0.17	0.18	0.2	0.23	0.18	0.2	0.2	0.19	0.21
ORP in mVolts		-132.2	-84.7	-119.6	-195.4		-109.8	9.4	28.7	21.5	-14.3	-146.5	-3.8	-149	-157.6	-118.8	-57.7	-144.9	-87.8
pH in pH Units		7.46	7.92	7.73	9.88		10.19	8.57	8.49	8.69	7.02	7.7	7.52	7.99	7.73	7.53	6.74	7.87	7.02
Specific Conductance in us/cm		1,459	4,887	2,718	8,860		9,572	479.7	1,650	448.3	1,050	1,282	915	1,024	1,076	1,170	1,095	1,180	1,048
Temperature in deg C		15.9	15.8	19.6	17		19.1	16.9	16.2	18.9	18.4	18.3	16.3	16.4	18	18.4	17.1	18.8	17.9
Turbidity in NTU		1,000	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U	835	1,000 U	1,000 U	810	1,000 U	296	1,000 U		

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-3 - 2014-2015 RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	B-131 9/10/14	B-132 9/10/14	B-133 9/10/14	B-134 9/10/14	B-135 9/19/14	B-136 9/19/14	B-137 9/19/14	B-138 9/19/14	B-139 9/19/14
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup										
Gasoline Range Hydrocarbons in ug/L	800	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
Diesel Range Hydrocarbons in ug/L	500									
Oil Range Hydrocarbons in ug/L	500									
Total TPHs D+O (ND=0U) in ug/L	500									
Total TPHs D+O (ND=1/2U) in ug/L	500									
Total TPHs G+D+O (ND=0U) in ug/L	720									
Total TPHs G+D+O (ND=1/2U) in ug/L	720									
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup										
Diesel Range Hydrocarbons in ug/L	500									
Oil Range Hydrocarbons in ug/L	500									
Total TPHs D+O (ND=0U) in ug/L	500									
Total TPHs D+O (ND=1/2U) in ug/L	500									
Total TPHs G+D+O (ND=0U) in ug/L	720									
Total TPHs G+D+O (ND=1/2U) in ug/L	720									
Dissolved Metals										
Lead in ug/L	8.1									
Manganese in ug/L										
Total Metals										
Lead in ug/L	8.1									
Conventional Chemistry Parameters										
Alkalinity (Total) in mg/L as CaCO3										
Ethane in ug/L										
Ethene in ug/L										
Methane in ug/L										
Nitrate as Nitrogen in mg-N/L										
Nitrite as Nitrogen in mg-N/L										
Sulfate in mg/L										
Volatile Organic Compounds (VOC)										
1,1,1,2-Tetrachloroethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1,1-Trichloroethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1,2 - Trichlorotrifluoroethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1,2,2-Tetrachloroethane in ug/L	3	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1,2-Trichloroethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1-Dichloroethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.44	0.20 U
1,1-Dichloroethene in ug/L	3.2	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1-Dichloropropene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2,3-Trichlorobenzene in ug/L		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane in ug/L		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene in ug/L		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2-Dibromo-3-chloropropane in ug/L		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (EDB) in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2-Dichlorobenzene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2-Dichloroethane (EDC) in ug/L	99	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2-Dichloropropane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,3,5-Trimethylbenzene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,3-Dichlorobenzene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,3-Dichloropropane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,4-Dichloro-2-Butene in ug/L		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 U
1,4-Dichlorobenzene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2,2-Dichloropropane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Butanone in ug/L		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 U
2-Chloroethyl Vinyl Ether in ug/L										
2-Chlorotoluene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Hexanone in ug/L		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 U
4-Chlorotoluene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
4-Methyl-2-pentanone in ug/L		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 U
Acetone in ug/l		9.7 U	5.0 U	24 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acrolein in ug/l		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 U

Aspect Consulting

2/25/2016

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Table B-3

RI

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Table B-3 - 2014-2015 RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	B-131 9/10/14	B-132 9/10/14	B-133 9/10/14	B-134 9/10/14	B-135 9/19/14	B-136 9/19/14	B-137 9/19/14	B-138 9/19/14	B-139 9/19/14
Acrylonitrile in ug/L	0.7	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 U
Benzene in ug/L	58	590	90	990	0.61	0.20 U	4.4	230	11	0.20 U
Bromobenzene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromochloromethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromodichloromethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromoethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromoform in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromomethane in ug/L		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 U
Carbon disulfide in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Carbon tetrachloride in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chlorobenzene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloroethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloroform in ug/L	470	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloromethane in ug/L		0.50 U	0.58	0.50 U	0.50 U	0.50 U	0.50 U	1.6 J	0.50 U	0.50 U
cis-1,2-Dichloroethene (DCE) in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,3-Dichloropropene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibromochloromethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibromomethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Ethylbenzene in ug/L	130	0.20 U	0.20 U	0.77	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Hexachlorobutadiene in ug/L	0.2	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Isopropylbenzene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Methylene chloride in ug/L	1,000	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 U
Methyl iodide in ug/L		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 U
n-Butylbenzene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
n-Propylbenzene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
p-Isopropyltoluene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
sec-Butylbenzene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Styrene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
tert-Butylbenzene in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Tetrachloroethene (PCE) in ug/L	8.9	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Toluene in ug/L	520	0.95	0.20 U	2.3	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
trans-1,2-Dichloroethene in ug/L	4,000	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
trans-1,3-Dichloropropene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene (TCE) in ug/L	7	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichlorofluoromethane in ug/l		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Vinyl acetate in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Vinyl chloride in ug/L	1.6	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
m,p-Xylenes in ug/L		0.40 U	0.40 U	0.48	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U
o-Xylene in ug/L		0.20 U	0.20 U	0.38	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total Xylenes in ug/L		ND	ND	0.86	ND	ND	ND	ND	ND	ND
Naphthalene in ug/L	4,710	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Field Parameters										
Dissolved Oxygen in mg/L		0.19	0.2	0.1	0.35	10.51				
ORP in mVolts		29.9	39.1	49	34.5	70.6	88.6	72.1	69.5	63.1
pH in pH Units		7.90	7.58	8.09	7.71	7.76	6.75	7.75	7.98	4.9
Specific Conductance in us/cm		1,084	938	1,111	806	450.7	1,072	1,093	1,149	1,008
Temperature in deg C		16.6	16.3	17.5	15.4	17	17.9	17.7	17.1	18.2
Turbidity in NTU		1,000 U	1,000 U		805	1,000 U	1,000 U		1,000 U	1,000 U

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-4 - 2014-2015 RI Groundwater Data - 50 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	93C-50 5/20/15	721-MW13-50 10/17/14	721-MW13-50 5/19/15
Total Petroleum Hydrocarbons (TPH)				
Gasoline Range Hydrocarbons in ug/L	800	250 U	250 U	250 U
Volatile Organic Compounds (VOC)				
1,1,1,2-Tetrachloroethane in ug/L		0.20 UJ	1.0 U	1.0 U
1,1,1-Trichloroethane in ug/L		0.20 UJ	1.0 U	1.0 U
1,1,2 - Trichlorotrifluoroethane in ug/L		0.20 UJ	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane in ug/L	3	0.20 UJ	1.0 U	1.0 U
1,1,2-Trichloroethane in ug/L		0.20 UJ	1.0 U	1.0 U
1,1-Dichloroethane in ug/L		0.20 UJ	1.0 U	1.0 U
1,1-Dichloroethene in ug/L	3.2	0.20 UJ	1.0 U	1.0 U
1,1-Dichloropropene in ug/L		0.20 UJ	1.0 U	6.9
1,2,3-Trichlorobenzene in ug/L		0.50 UJ	2.5 U	2.5 U
1,2,3-Trichloropropane in ug/L		0.50 UJ	2.5 U	2.5 U
1,2,4-Trichlorobenzene in ug/L		0.50 UJ	2.5 U	2.5 U
1,2,4-Trimethylbenzene in ug/L		0.20 UJ	1.0 U	1.0 U
1,2-Dibromo-3-chloropropane in ug/L		0.50 UJ	2.5 U	2.5 U
1,2-Dibromoethane (EDB) in ug/L		0.20 UJ	1.0 U	1.0 U
1,2-Dichlorobenzene in ug/L		0.20 UJ	1.0 U	1.0 U
1,2-Dichloroethane (EDC) in ug/L	99	0.20 UJ	1.0 U	1.0 U
1,2-Dichloropropane in ug/L		0.20 UJ	1.0 U	1.0 U
1,3,5-Trimethylbenzene in ug/L		0.20 UJ	1.0 U	1.0 U
1,3-Dichlorobenzene in ug/L		0.20 UJ	1.0 U	1.0 U
1,3-Dichloropropane in ug/L		0.20 UJ	1.0 U	1.0 U
1,4-Dichloro-2-Butene in ug/L		1.0 UJ	5.0 U	5.0 U
1,4-Dichlorobenzene in ug/L		0.20 UJ	1.0 U	1.0 U
2,2-Dichloropropane in ug/L		0.20 UJ	1.0 U	1.0 U
2-Butanone in ug/L		5.0 UJ	25 U	25 U
2-Chloroethyl Vinyl Ether in ug/L		1.0 UJ		5.0 U
2-Chlorotoluene in ug/L		0.20 UJ	1.0 U	1.0 U
2-Hexanone in ug/L		5.0 UJ	25 U	25 U
4-Chlorotoluene in ug/L		0.20 UJ	1.0 U	1.0 U
4-Methyl-2-pentanone in ug/L		5.0 UJ	25 U	25 U
Acetone in ug/L		5.0 UJ	25 U	25 U
Acrolein in ug/L		5.0 UJ	25 U	25 U
Acrylonitrile in ug/L	0.7	1.0 UJ	5.0 U	5.0 U
Benzene in ug/L	58	0.48 J	120	130
Bromobenzene in ug/L		0.20 UJ	1.0 U	1.0 U
Bromochloromethane in ug/L		0.20 UJ	1.0 U	1.0 U
Bromodichloromethane in ug/L		0.20 UJ	1.0 U	1.0 U
Bromoethane in ug/L		0.20 UJ	1.0 U	1.0 U
Bromoform in ug/L		0.20 UJ	1.0 U	1.0 U
Bromomethane in ug/L		1.0 UJ	5.0 U	5.0 U
Carbon disulfide in ug/L		0.20 UJ	1.0 U	1.0 U
Carbon tetrachloride in ug/L		0.20 UJ	1.0 U	1.0 U
Chlorobenzene in ug/L		0.20 UJ	1.0 U	1.0 U
Chloroethane in ug/L		0.20 UJ	1.0 U	1.0 U
Chloroform in ug/L	470	0.20 UJ	1.0 U	1.0 U
Chloromethane in ug/L		0.50 UJ	2.5 U	2.5 U
cis-1,2-Dichloroethene (DCE) in ug/L		0.20 UJ	1.0 U	1.0 U
cis-1,3-Dichloropropene in ug/L		0.20 UJ	1.0 U	1.0 U
Dibromochloromethane in ug/L		0.20 UJ	1.0 U	1.0 U
Dibromomethane in ug/L		0.20 UJ	1.0 U	1.0 U
Ethylbenzene in ug/L	130	0.20 UJ	1.0 U	1.0 U
Hexachlorobutadiene in ug/L	0.2	0.50 UJ	2.5 U	2.5 U
Isopropylbenzene in ug/L		0.20 UJ	1.0 U	1.0 U
Methylene chloride in ug/L	1,000	1.0 UJ	5.0 U	5.0 U
Methyliodide in ug/L		1.0 UJ	5.0 U	5.0 U
n-Butylbenzene in ug/L		0.20 UJ	1.0 U	1.0 U
n-Propylbenzene in ug/L		0.20 UJ	1.0 U	1.0 U
p-Isopropyltoluene in ug/L		0.20 UJ	1.0 U	1.0 U
sec-Butylbenzene in ug/L		0.20 UJ	1.0 U	1.0 U
Styrene in ug/L		0.20 UJ	1.0 U	1.0 U
tert-Butylbenzene in ug/L		0.20 UJ	1.0 U	1.0 U
Tetrachloroethene (PCE) in ug/L	8.9	0.20 UJ	1.0 U	1.0 U
Toluene in ug/L	520	0.20 UJ	3.6	3.8
trans-1,2-Dichloroethene in ug/L	4,000	0.20 UJ	1.0 U	1.0 U
trans-1,3-Dichloropropene in ug/L		0.20 UJ	1.0 U	1.0 U
Trichloroethene (TCE) in ug/L	7	0.20 UJ	1.0 U	1.0 U
Trichlorofluoromethane in ug/L		0.20 UJ	1.0 U	1.0 U
Vinyl acetate in ug/L		0.20 UJ	1.0 U	1.0 U
Vinyl chloride in ug/L	1.6	0.20 UJ	1.0 U	1.0 U
m,p-Xylenes in ug/L		0.40 UJ	2.0 U	2.0 U
o-Xylene in ug/L		0.20 UJ	1.0 U	1.0 U
Total Xylenes in ug/L		ND	ND	ND
Naphthalene in ug/L	4,710	0.50 UJ	2.5 U	2.5 U
Field Parameters				
Dissolved Oxygen in mg/L		0.13	1.43	0.04
ORP in mVolts		-6.7	26	-4.8
pH in pH Units		7.70	8.42	8.58
Specific Conductance in us/cm		34,712	3,241	2,868
Temperature in deg C		15.9	15.1	15.2
Turbidity in NTU		4.73	9.45	3.02

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-5 - 2014-2015 RI Seep Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Porewater Potential Cleanup Level (ug/L)	SP-101 FD 7/11/14	SP-101 7/11/14	SP-101 5/19/15	SP-102 8/8/14	SP-102 5/19/15	SP-103 5/19/15
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup							
Gasoline Range Hydrocarbons in ug/L	800	330	320	250 U	250 U	250 U	250 U
Diesel Range Hydrocarbons in ug/L	500			190		520	430
Oil Range Hydrocarbons in ug/L	500			200 U		200 U	320
Total TPHs D+O (ND=0U) in ug/L	500			190		520	750
Total TPHs D+O (ND=1/2U) in ug/L	500			290		620	750
Total TPHs G+D+O (ND=0U) in ug/L	720			190		520	750
Total TPHs G+D+O (ND=1/2U) in ug/L	720			420		740	880
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup							
Diesel Range Hydrocarbons in ug/L	500	100 U	100 U	100 U	100 U	100 U	100 U
Oil Range Hydrocarbons in ug/L	500	200 U	200 U	200 U	200 U	200 U	200 U
Total TPHs D+O (ND=0U) in ug/L	500	ND	ND	ND	ND	ND	ND
Total TPHs D+O (ND=1/2U) in ug/L	500	ND	ND	150 U	ND	150 U	150 U
Total TPHs G+D+O (ND=0U) in ug/L	720	330	320	ND	ND	ND	ND
Total TPHs G+D+O (ND=1/2U) in ug/L	720	480	470	ND	ND	ND	ND
Volatile Organic Compounds (VOC)							
1,1,1,2-Tetrachloroethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1,1-Trichloroethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1,2 - Trichlorotrifluoroethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1,2,2-Tetrachloroethane in ug/L	3	0.20 UJ	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U
1,1,2-Trichloroethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1-Dichloroethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,1-Dichloroethene in ug/L	3.2	0.20 UJ	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U
1,1-Dichloropropene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2,3-Trichlorobenzene in ug/L		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,3-Trichloropropane in ug/L		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trichlorobenzene in ug/L		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2,4-Trimethylbenzene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2-Dibromo-3-chloropropane in ug/L		0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
1,2-Dibromoethane (EDB) in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2-Dichlorobenzene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2-Dichloroethane (EDC) in ug/L	99	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,2-Dichloropropane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,3,5-Trimethylbenzene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,3-Dichlorobenzene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,3-Dichloropropane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
1,4-Dichloro-2-Butene in ug/L		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2,2-Dichloropropane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Butanone in ug/L		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Chloroethyl Vinyl Ether in ug/L		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Chlorotoluene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
2-Hexanone in ug/L		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorotoluene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
4-Methyl-2-pentanone in ug/L		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone in ug/L		5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acrolein in ug/L		5.0 UJ	5.0 UJ	5.0 U	5.0 U	5.0 U	5.0 U
Acrylonitrile in ug/L	0.7	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Benzene in ug/L	58	0.20 U	0.20 U	0.26	48	0.21	2.1
Bromobenzene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromochloromethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromodichloromethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromoethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromoform in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Bromomethane in ug/L		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon disulfide in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Carbon tetrachloride in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chlorobenzene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloroethane in ug/L		0.20 UJ	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U
Chloroform in ug/L	470	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chloromethane in ug/L		0.50 U	0.50 U	0.50 U	1.8 J	0.50 U	0.50 U
cis-1,2-Dichloroethene (DCE) in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,3-Dichloropropene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibromochloromethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Dibromomethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Ethylbenzene in ug/L	130	0.20 U	0.20 U	0.20 U	0.32	0.20 U	0.20 U
Hexachlorobutadiene in ug/L	0.2	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Isopropylbenzene in ug/L		0.20 U	0.20 U	0.20 U	1.0	0.29	0.20 U
Methylene chloride in ug/L	1,000	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methyliodide in ug/L		1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
n-Butylbenzene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
n-Propylbenzene in ug/L		0.20 U	0.20 U	0.20 U	0.79	0.20 U	0.20 U
p-Isopropyltoluene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
sec-Butylbenzene in ug/L		0.20 U	0.20 U	0.20 U	0.21	0.20 U	0.20 U
Styrene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
tert-Butylbenzene in ug/L		0.30	0.28	0.20 U	0.20 U	0.21	0.20 U
Tetrachloroethene (PCE) in ug/L	8.9	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Toluene in ug/L	520	0.20 U	0.20 U	0.20 U	0.50	0.20 U	0.20 U
trans-1,2-Dichloroethene in ug/L	4,000	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
trans-1,3-Dichloropropene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichloroethene (TCE) in ug/L	7	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Trichlorofluoromethane in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Vinyl acetate in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Vinyl chloride in ug/L	1.6	0.20 UJ	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U
m,p-Xylenes in ug/L		0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U
o-Xylene in ug/L		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Total Xylenes in ug/L		ND	ND	ND	ND	ND	ND
Naphthalene in ug/L	4,710	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.62
Field Parameters							
Dissolved Oxygen in mg/L			1.72	1.34	1.07	1.45	3
ORP in mVolts			-89	-39.6	-12.6	-42.2	-52.3
pH in pH Units			7.21	8.23	7.83	9.01	8.30
Specific Conductance in us/cm			22,690	29,816	6,116	37,253	33,605
Temperature in deg C			16.1	13.3	14.6	12.6	13.1
Turbidity in NTU			3.42	1.28	6.28	4.08	9.58

Notes
Concentrations in shaded cells indicate value exceeds Porewater Potential Cleanup Level (ug/L)

J - Analyte was positively identified. The reported result is an estimate.
U - Analyte was not detected at or above the reported result.
UJ - Analyte was not detected at or above the reported estimate

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Table B-5

Table B-6 - 2014-2015 RI Sediment Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Table with columns for Chemical Name, Sediment Screening Level (mg/kg), and various sampling locations (SS-101 to SS-112, SS-BKGRD-1 to SS-BKGRD-2C). Rows include Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup, Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup, Conventional Chemistry Parameters, Polycyclic Aromatic Hydrocarbons (PAHs), and Volatile Organic Compounds (VOC).

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Table B-6

RI

Page 1 of 2

Table B-6 - 2014-2015 RI Sediment Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Sediment Screening Level (mg/kg)	SS-101 7/24/14	SS-102 7/24/14	SS-103 7/24/14	SS-104 FD 7/24/14	SS-104 7/24/14	SS-105 7/24/14	SS-106 7/25/14	SS-107 7/25/14	SS-108 7/25/14	SS-109 7/24/14	SS-110 7/24/14	SS-111 7/24/14	SS-112 7/25/14	SS-BKGRD-1 7/25/14	SS-BKGRD-2 (Composite) 7/25/14	SS-BKGRD-2A 7/25/14	SS-BKGRD-2C 7/25/14
1,3,5-Trimethylbenzene in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
1,3-Dichlorobenzene in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
1,3-Dichloropropane in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
1,4-Dichloro-2-Butene in mg/kg		0.005 U	0.0053 U	0.0086 U	0.0045 U	0.0046 U	0.0066 U	0.0055 U	0.0028 U	0.0029 U	0.007 U	0.0087 U	0.0053 U	0.0034 U	0.0023 U		0.0045 U	0.0037 U
1,4-Dichlorobenzene in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
2,2-Dichloropropane in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
2-Butanone in mg/kg		0.045 J	0.0048 J	0.0075 J	0.012 J	0.01 J	0.027 J	0.071 J	0.067 J	0.086 J	0.007 U	0.021 J	0.0094 J	0.01 J	0.0066 J		0.005 U	0.0075 J
2-Chloroethyl Vinyl Ether in mg/kg		0.005 U	0.0053 U	0.0086 U	0.0045 U	0.0046 U	0.0066 U	0.0055 U	0.0028 U	0.0029 U	0.007 U	0.0087 U	0.0053 U	0.0034 U	0.0023 U		0.0045 U	0.0037 U
2-Chlorotoluene in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
2-Hexanone in mg/kg		0.005 U	0.0053 U	0.0086 U	0.0045 U	0.0046 U	0.0066 U	0.0055 U	0.0028 U	0.0029 U	0.007 U	0.0087 U	0.0053 U	0.0034 U	0.0023 U		0.0045 U	0.0037 U
4-Chlorotoluene in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
4-Methyl-2-pentanone in mg/kg		0.005 U	0.0053 U	0.0086 U	0.0045 U	0.0046 U	0.0066 U	0.0055 U	0.0028 U	0.0029 U	0.007 U	0.0087 U	0.0053 U	0.0034 U	0.0023 U		0.0045 U	0.0037 U
Acetone in mg/kg		0.22 J	0.038 J	0.071 J	0.071 J	0.069 J	0.13 J	0.32 J	0.25 J	0.28 J	0.17 J	0.098 J	0.047 J	0.045 J	0.035 J		0.058 J	0.069 J
Acrolein in mg/kg		0.05 U	0.053 U	0.086 U	0.045 U	0.046 U	0.066 U	0.055 U	0.028 U	0.029 U	0.07 U	0.087 U	0.053 U	0.034 U	0.023 U		0.045 U	0.023 U
Acrylonitrile in mg/kg		0.005 U	0.0053 U	0.0086 U	0.0045 U	0.0046 U	0.0066 U	0.0055 U	0.0028 U	0.0029 U	0.007 U	0.0087 U	0.0053 U	0.0034 U	0.0023 U		0.0045 U	0.0037 U
Benzene in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0008 U	0.0061 U	0.057 U	0.001 J	0.0008 U	0.0005 U		0.0009 U	0.0005 J
Bromobenzene in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Bromochloromethane in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Bromodichloromethane in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Bromoethane in mg/kg		0.002 U	0.0021 U	0.0034 U	0.0018 U	0.0019 U	0.0026 U	0.0022 U	0.0011 U	0.0011 U	0.0028 U	0.0035 U	0.0021 U	0.0014 U	0.0009 U		0.0018 U	0.0015 U
Bromoform in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Bromomethane in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Carbon disulfide in mg/kg		0.02 J	0.0069 J	0.017 J	0.016 J	0.017 J	0.022 J	0.015 J	0.0073 J	0.036 J	0.059 J	0.037 J	0.062 J	0.0087 J	0.018 J		0.0057 J	0.016 J
Carbon tetrachloride in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Chlorobenzene in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Chloroethane in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Chloroform in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0021 U	0.0022 U	0.0003 J	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Chloromethane in mg/kg		0.001 U	0.0011 U	0.0017 U	0.005 J	0.0045 J	0.0013 U	0.0014 J	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0028 J	0.0044 J
cis-1,2-Dichloroethene (DCE) in mg/kg		0.0007 J	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0006 U	0.0027 U	0.0005 J	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0009 U
cis-1,3-Dichloropropene in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Dibromochloromethane in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Dibromomethane in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Dichlorodifluoromethane in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Ethylbenzene in mg/kg	0.01	0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Hexachlorobutadiene in mg/kg	0.011	0.005 U	0.0053 U	0.0086 U	0.0045 U	0.0046 U	0.0066 U	0.0055 U	0.0008 J	0.0029 U	0.007 U	0.0087 U	0.0053 U	0.0034 U	0.0023 U		0.0045 U	0.0037 U
Isopropylbenzene in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Methyl tert-butyl ether (MTBE) in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Methylene chloride in mg/kg		0.0023 U	0.0021 U	0.0048 U	0.0018 U	0.0019 U	0.0039 U	0.002 U	0.0023 U	0.0011 U	0.0028 U	0.0035 U	0.0021 U	0.0032 U	0.0009 U		0.0018 U	0.0015 U
Methyliodide in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
n-Butylbenzene in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
n-Propylbenzene in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
p-Isopropyltoluene in mg/kg		0.0006 J	0.0011 U	0.001 J	0.0009 U	0.0009 U	0.0014 U	0.0006 J	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0008 U
sec-Butylbenzene in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Styrene in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
tert-Butylbenzene in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Tetrachloroethene (PCE) in mg/kg	0.057	0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0006 J	0.0041 U	0.0004 J	0.0014 U	0.0017 U	0.0006 J	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Toluene in mg/kg		0.0014 U	0.0007 J	0.0011 J	0.0006 J	0.0009 U	0.0014 U	0.0012 U	0.0011 U	0.0008 U	0.0022 U	0.0014 J	0.001 J	0.001 U	0.0003 J		0.0009 U	0.0008 U
trans-1,2-Dichloroethene in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
trans-1,3-Dichloropropene in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Trichloroethene (TCE) in mg/kg		0.0009 J	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0025 U	0.002 U	0.0007 U	0.001 J	0.0017 U	0.0034 U	0.0004 J	0.0005 U		0.0009 U	0.0025 U
Trichlorofluoromethane in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
Vinyl acetate in mg/kg		0.005 U	0.0053 U	0.0086 U	0.0045 U	0.0046 U	0.0066 U	0.0055 U	0.0028 U	0.0029 U	0.007 U	0.0087 U	0.0053 U	0.0034 U	0.0023 U		0.0045 U	0.0037 U
Vinyl chloride in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
m,p-Xylenes in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0003 J	0.0006 U	0.0014 U	0.0017 U	0.0011 U	0.0007 U	0.0005 U		0.0009 U	0.0007 U
o-Xylene in mg/kg		0.001 U	0.0011 U	0.0017 U	0.0009 U	0.0009 U	0.0013 U	0.0011 U	0.0006 U									

Table B-7 - PSE Tacoma LNG Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	B-2 5/20/14 (2 ft.)	B-2 5/20/14 (8 ft.)	B-4 5/20/14 (2 ft.)	B-4 5/20/14 (8 ft.)	B-5 5/21/14 (2 ft.)	B-5 5/21/14 (8 ft.)	B-6 5/21/14 (2 ft.)	B-6 5/21/14 (8 ft.)	B-7 5/27/14 (2 ft.)	B-7 5/27/14 (8 ft.)	B-8 5/21/14 (6 ft.)	B-8 5/21/14 (11 ft.)	B-9 5/29/14 (7 ft.)	B-9 5/29/14 (13 ft.)	B-10 5/22/14 (2 ft.)	B-10 5/22/14 (7 ft.)	B-10 5/22/14 (13 ft.)	B-11 5/21/14 (8 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
Gasoline Range Hydrocarbons in mg/kg	30	6.8 U	7.3 U	7.9 U	8.2 U					6.7 U	8.2 U					5.6 U	5.3 U	6.6 U	
Diesel Range Hydrocarbons in mg/kg	2,000	29 U	32 U	34 U	37 U	27 U	32 U	27 U	30 U	27 U	32 U	26 U	34 U	27 U	34 U	27 U	26 U	36 U	40 U
Oil Range Hydrocarbons in mg/kg	2,000	59 U	63 U	67 U	73 U	55 U	64 U	53 U	59 U	54 U	65 U	53 U	68 U	54 U	67 U	54 U	52 U	72 U	79 U
Total TPHs D+O (ND=1/2U) in mg/kg	2,000	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U
Total Metals																			
Arsenic in mg/kg	20	12 U	13 U	13 U	15 U	11 U	13 U	11 U	12 U	11 U	13 U	11 U	14 U	11 U	13 U	11 U	10 U	14 U	16 U
Cadmium in mg/kg		0.59 U	0.63 U	0.67 U	0.73 U	0.55 U	0.64 U	0.53 U	0.59 U	0.54 U	0.65 U	0.53 U	0.68 U	0.54 U	0.67 U	0.54 U	0.52 U	0.72 U	0.79 U
Chromium (Total) in mg/kg		14	11	7.9	20	9.5	9.5	8.2	7.5	14	9.5	7.8	12	8.6	13	33	7.6	18	16
Copper in mg/kg	36	9.5	7.3	12	30	12	11	8.6	6.7	10	9.6	8.1	20	9.4	13	11	9.1	33	20
Lead in mg/kg	1,000	5.9 U	6.3 U	6.7 U	7.3 U	5.5 U	6.4 U	5.3 U	5.9 U	5.4 U	6.5 U	5.3 U	6.8 U	5.4 U	6.7 U	5.4 U	5.2 U	7.2 U	7.9 U
Mercury in mg/kg		0.29 U	0.32 U	0.34 U	0.37 U	0.27 U	0.32 U	0.27 U	0.3 U	0.27 U	0.32 U	0.26 U	0.34 U	0.27 U	0.34 U	0.27 U	0.26 U	0.36 U	0.4 U
Polycyclic Aromatic Hydrocarbons (PAHs)																			
Acenaphthene in mg/kg	210,000	0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
Acenaphthylene in mg/kg		0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
Anthracene in mg/kg	1,050,000	0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
Benzo(g,h,i)perylene in mg/kg		0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
Benzo(j,k)fluoranthene in mg/kg		0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
Dibenzofuran in mg/kg	3,500	0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Fluoranthene in mg/kg	140,000	0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
Fluorene in mg/kg	140,000	0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
Phenanthrene in mg/kg		0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
Pyrene in mg/kg	105,000	0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
1-Methylnaphthalene in mg/kg	4,500	0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
2-Methylnaphthalene in mg/kg	14,000	0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
Naphthalene in mg/kg	6	0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
Benz(a)anthracene in mg/kg		0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
Benzo(a)pyrene in mg/kg		0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
Benzo(b)fluoranthene in mg/kg		0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
Chrysene in mg/kg		0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
Dibenzo(a,h)anthracene in mg/kg		0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
Indeno(1,2,3-cd)pyrene in mg/kg		0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
Other (Non-PAH) Semivolatiles																			
1,2,4-Trichlorobenzene in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
1,2-Dichlorobenzene in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
1,2-Dinitrobenzene in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
1,2-Diphenylhydrazine in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
1,3-Dichlorobenzene in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
1,3-Dinitrobenzene in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
1,4-Dichlorobenzene in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
1,4-Dinitrobenzene in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
2,3,4,6-Tetrachlorophenol in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
2,3,5,6-Tetrachlorophenol in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
2,3-Dichloroaniline in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
2,4,5-Trichlorophenol in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
2,4,6-Trichlorophenol in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
2,4-Dichlorophenol in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
2,4-Dimethylphenol in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
2,4-Dinitrophenol in mg/kg		0.2 U	0.21 U	0.22 U	0.24 U					0.18 U	0.22 U					0.18 U	0.17 U	0.24 U	
2-Chloronaphthalene in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
2-Chlorophenol in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
2-Methylphenol in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
2-Nitroaniline in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
2-Nitrophenol in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
3 & 4 Methylphenol in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
3,3'-Dichlorobenzidine in mg/kg		0.2 U	0.21 U	0.22 U	0.24 U					0.18 U	0.22 U					0.18 U	0.17 U	0.24 U	
3-Nitroaniline in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
4,6-Dinitro-2-methylphenol in mg/kg		0.2 U	0.21 U	0.22 U	0.24 U					0.18 U	0.22 U					0.18 U	0.17 U	0.24 U	
4-Bromophenyl phenyl ether in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
4-Chloro-3-methylphenol in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	

Table B-7 - PSE Tacoma LNG Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	B-2 5/20/14 (2 ft.)	B-2 5/20/14 (8 ft.)	B-4 5/20/14 (2 ft.)	B-4 5/20/14 (8 ft.)	B-5 5/21/14 (2 ft.)	B-5 5/21/14 (8 ft.)	B-6 5/21/14 (2 ft.)	B-6 5/21/14 (8 ft.)	B-7 5/27/14 (2 ft.)	B-7 5/27/14 (8 ft.)	B-8 5/21/14 (6 ft.)	B-8 5/21/14 (11 ft.)	B-9 5/29/14 (7 ft.)	B-9 5/29/14 (13 ft.)	B-10 5/22/14 (2 ft.)	B-10 5/22/14 (7 ft.)	B-10 5/22/14 (13 ft.)	B-11 5/21/14 (8 ft.)
4-Chloroaniline in mg/kg		0.2 U	0.21 U	0.22 U	0.24 U					0.18 U	0.22 U					0.18 U	0.17 U	0.24 U	
4-Chlorophenyl phenyl ether in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
4-Nitroaniline in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
4-Nitrophenol in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Aniline in mg/kg		0.2 U	0.21 U	0.22 U	0.24 U					0.18 U	0.22 U					0.18 U	0.17 U	0.24 U	
Benzidine in mg/kg		0.39 U	0.42 U	0.45 U	0.49 U					0.36 U	0.43 U					0.36 U	0.35 U	0.48 U	
Benzyl alcohol in mg/kg		0.2 U	0.21 U	0.22 U	0.24 U					0.18 U	0.22 U					0.18 U	0.17 U	0.24 U	
Benzyl butyl phthalate in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Bis(2-chloroethoxy)methane in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Bis(2-chloroethyl) ether in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
bis(2-Chloroisopropyl)ether in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Bis(2-ethylhexyl) adipate in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Bis(2-ethylhexyl) phthalate in mg/kg	0.03	0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Carbazole in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Diethyl phthalate in mg/kg	2,800,000	0.2 U	0.21 U	0.22 U	0.24 U					0.18 U	0.22 U					0.18 U	0.17 U	0.24 U	
Dimethyl phthalate in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Di-n-butyl phthalate in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Di-n-octyl phthalate in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Hexachlorobenzene in mg/kg	0.01	0.0078 U	0.0084 U	0.009 U	0.0097 U					0.0072 U	0.0086 U					0.0071 U	0.0069 U	0.0096 U	
Hexachlorobutadiene in mg/kg	0.01	0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Hexachlorocyclopentadiene in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Hexachloroethane in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Isophorone in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Nitrobenzene in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
N-Nitrosodimethylamine in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
N-Nitroso-di-n-propylamine in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
N-Nitrosodiphenylamine in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Pentachlorophenol in mg/kg	0.1	0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Phenol in mg/kg	1,050,000	0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Pyridine in mg/kg		0.39 U	0.42 U	0.45 U	0.49 U					0.36 U	0.43 U					0.36 U	0.35 U	0.48 U	
2,4-Dinitrotoluene in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
2,6-Dinitrotoluene in mg/kg		0.039 U	0.042 U	0.045 U	0.049 U					0.036 U	0.043 U					0.036 U	0.035 U	0.048 U	
Volatiles Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
1,1,1-Trichloroethane in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
1,1,2,2-Tetrachloroethane in mg/kg	700	0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
1,1,2-Trichloroethane in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
1,1-Dichloroethane in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
1,1-Dichloroethene in mg/kg	175,000	0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
1,1-Dichloropropene in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
1,2,3-Trichlorobenzene in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
1,2,3-Trichloropropane in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
1,2,4-Trichlorobenzene in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
1,2,4-Trimethylbenzene in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.027	0.0012 U	0.0015 U	
1,2-Dibromo-3-chloropropane in mg/kg		0.0079 U	0.0082 U	0.0079 U	0.0089 U					0.0058 U	0.0065 U					0.0048 U	0.0058 U	0.0075 U	
1,2-Dibromoethane (EDB) in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
1,2-Dichlorobenzene in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
1,2-Dichloroethane (EDC) in mg/kg	1,000	0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
1,2-Dichloropropane in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
1,3,5-Trimethylbenzene in mg/kg	35,000	0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.0082	0.0012 U	0.0015 U	
1,3-Dichlorobenzene in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
1,3-Dichloropropane in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
1,4-Dichlorobenzene in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
2,2-Dichloropropane in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
2-Butanone in mg/kg		0.0079 U	0.0082 U	0.0079 U	0.0089 U					0.0058 U	0.0065 U					0.0048 U	0.0058 U	0.0093	
2-Chloroethyl Vinyl Ether in mg/kg		0.0079 U	0.0082 U	0.0079 U	0.0089 U					0.0058 U	0.0065 U					0.0048 U	0.0058 U	0.0075 U	
2-Chlorotoluene in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
2-Hexanone in mg/kg		0.0079 U	0.0082 U	0.0079 U	0.0089 U					0.0058 U	0.0065 U					0.0048 U	0.0058 U	0.0075 U	
4-Chlorotoluene in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
4-Methyl-2-pentanone in mg/kg		0.0079 U	0.0082 U	0.0079 U	0.0089 U					0.0058 U	0.0065 U					0.0048 U	0.0058 U	0.0075 U	

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Appendix B-7

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Table B-7 - PSE Tacoma LNG Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	B-2 5/20/14 (2 ft.)	B-2 5/20/14 (8 ft.)	B-4 5/20/14 (2 ft.)	B-4 5/20/14 (8 ft.)	B-5 5/21/14 (2 ft.)	B-5 5/21/14 (8 ft.)	B-6 5/21/14 (2 ft.)	B-6 5/21/14 (8 ft.)	B-7 5/27/14 (2 ft.)	B-7 5/27/14 (8 ft.)	B-8 5/21/14 (6 ft.)	B-8 5/21/14 (11 ft.)	B-9 5/29/14 (7 ft.)	B-9 5/29/14 (13 ft.)	B-10 5/22/14 (2 ft.)	B-10 5/22/14 (7 ft.)	B-10 5/22/14 (13 ft.)	B-11 5/21/14 (8 ft.)
Acetone in mg/kg	3,150,000	0.0079 U	0.0082 U	0.0079 U	0.02 Y					0.0058 U	0.0065 U					0.0048 U	0.0058 U	0.036 Y	
Benzene in mg/kg	0.02	0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Bromobenzene in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Bromochloromethane in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Bromodichloromethane in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Bromoform in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Bromomethane in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Carbon disulfide in mg/kg		0.0016 U	0.003 Y	0.0016 U	0.0061 Y					0.0012 U	0.0031 U					0.00097 U	0.0012 U	0.0076 U	
Carbon tetrachloride in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Chlorobenzene in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Chloroethane in mg/kg		0.0079 U	0.0082 U	0.0079 U	0.0089 U					0.0058 U	0.0065 U					0.0048 U	0.0058 U	0.0075 U	
Chloroform in mg/kg	4,000	0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Chloromethane in mg/kg		0.0079 U	0.0082 U	0.0079 U	0.0089 U					0.0058 U	0.0065 U					0.0048 U	0.0058 U	0.0075 U	
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
cis-1,3-Dichloropropene in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Dibromochloromethane in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Dibromomethane in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Dichlorodifluoromethane in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Ethylbenzene in mg/kg	0.06	0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.0031 U	0.0012 U	0.0015 U	
Hexachlorobutadiene in mg/kg	0.01	0.0079 U	0.0082 U	0.0079 U	0.0089 U					0.0058 U	0.0065 U					0.0048 U	0.0058 U	0.0075 U	
Isopropylbenzene in mg/kg	350,000	0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.0019 U	0.0012 U	0.0015 U	
Methyl tert-butyl ether (MTBE) in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Methylene chloride in mg/kg	20,000	0.0079 U	0.0082 U	0.0079 U	0.0089 U					0.0058 U	0.0065 U					0.0048 U	0.0058 U	0.0075 U	
Methyliodide in mg/kg		0.0079 U	0.0082 U	0.0079 U	0.0089 U					0.0058 U	0.0065 U					0.0048 U	0.0058 U	0.0075 U	
n-Butylbenzene in mg/kg	175,000	0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.0085 U	0.0012 U	0.0015 U	
n-Propylbenzene in mg/kg	350,000	0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.0047 U	0.0012 U	0.0015 U	
p-Isopropyltoluene in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.0036 U	0.0012 U	0.0015 U	
sec-Butylbenzene in mg/kg	350,000	0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.0048 U	0.0012 U	0.0015 U	
Styrene in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
tert-Butylbenzene in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Tetrachloroethene (PCE) in mg/kg	0.005	0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Toluene in mg/kg	280,000	0.0079 U	0.0082 U	0.0079 U	0.0089 U					0.0058 U	0.0065 U					0.0048 U	0.0058 U	0.0075 U	
trans-1,2-Dichloroethene in mg/kg	70,000	0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
trans-1,3-Dichloropropene in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Trichloroethene (TCE) in mg/kg	0.005	0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Trichlorofluoromethane in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Vinyl acetate in mg/kg		0.0079 U	0.0082 U	0.0079 U	0.0089 U					0.0058 U	0.0065 U					0.0048 U	0.0058 U	0.0075 U	
Vinyl chloride in mg/kg	0.005	0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
m,p-Xylenes in mg/kg		0.0032 U	0.0033 U	0.0032 U	0.0036 U					0.0023 U	0.0026 U					0.012 U	0.0023 U	0.003 U	
o-Xylene in mg/kg		0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.0054 U	0.0012 U	0.0015 U	
Naphthalene in mg/kg	6	0.0016 U	0.0016 U	0.0016 U	0.0018 U					0.0012 U	0.0013 U					0.00097 U	0.0012 U	0.0015 U	
Polychlorinated Biphenyls (PCBs)																			
Aroclor 1016 in mg/kg		0.0029 U	0.0032 U	0.0034 U	0.0037 U					0.0027 U	0.0032 U					0.0025 U	0.0026 U	0.0036 U	
Aroclor 1221 in mg/kg		0.0029 U	0.0032 U	0.0034 U	0.0037 U					0.0027 U	0.0032 U					0.0025 U	0.0026 U	0.0036 U	
Aroclor 1232 in mg/kg		0.0029 U	0.0032 U	0.0034 U	0.0037 U					0.0027 U	0.0032 U					0.0025 U	0.0026 U	0.0036 U	
Aroclor 1242 in mg/kg		0.0029 U	0.0032 U	0.0034 U	0.0037 U					0.0027 U	0.0032 U					0.0025 U	0.0026 U	0.0036 U	
Aroclor 1248 in mg/kg		0.0029 U	0.0032 U	0.0034 U	0.0037 U					0.0027 U	0.0032 U					0.0025 U	0.0026 U	0.0036 U	
Aroclor 1254 in mg/kg		0.0029 U	0.0032 U	0.0034 U	0.0037 U					0.0027 U	0.0032 U					0.0025 U	0.0026 U	0.0036 U	
Aroclor 1260 in mg/kg		0.0029 U	0.0032 U	0.0034 U	0.0037 U					0.0027 U	0.0032 U					0.0025 U	0.0026 U	0.0036 U	

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

U - Analyte was not detected at or above the reported result.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Table B-7 - PSE Tacoma LNG Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	B-11 5/21/14 (12 ft.)	B-12 5/30/14 (2 ft.)	B-12 5/30/14 (7 ft.)	B-12 5/30/14 (13 ft.)	B-13 5/30/14 (7 ft.)	B-13 5/30/14 (13 ft.)	B-14 5/30/14 (7 ft.)	B-14 5/30/14 (13 ft.)	B-15 6/2/14 (2 ft.)	B-15 6/2/14 (7 ft.)	B-15 6/2/14 (13 ft.)	B-16 6/2/14 (2 ft.)	B-16 6/2/14 (7 ft.)	B-16 6/2/14 (13 ft.)	B-17 5/28/14 (2 ft.)	B-17 5/28/14 (8 ft.)	B-18 5/27/14 (2 ft.)	B-18 5/27/14 (8 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
Gasoline Range Hydrocarbons in mg/kg	30		6.7 U	7.3 U	6.9 U					5.3 U	5.8 U	7.5 U	5.3 U			5.8 U	6.6 U	5.8 U	5.1 U
Diesel Range Hydrocarbons in mg/kg	2,000	35 U	30 U	31 U	31 U	26 U	36 U	33 U	32 U	26 U	27 U	36 U	27 U	26 U	33 U	28 U	29 U	27 U	27 U
Oil Range Hydrocarbons in mg/kg	2,000	70 U	61 U	62 U	61 U	52 U	72 U	66 U	63 U	53 U	54 U	72 U	54 U	52 U	66 U	57 U	58 U	53 U	54 U
Total TPHs D+O (ND=1/2U) in mg/kg	2,000	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U
Total Metals																			
Arsenic in mg/kg	20	14 U	12 U	12 U	12 U	10 U	14 U	13 U	13 U	11 U	11 U	14 U	11 U	10 U	13 U	11 U	12 U	11 U	11 U
Cadmium in mg/kg		0.7 U	0.61 U	0.62 U	0.61 U	0.52 U	0.72 U	0.66 U	0.63 U	0.53 U	0.54 U	0.72 U	0.54 U	0.52 U	0.66 U	0.57 U	0.58 U	0.53 U	0.54 U
Chromium (Total) in mg/kg		8.1	30	7.6	9.7	11	15	12	9.7	28	9.2	13	36	8.6	10	25	9.6	22	14
Copper in mg/kg	36	11	11	7.7	8.4	13	25	10	9.7	11	9	19	10	8.1	11	13	12	12	11
Lead in mg/kg	1,000	7 U	6.1 U	6.2 U	6.1 U	5.2 U	7.2 U	6.6 U	6.3 U	5.3 U	5.4 U	7.2 U	5.4 U	5.2 U	6.6 U	5.7 U	5.8 U	5.3 U	35
Mercury in mg/kg		0.35 U	0.3 U	0.31 U	0.31 U	0.26 U	0.36 U	0.33 U	0.32 U	0.26 U	0.27 U	0.36 U	0.27 U	0.26 U	0.33 U	0.28 U	0.29 U	0.27 U	0.27 U
Polycyclic Aromatic Hydrocarbons (PAHs)																			
Acenaphthene in mg/kg	210,000		0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.0096 U	0.0071 U			0.0075 U	0.0078 U	0.0071 U	0.0072 U
Acenaphthylene in mg/kg			0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.0096 U	0.0071 U			0.0075 U	0.0078 U	0.0071 U	0.0072 U
Anthracene in mg/kg	1,050,000		0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.0096 U	0.0071 U			0.0075 U	0.0078 U	0.0071 U	0.0072 U
Benzo(g,h,i)perylene in mg/kg			0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.0096 U	0.0071 U			0.0075 U	0.0078 U	0.0071 U	0.0072 U
Benzo(j,k)fluoranthene in mg/kg			0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.0096 U	0.0071 U			0.0075 U	0.0078 U	0.0071 U	0.0072 U
Dibenzofuran in mg/kg	3,500		0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
Fluoranthene in mg/kg	140,000		0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.0096 U	0.0071 U			0.0075 U	0.0078 U	0.011	0.0072 U
Fluorene in mg/kg	140,000		0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.0096 U	0.0071 U			0.0075 U	0.0078 U	0.0071 U	0.0072 U
Phenanthrene in mg/kg			0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.015	0.0071 U			0.0075 U	0.0078 U	0.0088	0.0072 U
Pyrene in mg/kg	105,000		0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.0096 U	0.0071 U			0.0075 U	0.0078 U	0.015	0.0072 U
1-Methylnaphthalene in mg/kg	4,500		0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.0096 U	0.0071 U			0.0075 U	0.0078 U	0.0071 U	0.0072 U
2-Methylnaphthalene in mg/kg	14,000		0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.0096 U	0.0071 U			0.0075 U	0.0078 U	0.0071 U	0.0072 U
Naphthalene in mg/kg	6		0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.0096 U	0.0071 U			0.0075 U	0.0078 U	0.0071 U	0.0072 U
Benz(a)anthracene in mg/kg			0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.0096 U	0.0071 U			0.0075 U	0.0078 U	0.0084	0.0072 U
Benzo(a)pyrene in mg/kg			0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.0096 U	0.0071 U			0.0075 U	0.0078 U	0.0085	0.0072 U
Benzo(b)fluoranthene in mg/kg			0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.0096 U	0.0071 U			0.0075 U	0.0078 U	0.0071 U	0.0072 U
Chrysene in mg/kg			0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.0096 U	0.0071 U			0.0075 U	0.0078 U	0.0081	0.0072 U
Dibenzo(a,h)anthracene in mg/kg			0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.0096 U	0.0071 U			0.0075 U	0.0078 U	0.0071 U	0.0072 U
Indeno(1,2,3-cd)pyrene in mg/kg			0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.0096 U	0.0071 U			0.0075 U	0.0078 U	0.0071 U	0.0072 U
Other (Non-PAH) Semivolatiles																			
1,2,4-Trichlorobenzene in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
1,2-Dichlorobenzene in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
1,2-Dinitrobenzene in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
1,2-Diphenylhydrazine in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
1,3-Dichlorobenzene in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
1,3-Dinitrobenzene in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
1,4-Dichlorobenzene in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
1,4-Dinitrobenzene in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
2,3,4,6-Tetrachlorophenol in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
2,3,5,6-Tetrachlorophenol in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
2,3-Dichloroaniline in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
2,4,5-Trichlorophenol in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
2,4,6-Trichlorophenol in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
2,4-Dichlorophenol in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
2,4-Dimethylphenol in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
2,4-Dinitrophenol in mg/kg			0.2 U	0.21 U	0.2 U					0.18 U	0.18 U	0.24 U	0.18 U			0.19 U	0.19 U	0.18 U	0.18 U
2-Chloronaphthalene in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
2-Chlorophenol in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
2-Methylphenol in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
2-Nitroaniline in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
2-Nitrophenol in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
3 & 4 Methylphenol in mg/kg																0.038 U	0.039 U	0.035 U	0.036 U
3,3'-Dichlorobenzidine in mg/kg			0.2 U	0.21 U	0.2 U					0.18 U	0.18 U	0.24 U	0.18 U			0.19 U	0.19 U	0.18 U	0.18 U
3-Nitroaniline in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
4,6-Dinitro-2-methylphenol in mg/kg			0.2 U	0.21 U	0.2 U					0.18 U	0.18 U	0.24 U	0.18 U			0.19 U	0.19 U	0.18 U	0.18 U
4-Bromophenyl phenyl ether in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
4-Chloro-3-methylphenol in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U

Table B-7 - PSE Tacoma LNG Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	B-11 5/21/14 (12 ft.)	B-12 5/30/14 (2 ft.)	B-12 5/30/14 (7 ft.)	B-12 5/30/14 (13 ft.)	B-13 5/30/14 (7 ft.)	B-13 5/30/14 (13 ft.)	B-14 5/30/14 (7 ft.)	B-14 5/30/14 (13 ft.)	B-15 6/2/14 (2 ft.)	B-15 6/2/14 (7 ft.)	B-15 6/2/14 (13 ft.)	B-16 6/2/14 (2 ft.)	B-16 6/2/14 (7 ft.)	B-16 6/2/14 (13 ft.)	B-17 5/28/14 (2 ft.)	B-17 5/28/14 (8 ft.)	B-18 5/27/14 (2 ft.)	B-18 5/27/14 (8 ft.)
4-Chloroaniline in mg/kg			0.2 U	0.21 U	0.2 U					0.18 U	0.18 U	0.24 U	0.18 U			0.19 U	0.19 U	0.18 U	0.18 U
4-Chlorophenyl phenyl ether in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
4-Nitroaniline in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
4-Nitrophenol in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
Aniline in mg/kg			0.2 U	0.21 U	0.2 U					0.18 U	0.18 U	0.24 U	0.18 U			0.19 U	0.19 U	0.18 U	0.18 U
Benzidine in mg/kg			0.4 U	0.41 U	0.41 U					0.35 U	0.36 U	0.48 U	0.36 U			0.38 U	0.39 U	0.35 U	0.36 U
Benzyl alcohol in mg/kg			0.2 U	0.21 U	0.2 U					0.18 U	0.18 U	0.24 U	0.18 U			0.19 U	0.19 U	0.18 U	0.18 U
Benzyl butyl phthalate in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
Bis(2-chloroethoxy)methane in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
Bis(2-chloroethyl) ether in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
bis(2-Chloroisopropyl)ether in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
Bis(2-ethylhexyl) adipate in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
Bis(2-ethylhexyl) phthalate in mg/kg	0.03		0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.16
Carbazole in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
Diethyl phthalate in mg/kg	2,800,000		0.2 U	0.21 U	0.2 U					0.18 U	0.18 U	0.24 U	0.18 U			0.19 U	0.19 U	0.18 U	0.18 U
Dimethyl phthalate in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
Di-n-butyl phthalate in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
Di-n-octyl phthalate in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
Hexachlorobenzene in mg/kg	0.01		0.0081 U	0.0083 U	0.0082 U					0.007 U	0.0073 U	0.0096 U	0.0071 U			0.0075 U	0.0078 U	0.0071 U	0.0072 U
Hexachlorobutadiene in mg/kg	0.01		0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
Hexachlorocyclopentadiene in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
Hexachloroethane in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
Isophorone in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
Nitrobenzene in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
N-Nitrosodimethylamine in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
N-Nitroso-di-n-propylamine in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
N-Nitrosodiphenylamine in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
Pentachlorophenol in mg/kg	0.1		0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
Phenol in mg/kg	1,050,000		0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
Pyridine in mg/kg			0.4 U	0.41 U	0.41 U					0.35 U	0.36 U	0.48 U	0.36 U			0.38 U	0.39 U	0.35 U	0.36 U
2,4-Dinitrotoluene in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
2,6-Dinitrotoluene in mg/kg			0.04 U	0.041 U	0.041 U					0.035 U	0.036 U	0.048 U	0.036 U			0.038 U	0.039 U	0.035 U	0.036 U
Volatiles Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
1,1,1-Trichloroethane in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
1,1,2,2-Tetrachloroethane in mg/kg	700		0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
1,1,2-Trichloroethane in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
1,1-Dichloroethane in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
1,1-Dichloroethene in mg/kg	175,000		0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
1,1-Dichloropropene in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
1,2,3-Trichlorobenzene in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
1,2,3-Trichloropropane in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
1,2,4-Trichlorobenzene in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
1,2,4-Trimethylbenzene in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
1,2-Dibromo-3-chloropropane in mg/kg			0.005 U	0.0064 U	0.0044 U					0.005 U	0.0061 U	0.0062 U	0.0053 U			0.0057 U	0.005 U	0.0061 U	0.0073 U
1,2-Dibromoethane (EDB) in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
1,2-Dichlorobenzene in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
1,2-Dichloroethane (EDC) in mg/kg	1,000		0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
1,2-Dichloropropane in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
1,3,5-Trimethylbenzene in mg/kg	35,000		0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
1,3-Dichlorobenzene in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
1,3-Dichloropropane in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
1,4-Dichlorobenzene in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
2,2-Dichloropropane in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
2-Butanone in mg/kg			0.005 U	0.0064 U	0.0044 U					0.005 U	0.0061 U	0.0062 U	0.0053 U			0.0057 U	0.005 U	0.0061 U	0.0073 U
2-Chloroethyl Vinyl Ether in mg/kg			0.005 U	0.0064 U	0.0044 U					0.005 U	0.0061 U	0.0062 U	0.0053 U			0.0057 U	0.005 U	0.0061 U	0.0073 U
2-Chlorotoluene in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
2-Hexanone in mg/kg			0.005 U	0.0064 U	0.0044 U					0.005 U	0.0061 U	0.0062 U	0.0053 U			0.0057 U	0.005 U	0.0061 U	0.0073 U
4-Chlorotoluene in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
4-Methyl-2-pentanone in mg/kg			0.005 U	0.0064 U	0.0044 U					0.005 U	0.0061 U	0.0062 U	0.0053 U			0.0057 U	0.005 U	0.0061 U	0.0073 U

Table B-7 - PSE Tacoma LNG Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	B-11 5/21/14 (12 ft.)	B-12 5/30/14 (2 ft.)	B-12 5/30/14 (7 ft.)	B-12 5/30/14 (13 ft.)	B-13 5/30/14 (7 ft.)	B-13 5/30/14 (13 ft.)	B-14 5/30/14 (7 ft.)	B-14 5/30/14 (13 ft.)	B-15 6/2/14 (2 ft.)	B-15 6/2/14 (7 ft.)	B-15 6/2/14 (13 ft.)	B-16 6/2/14 (2 ft.)	B-16 6/2/14 (7 ft.)	B-16 6/2/14 (13 ft.)	B-17 5/28/14 (2 ft.)	B-17 5/28/14 (8 ft.)	B-18 5/27/14 (2 ft.)	B-18 5/27/14 (8 ft.)
Acetone in mg/kg	3,150,000		0.005 U	0.0064 U	0.015 Y					0.005 U	0.0061 U	0.017 Y	0.0053 U			0.0057 U	0.005 U	0.0061 U	0.0073 U
Benzene in mg/kg	0.02		0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Bromobenzene in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Bromochloromethane in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Bromodichloromethane in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Bromoform in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Bromomethane in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Carbon disulfide in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.004 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Carbon tetrachloride in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Chlorobenzene in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Chloroethane in mg/kg			0.005 U	0.0064 U	0.0044 U					0.005 U	0.0061 U	0.0062 U	0.0053 U			0.0057 U	0.005 U	0.0061 U	0.0073 U
Chloroform in mg/kg	4,000		0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Chloromethane in mg/kg			0.005 U	0.0064 U	0.0044 U					0.005 U	0.0061 U	0.0062 U	0.0053 U			0.0057 U	0.005 U	0.0061 U	0.0073 U
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000		0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
cis-1,3-Dichloropropene in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Dibromochloromethane in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Dibromomethane in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Dichlorodifluoromethane in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Ethylbenzene in mg/kg	0.06		0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Hexachlorobutadiene in mg/kg	0.01		0.005 U	0.0064 U	0.0044 U					0.005 U	0.0061 U	0.0062 U	0.0053 U			0.0057 U	0.005 U	0.0061 U	0.0073 U
Isopropylbenzene in mg/kg	350,000		0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Methyl tert-butyl ether (MTBE) in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Methylene chloride in mg/kg	20,000		0.005 U	0.0064 U	0.0044 U					0.005 U	0.0061 U	0.0062 U	0.0053 U			0.0057 U	0.005 U	0.0061 U	0.0073 U
Methyliodide in mg/kg			0.005 U	0.0064 U	0.0044 U					0.005 U	0.0061 U	0.0062 U	0.0053 U			0.0057 U	0.005 U	0.0061 U	0.0073 U
n-Butylbenzene in mg/kg	175,000		0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
n-Propylbenzene in mg/kg	350,000		0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
p-Isopropyltoluene in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
sec-Butylbenzene in mg/kg	350,000		0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Styrene in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
tert-Butylbenzene in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Tetrachloroethene (PCE) in mg/kg	0.005		0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0026 U	0.001 U	0.0012 U	0.0015 U
Toluene in mg/kg	280,000		0.005 U	0.0064 U	0.0044 U					0.005 U	0.0061 U	0.0062 U	0.0053 U			0.0057 U	0.005 U	0.0061 U	0.0073 U
trans-1,2-Dichloroethene in mg/kg	70,000		0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
trans-1,3-Dichloropropene in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Trichloroethene (TCE) in mg/kg	0.005		0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Trichlorofluoromethane in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Vinyl acetate in mg/kg			0.005 U	0.0064 U	0.0044 U					0.005 U	0.0061 U	0.0062 U	0.0053 U			0.0057 U	0.005 U	0.0061 U	0.0073 U
Vinyl chloride in mg/kg	0.005		0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
m,p-Xylenes in mg/kg			0.002 U	0.0026 U	0.0018 U					0.002 U	0.0024 U	0.0025 U	0.0021 U			0.0023 U	0.002 U	0.0024 U	0.0029 U
o-Xylene in mg/kg			0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Naphthalene in mg/kg	6		0.001 U	0.0013 U	0.00088 U					0.001 U	0.0012 U	0.0012 U	0.0011 U			0.0011 U	0.001 U	0.0012 U	0.0015 U
Polychlorinated Biphenyls (PCBs)																			
Aroclor 1016 in mg/kg			0.003 U	0.0031 U	0.0031 U					0.0026 U	0.0027 U	0.0036 U	0.0027 U			0.0028 U	0.0029 U	0.0027 U	0.0027 U
Aroclor 1221 in mg/kg			0.003 U	0.0031 U	0.0031 U					0.0026 U	0.0027 U	0.0036 U	0.0027 U			0.0028 U	0.0029 U	0.0027 U	0.0027 U
Aroclor 1232 in mg/kg			0.003 U	0.0031 U	0.0031 U					0.0026 U	0.0027 U	0.0036 U	0.0027 U			0.0028 U	0.0029 U	0.0027 U	0.0027 U
Aroclor 1242 in mg/kg			0.003 U	0.0031 U	0.0031 U					0.0026 U	0.0027 U	0.0036 U	0.0027 U			0.0028 U	0.0029 U	0.0027 U	0.0027 U
Aroclor 1248 in mg/kg			0.003 U	0.0031 U	0.0031 U					0.0026 U	0.0027 U	0.0036 U	0.0027 U			0.0028 U	0.0029 U	0.0027 U	0.0027 U
Aroclor 1254 in mg/kg			0.003 U	0.0031 U	0.0031 U					0.0026 U	0.0027 U	0.0036 U	0.0027 U			0.0028 U	0.0029 U	0.0027 U	0.0027 U
Aroclor 1260 in mg/kg			0.003 U	0.0031 U	0.0031 U					0.0026 U	0.0027 U	0.0036 U	0.0027 U			0.0028 U	0.0029 U	0.0027 U	0.0027 U

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

U - Analyte was not detected at or above the reported result.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Table B-7 - PSE Tacoma LNG Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	B-19 5/29/14 (2 ft.)	B-19 5/29/14 (8 ft.)	B-20 5/21/14 (2 ft.)	B-20 5/21/14 (8 ft.)	B-21 5/28/14 (2 ft.)	B-21 5/28/14 (8 ft.)	B-22 5/21/14 (2 ft.)	B-22 5/21/14 (8 ft.)	B-23 5/20/14 (2 ft.)	B-23 5/20/14 (8 ft.)	B-24 5/27/14 (2 ft.)	B-24 5/27/14 (8 ft.)	B-26 5/20/14 (2 ft.)	B-26 5/20/14 (8 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup															
Gasoline Range Hydrocarbons in mg/kg	30	4.7 U	6.9 U	5.6 U	12 U	7.1 U	7.9 U	5.9 U	7.5 U	5.8 U	7.6 U	8.5 U	7 U	6.7 U	5.3 U
Diesel Range Hydrocarbons in mg/kg	2,000	29 U	31 U	27 U	5,900	32 U	33 U	32	32 U	27 U	33 U	32 U	30 U	30 U	27 U
Oil Range Hydrocarbons in mg/kg	2,000	57 U	61 U	53 U	740 N1	63 U	66 U	76	65 U	55 U	66 U	64 U	61 U	59 U	54 U
Total TPHs D+O (ND=1/2U) in mg/kg	2,000	ND U	ND U	ND U	6,190	ND U	ND U	86	ND U	ND U	ND U	ND U	ND U	ND U	ND U
Total Metals															
Arsenic in mg/kg	20	11 U	12 U	11 U	12 U	13 U	13 U	11 U	13 U	11 U	13 U	13 U	12 U		
Cadmium in mg/kg		0.57 U	0.61 U	0.53 U	0.58 U	0.63 U	0.66 U	0.54 U	0.65 U	0.55 U	0.66 U	0.64 U	0.61 U		
Chromium (Total) in mg/kg		11	12	12	12	11	9.9	8.5	7.6	8.5	11	12	11		
Copper in mg/kg	36	11	11	21	13	10	9.2	9.1	8.4	36	18	11	11		
Lead in mg/kg	1,000	5.7 U	6.1 U	28	35	6.3 U	6.6 U	5.4 U	6.5 U	160	18	6.4 U	6.1 U		
Mercury in mg/kg		0.29 U	0.31 U	0.27 U	0.29 U	0.32 U	0.33 U	0.27 U	0.32 U	0.27 U	0.33 U	0.32 U	0.3 U		
Polycyclic Aromatic Hydrocarbons (PAHs)															
Acenaphthene in mg/kg	210,000	0.0076 U	0.0082 U	0.0071 U	0.024	0.0084 U	0.0088 U	0.0072 U	0.0086 U	0.0073 U	0.0087 U				
Acenaphthylene in mg/kg		0.0076 U	0.0082 U	0.0071 U	0.058	0.0084 U	0.0088 U	0.0072 U	0.0086 U	0.0073 U	0.0087 U				
Anthracene in mg/kg	1,050,000	0.0076 U	0.0082 U	0.0071 U	0.016	0.0084 U	0.0088 U	0.0072 U	0.0086 U	0.0073 U	0.0087 U				
Benzo(g,h,i)perylene in mg/kg		0.0076 U	0.0082 U	0.0071 U	0.015 U	0.0084 U	0.0088 U	0.0072 U	0.0086 U	0.016	0.0087 U				
Benzo(j,k)fluoranthene in mg/kg		0.0076 U	0.0082 U	0.0071 U	0.015 U	0.0084 U	0.0088 U	0.0072 U	0.0086 U	0.012	0.0087 U				
Dibenzofuran in mg/kg	3,500	0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Fluoranthene in mg/kg	140,000	0.0076 U	0.0082 U	0.0071 U	0.015 U	0.0084 U	0.0088 U	0.0072 U	0.0086 U	0.012	0.0087 U				
Fluorene in mg/kg	140,000	0.0076 U	0.0082 U	0.0071 U	0.033	0.0084 U	0.0088 U	0.0072 U	0.0086 U	0.0073 U	0.0087 U				
Phenanthrene in mg/kg		0.0076 U	0.0082 U	0.0071 U	0.015	0.0084 U	0.0088 U	0.011	0.0086 U	0.0088	0.0087 U				
Pyrene in mg/kg	105,000	0.013	0.0096	0.0071 U	0.034	0.0084 U	0.0088 U	0.0072 U	0.0086 U	0.015	0.0087 U				
1-Methylnaphthalene in mg/kg	4,500	0.0076 U	0.0082 U	0.0071 U	0.2	0.0084 U	0.0088 U	0.0076	0.0086 U	0.0073 U	0.0087 U				
2-Methylnaphthalene in mg/kg	14,000	0.0076 U	0.0082 U	0.0071 U	0.19	0.0084 U	0.0088 U	0.0072 U	0.0086 U	0.0073 U	0.0087 U				
Naphthalene in mg/kg	6	0.0076 U	0.0082 U	0.0071 U	0.099	0.0084 U	0.0088 U	0.0072 U	0.0086 U	0.0073 U	0.0087 U				
Benz(a)anthracene in mg/kg		0.0076 U	0.0082 U	0.0071 U	0.015 U	0.0084 U	0.0088 U	0.0072 U	0.0086 U	0.01	0.0087 U				
Benzo(a)pyrene in mg/kg		0.0076 U	0.0082 U	0.0071 U	0.015 U	0.0084 U	0.0088 U	0.0072 U	0.0086 U	0.014	0.0087 U				
Benzo(b)fluoranthene in mg/kg		0.0076 U	0.0082 U	0.0071 U	0.015 U	0.0084 U	0.0088 U	0.0072 U	0.0086 U	0.013	0.0099				
Chrysene in mg/kg		0.0076 U	0.0082 U	0.0071 U	0.022	0.0084 U	0.0088 U	0.0072 U	0.0086 U	0.012	0.0087 U				
Dibenzo(a,h)anthracene in mg/kg		0.0076 U	0.0082 U	0.0071 U	0.015 U	0.0084 U	0.0088 U	0.0072 U	0.0086 U	0.0073 U	0.0087 U				
Indeno(1,2,3-cd)pyrene in mg/kg		0.0076 U	0.0082 U	0.0071 U	0.015 U	0.0084 U	0.0088 U	0.0072 U	0.0086 U	0.011	0.0087 U				
Other (Non-PAH) Semivolatiles															
1,2,4-Trichlorobenzene in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
1,2-Dichlorobenzene in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
1,2-Dinitrobenzene in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
1,2-Diphenylhydrazine in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
1,3-Dichlorobenzene in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
1,3-Dinitrobenzene in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
1,4-Dichlorobenzene in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
1,4-Dinitrobenzene in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
2,3,4,6-Tetrachlorophenol in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
2,3,5,6-Tetrachlorophenol in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
2,3-Dichloroaniline in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
2,4,5-Trichlorophenol in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
2,4,6-Trichlorophenol in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
2,4-Dichlorophenol in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
2,4-Dimethylphenol in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
2,4-Dinitrophenol in mg/kg		0.19 U	0.2 U	0.18 U	0.96 U	0.21 U	0.22 U	0.18 U	0.22 U	0.18 U	0.22 U				
2-Chloronaphthalene in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
2-Chlorophenol in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
2-Methylphenol in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
2-Nitroaniline in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
2-Nitrophenol in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
3 & 4 Methylphenol in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
3,3'-Dichlorobenzidine in mg/kg		0.19 U	0.2 U	0.18 U	0.96 U	0.21 U	0.22 U	0.18 U	0.22 U	0.18 U	0.22 U				
3-Nitroaniline in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
4,6-Dinitro-2-methylphenol in mg/kg		0.19 U	0.2 U	0.18 U	0.96 U	0.21 U	0.22 U	0.18 U	0.22 U	0.18 U	0.22 U				
4-Bromophenyl phenyl ether in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
4-Chloro-3-methylphenol in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				

Table B-7 - PSE Tacoma LNG Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	B-19 5/29/14 (2 ft.)	B-19 5/29/14 (8 ft.)	B-20 5/21/14 (2 ft.)	B-20 5/21/14 (8 ft.)	B-21 5/28/14 (2 ft.)	B-21 5/28/14 (8 ft.)	B-22 5/21/14 (2 ft.)	B-22 5/21/14 (8 ft.)	B-23 5/20/14 (2 ft.)	B-23 5/20/14 (8 ft.)	B-24 5/27/14 (2 ft.)	B-24 5/27/14 (8 ft.)	B-26 5/20/14 (2 ft.)	B-26 5/20/14 (8 ft.)
4-Chloroaniline in mg/kg		0.19 U	0.2 U	0.18 U	0.96 U	0.21 U	0.22 U	0.18 U	0.22 U	0.18 U	0.22 U				
4-Chlorophenyl phenyl ether in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
4-Nitroaniline in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
4-Nitrophenol in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Aniline in mg/kg		0.19 U	0.2 U	0.18 U	0.96 U	0.21 U	0.22 U	0.18 U	0.22 U	0.18 U	0.22 U				
Benzidine in mg/kg		0.38 U	0.41 U	0.36 U	1.9 U	0.42 U	0.44 U	0.36 U	0.43 U	0.36 U	0.44 U				
Benzyl alcohol in mg/kg		0.19 U	0.2 U	0.18 U	0.96 U	0.21 U	0.22 U	0.18 U	0.22 U	0.18 U	0.22 U				
Benzyl butyl phthalate in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Bis(2-chloroethoxy)methane in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Bis(2-chloroethyl) ether in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
bis(2-Chloroisopropyl)ether in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Bis(2-ethylhexyl) adipate in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Bis(2-ethylhexyl) phthalate in mg/kg	0.03	0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Carbazole in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Diethyl phthalate in mg/kg	2,800,000	0.19 U	0.2 U	0.18 U	0.96 U	0.21 U	0.22 U	0.18 U	0.22 U	0.18 U	0.22 U				
Dimethyl phthalate in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Di-n-butyl phthalate in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Di-n-octyl phthalate in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Hexachlorobenzene in mg/kg	0.01	0.0076 U	0.0082 U	0.0071 U	0.039 U	0.0084 U	0.0088 U	0.0072 U	0.0086 U	0.0073 U	0.0087 U				
Hexachlorobutadiene in mg/kg	0.01	0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Hexachlorocyclopentadiene in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Hexachloroethane in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Isophorone in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Nitrobenzene in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
N-Nitrosodimethylamine in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
N-Nitroso-di-n-propylamine in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
N-Nitrosodiphenylamine in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Pentachlorophenol in mg/kg	0.1	0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Phenol in mg/kg	1,050,000	0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Pyridine in mg/kg		0.38 U	0.41 U	0.36 U	1.9 U	0.42 U	0.44 U	0.36 U	0.43 U	0.36 U	0.44 U				
2,4-Dinitrotoluene in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
2,6-Dinitrotoluene in mg/kg		0.038 U	0.041 U	0.036 U	0.19 U	0.042 U	0.044 U	0.036 U	0.043 U	0.036 U	0.044 U				
Volatile Organic Compounds (VOC)															
1,1,1,2-Tetrachloroethane in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
1,1,1-Trichloroethane in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
1,1,2,2-Tetrachloroethane in mg/kg	700	0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
1,1,2-Trichloroethane in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
1,1-Dichloroethane in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
1,1-Dichloroethene in mg/kg	175,000	0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
1,1-Dichloropropene in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
1,2,3-Trichlorobenzene in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
1,2,3-Trichloropropane in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
1,2,4-Trichlorobenzene in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
1,2,4-Trimethylbenzene in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
1,2-Dibromo-3-chloropropane in mg/kg		0.0069 U	0.006 U	0.006 U	0.33 U	0.0068 U	0.0066 U	0.29 U	0.0076 U	0.0078 U	0.0066 U	0.0068 U	0.0056 U		
1,2-Dibromoethane (EDB) in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
1,2-Dichlorobenzene in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
1,2-Dichloroethane (EDC) in mg/kg	1,000	0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
1,2-Dichloropropane in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
1,3,5-Trimethylbenzene in mg/kg	35,000	0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
1,3-Dichlorobenzene in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
1,3-Dichloropropane in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
1,4-Dichlorobenzene in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
2,2-Dichloropropane in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
2-Butanone in mg/kg		0.0069 U	0.006 U	0.006 U	0.33 U	0.0068 U	0.0066 U	0.29 U	0.0076 U	0.0078 U	0.0066 U	0.0068 U	0.0056 U		
2-Chloroethyl Vinyl Ether in mg/kg		0.0069 U	0.006 U	0.006 U	0.33 U	0.0068 U	0.0066 U	0.29 U	0.0076 U	0.0078 U	0.0066 U	0.0068 U	0.0056 U		
2-Chlorotoluene in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
2-Hexanone in mg/kg		0.0069 U	0.006 U	0.006 U	0.33 U	0.0068 U	0.0066 U	0.29 U	0.0076 U	0.0078 U	0.0066 U	0.0068 U	0.0056 U		
4-Chlorotoluene in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
4-Methyl-2-pentanone in mg/kg		0.0069 U	0.006 U	0.006 U	0.33 U	0.0068 U	0.0066 U	0.29 U	0.0076 U	0.0078 U	0.0066 U	0.0068 U	0.0056 U		

Table B-7 - PSE Tacoma LNG Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	B-19 5/29/14 (2 ft.)	B-19 5/29/14 (8 ft.)	B-20 5/21/14 (2 ft.)	B-20 5/21/14 (8 ft.)	B-21 5/28/14 (2 ft.)	B-21 5/28/14 (8 ft.)	B-22 5/21/14 (2 ft.)	B-22 5/21/14 (8 ft.)	B-23 5/20/14 (2 ft.)	B-23 5/20/14 (8 ft.)	B-24 5/27/14 (2 ft.)	B-24 5/27/14 (8 ft.)	B-26 5/20/14 (2 ft.)	B-26 5/20/14 (8 ft.)
Acetone in mg/kg	3,150,000	0.0098 Y	0.01 Y	0.006 U	0.33 U	0.0068 U	0.0066 U	0.29 U	0.0076 U	0.0078 U	0.0066 U	0.0068 U	0.043		
Benzene in mg/kg	0.02	0.0014 U	0.0019 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.014		
Bromobenzene in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Bromochloromethane in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Bromodichloromethane in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Bromoform in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Bromomethane in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Carbon disulfide in mg/kg		0.0014 U	0.004 U	0.0012 U	0.065 U	0.0014 U	0.004 U	0.059 U	0.0017 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Carbon tetrachloride in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Chlorobenzene in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Chloroethane in mg/kg		0.0069 U	0.006 U	0.006 U	0.33 U	0.0068 U	0.0066 U	0.29 U	0.0076 U	0.0078 U	0.0066 U	0.0068 U	0.0056 U		
Chloroform in mg/kg	4,000	0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Chloromethane in mg/kg		0.0069 U	0.006 U	0.006 U	0.33 U	0.0068 U	0.0066 U	0.29 U	0.0076 U	0.0078 U	0.0066 U	0.0068 U	0.0056 U		
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
cis-1,3-Dichloropropene in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Dibromochloromethane in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Dibromomethane in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Dichlorodifluoromethane in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Ethylbenzene in mg/kg	0.06	0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0021		
Hexachlorobutadiene in mg/kg	0.01	0.0069 U	0.006 U	0.006 U	0.33 U	0.0068 U	0.0066 U	0.29 U	0.0076 U	0.0078 U	0.0066 U	0.0068 U	0.0056 U		
Isopropylbenzene in mg/kg	350,000	0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.043		
Methyl tert-butyl ether (MTBE) in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Methylene chloride in mg/kg	20,000	0.0083 H	0.0095 H	0.006 U	0.33 U	0.0068 U	0.0066 U	0.29 U	0.0076 U	0.0078 U	0.0066 U	0.0068 U	0.0056 U		
Methyliodide in mg/kg		0.0069 U	0.006 U	0.006 U	0.33 U	0.0068 U	0.0066 U	0.29 U	0.0076 U	0.0078 U	0.0066 U	0.0068 U	0.0056 U		
n-Butylbenzene in mg/kg	175,000	0.0014 U	0.0012 U	0.0012 U	0.38	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.03		
n-Propylbenzene in mg/kg	350,000	0.0014 U	0.0012 U	0.0012 U	0.067	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.11		
p-Isopropyltoluene in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0019		
sec-Butylbenzene in mg/kg	350,000	0.0014 U	0.0012 U	0.0012 U	0.071	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.018		
Styrene in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
tert-Butylbenzene in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Tetrachloroethene (PCE) in mg/kg	0.005	0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Toluene in mg/kg	280,000	0.0069 U	0.006 U	0.006 U	0.33 U	0.0068 U	0.0066 U	0.29 U	0.0076 U	0.0078 U	0.0066 U	0.0068 U	0.0056 U		
trans-1,2-Dichloroethene in mg/kg	70,000	0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
trans-1,3-Dichloropropene in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Trichloroethene (TCE) in mg/kg	0.005	0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Trichlorofluoromethane in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Vinyl acetate in mg/kg		0.0069 U	0.006 U	0.006 U	0.33 U	0.0068 U	0.0066 U	0.29 U	0.0076 U	0.0078 U	0.0066 U	0.0068 U	0.0056 U		
Vinyl chloride in mg/kg	0.005	0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
m,p-Xylenes in mg/kg		0.0027 U	0.0024 U	0.0024 U	0.13 U	0.0027 U	0.0026 U	0.12 U	0.003 U	0.0031 U	0.0026 U	0.0027 U	0.0023 U		
o-Xylene in mg/kg		0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0011 U		
Naphthalene in mg/kg	6	0.0014 U	0.0012 U	0.0012 U	0.065 U	0.0014 U	0.0013 U	0.059 U	0.0015 U	0.0016 U	0.0013 U	0.0014 U	0.0034		
Polychlorinated Biphenyls (PCBs)															
Aroclor 1016 in mg/kg		0.0029 U	0.0031 U	0.0027 U	0.0029 U	0.0032 U	0.0033 U	0.0027 U	0.0032 U	0.0027 U	0.0033 U				
Aroclor 1221 in mg/kg		0.0029 U	0.0031 U	0.0027 U	0.0029 U	0.0032 U	0.0033 U	0.0027 U	0.0032 U	0.0027 U	0.0033 U				
Aroclor 1232 in mg/kg		0.0029 U	0.0031 U	0.0027 U	0.0029 U	0.0032 U	0.0033 U	0.0027 U	0.0032 U	0.0027 U	0.0033 U				
Aroclor 1242 in mg/kg		0.0029 U	0.0031 U	0.0027 U	0.0029 U	0.0032 U	0.0033 U	0.0027 U	0.0032 U	0.0027 U	0.0033 U				
Aroclor 1248 in mg/kg		0.0029 U	0.0031 U	0.0027 U	0.0029 U	0.0032 U	0.0033 U	0.0027 U	0.0032 U	0.0027 U	0.0033 U				
Aroclor 1254 in mg/kg		0.0029 U	0.0031 U	0.0027 U	0.0029 U	0.0032 U	0.0033 U	0.0027 U	0.0032 U	0.0027 U	0.0033 U				
Aroclor 1260 in mg/kg		0.0029 U	0.0031 U	0.017	0.0038	0.0032 U	0.0033 U	0.0027 U	0.0032 U	0.0027 U	0.0033 U				

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

U - Analyte was not detected at or above the reported result.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Table B-8 - PSE Tacoma LNG Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	B-2 5/20/14	B-4 5/20/14	B-7 5/27/14	B-10 5/22/14	B-12 5/30/14	B-13 5/30/14	B-14 5/30/14	B-15 6/2/14	B-16 6/2/14	B-17 5/28/14	B-19 5/29/14	B-21 5/28/14	B-22 5/21/14	B-24 5/27/14	B-25 5/28/14	B-26 5/20/14
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																	
Gasoline Range Hydrocarbons in ug/L	800	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	610	100 U	100 U
Diesel Range Hydrocarbons in ug/L	500	260 U	260 U	260 U	260 U	260 U	240 U	260 U	260 U	270 U	260 U	260 U	260 U	260 U	460 M	270 U	260 U
Oil Range Hydrocarbons in ug/L	500	410 U	410 U	410 U	410 U	410 U	390 U	410 U	410 U	420 U	420 U	410 U	410 U	410 U	600	430 U	410 U
Total TPHs D+O (ND=1/2U) in ug/L	500	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	ND U	860	ND U	ND U
Dissolved Metals																	
Arsenic in ug/L	5	3 U	3 U	3 U	3 U	3 U	8.3	6.3	11	3 U	3 U	3 U	3 U	3 U	3 U		
Cadmium in ug/L		4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U		
Chromium (Total) in ug/L		10 U	10 U	10 U	10 U	10 U	39	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U		
Copper in ug/L	2.4	10 U	10 U	10 U	10 U	10 U	54	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U		
Lead in ug/L	8.1	1 U	1 U	1 U	1 U	1 U	8.5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U		
Mercury in ug/L		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		
TCLP Metals																	
Dissolved Mercury in ug/L		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	
Polycyclic Aromatic Hydrocarbons (PAHs)																	
Acenaphthene in ug/L	90	0.098 U		0.095 U					0.1 U			0.094 U	0.095 U				
Acenaphthylene in ug/L		0.098 U		0.095 U					0.1 U			0.094 U	0.095 U				
Anthracene in ug/L	400	0.098 U		0.095 U					0.1 U			0.094 U	0.095 U				
Benzo(g,h,i)perylene in ug/L		0.0098 U		0.013					0.01 U			0.0094 U	0.0095 U				
Benzo(j,k)fluoranthene in ug/L		0.0098 U		0.0095 U					0.01 U			0.0094 U	0.0095 U				
Dibenzofuran in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
Fluoranthene in ug/L	20	0.098 U		0.095 U					0.1 U			0.094 U	0.095 U				
Fluorene in ug/L	70	0.098 U		0.095 U					0.1 U			0.094 U	0.095 U				
Phenanthrene in ug/L		0.098 U		0.095 U					0.1 U			0.094 U	0.095 U				
Pyrene in ug/L	30	0.098 U		0.095 U					0.1 U			0.094 U	0.095 U				
1-Methylnaphthalene in ug/L		0.098 U		0.095 U					0.1 U			0.094 U	0.095 U				
2-Methylnaphthalene in ug/L		0.098 U		0.095 U					0.1 U			0.094 U	0.095 U				
Naphthalene in ug/L	90	0.098 U		0.095 U					0.1 U			0.094 U	0.095 U				
Benz(a)anthracene in ug/L	0.02	0.01		0.015					0.011			0.0094 U	0.0095 U				
Benzo(a)pyrene in ug/L	0.02	0.0098 U		0.0095 U					0.01 U			0.0094 U	0.0095 U				
Benzo(b)fluoranthene in ug/L	0.02	0.0098 U		0.01					0.01 U			0.0094 U	0.0095 U				
Chrysene in ug/L	0.03	0.0098 U		0.019					0.01 U			0.0094 U	0.0095 U				
Dibenzo(a,h)anthracene in ug/L	0.02	0.0098 U		0.0095 U					0.01 U			0.0094 U	0.0095 U				
Indeno(1,2,3-cd)pyrene in ug/L	0.02	0.0098 U		0.0095 U					0.01 U			0.0094 U	0.0095 U				
Other (Non-PAH) Semivolatiles																	
1,2,4-Trichlorobenzene in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
1,2-Dichlorobenzene in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
1,2-Dinitrobenzene in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
1,2-Diphenylhydrazine in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
1,3-Dichlorobenzene in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
1,3-Dinitrobenzene in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
1,4-Dichlorobenzene in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
1,4-Dinitrobenzene in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
2,3,4,6-Tetrachlorophenol in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
2,3,5,6-Tetrachlorophenol in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
2,3-Dichloroaniline in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
2,4,5-Trichlorophenol in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
2,4,6-Trichlorophenol in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
2,4-Dichlorophenol in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
2,4-Dimethylphenol in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
2,4-Dinitrophenol in ug/L		4.9 U		4.7 U					5.1 U			4.7 U	4.7 U				
2-Chloronaphthalene in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
2-Chlorophenol in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
2-Methylphenol in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
2-Nitroaniline in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
2-Nitrophenol in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
3 & 4 Methylphenol in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
3,3'-Dichlorobenzidine in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
3-Nitroaniline in ug/L		0.98 U		0.95 U					1 U			0.94 U	0.95 U				
4,6-Dinitro-2-methylphenol in ug/L		4.9 U		4.7 U					5.1 U			4.7 U	4.7 U				

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Table B-8

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Table B-8 - PSE Tacoma LNG Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	B-2 5/20/14	B-4 5/20/14	B-7 5/27/14	B-10 5/22/14	B-12 5/30/14	B-13 5/30/14	B-14 5/30/14	B-15 6/2/14	B-16 6/2/14	B-17 5/28/14	B-19 5/29/14	B-21 5/28/14	B-22 5/21/14	B-24 5/27/14	B-25 5/28/14	B-26 5/20/14
4-Bromophenyl phenyl ether in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
4-Chloro-3-methylphenol in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
4-Chloroaniline in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
4-Chlorophenyl phenyl ether in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
4-Nitroaniline in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
4-Nitrophenol in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
Aniline in ug/L		4.9 U		4.7 U				5.1 U			4.7 U	4.7 U					
Benzidine in ug/L		4.9 U		4.7 U				5.1 U			4.7 U	4.7 U					
Benzyl alcohol in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
Benzyl butyl phthalate in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
Bis(2-chloroethoxy)methane in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
Bis(2-chloroethyl) ether in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
bis(2-Chloroisopropyl)ether in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
Bis(2-ethylhexyl) adipate in ug/L		4.9 U		4.7 U				5.1 U			4.7 U	4.7 U					
Bis(2-ethylhexyl) phthalate in ug/L	1	0.98 U		0.95 U				1 U			0.94 U	0.95 U					
Carbazole in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
Diethyl phthalate in ug/L	600	0.98 U		0.95 U				1 U			0.94 U	0.95 U					
Dimethyl phthalate in ug/L	2,000	0.98 U		0.95 U				1 U			0.94 U	0.95 U					
Di-n-butyl phthalate in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
Di-n-octyl phthalate in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
Hexachlorobenzene in ug/L	0.2	0.2 U		0.19 U				0.2 U			0.19 U	0.19 U					
Hexachlorobutadiene in ug/L	0.2	0.98 U		0.95 U				1 U			0.94 U	0.95 U					
Hexachlorocyclopentadiene in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
Hexachloroethane in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
Isophorone in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
Nitrobenzene in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
N-Nitrosodimethylamine in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
N-Nitroso-di-n-propylamine in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
N-Nitrosodiphenylamine in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
Pentachlorophenol in ug/L	1	0.98 U		0.95 U				1 U			0.94 U	0.95 U					
Phenol in ug/L	300,000	3.4		0.95 U				1 U			0.94 U	0.95 U					
Pyridine in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
2,4-Dinitrotoluene in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
2,6-Dinitrotoluene in ug/L		0.98 U		0.95 U				1 U			0.94 U	0.95 U					
Volatile Organic Compounds (VOC)																	
1,1,1,2-Tetrachloroethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
1,1,1-Trichloroethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
1,1,2,2-Tetrachloroethane in ug/L	3	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
1,1,2-Trichloroethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
1,1-Dichloroethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
1,1-Dichloroethene in ug/L	3.2	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
1,1-Dichloropropene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
1,2,3-Trichlorobenzene in ug/L		0.31 U	0.31 U	0.3 U	0.31 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.31 U	0.31 U	3 U
1,2,3-Trichloropropane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.25 U	0.25 U	0.2 U	0.2 U	0.25 U	0.2 U	0.25 U	0.2 U	0.25 U	0.2 U	2 U
1,2,4-Trichlorobenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
1,2,4-Trimethylbenzene in ug/L	63	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
1,2-Dibromo-3-chloropropane in ug/L		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U
1,2-Dibromoethane (EDB) in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
1,2-Dichlorobenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
1,2-Dichloroethane (EDC) in ug/L	42	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
1,2-Dichloropropane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
1,3,5-Trimethylbenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
1,3-Dichlorobenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
1,3-Dichloropropane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
1,4-Dichlorobenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
2,2-Dichloropropane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
2-Butanone in ug/L		6.6 U	6.6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	6.6 U	50 U	
2-Chloroethyl Vinyl Ether in ug/L		3.2 U	3.2 U	4.3 U	1.3 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.6 U	43 U		
2-Chlorotoluene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U
2-Hexanone in ug/L		2.6 U	2.6 U	2 U	2.6 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2.6 U	20 U		

Table B-8 - PSE Tacoma LNG Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	B-2 5/20/14	B-4 5/20/14	B-7 5/27/14	B-10 5/22/14	B-12 5/30/14	B-13 5/30/14	B-14 5/30/14	B-15 6/2/14	B-16 6/2/14	B-17 5/28/14	B-19 5/29/14	B-21 5/28/14	B-22 5/21/14	B-24 5/27/14	B-25 5/28/14	B-26 5/20/14
4-Chlorotoluene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
4-Methyl-2-pentanone in ug/L		2.5 U	2.5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2.5 U	20 U		
Acetone in ug/L	31,896,900	7.7 U	7.7 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	7.7 U	50 U		
Benzene in ug/L	24	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	7.7	10	0.2 U	270		
Bromobenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Bromochloromethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Bromodichloromethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Bromoform in ug/L		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U		
Bromomethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Carbon disulfide in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Carbon tetrachloride in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Chlorobenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Chloroethane in ug/L		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U		
Chloroform in ug/L	12	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Chloromethane in ug/L		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U		
cis-1,2-Dichloroethene (DCE) in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
cis-1,3-Dichloropropene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Dibromochloromethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Dibromomethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Dichlorodifluoromethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Ethylbenzene in ug/L	130	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Hexachlorobutadiene in ug/L	0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Isopropylbenzene in ug/L	1,614	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.29	0.2 U	10		
Methyl tert-butyl ether (MTBE) in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Methylene chloride in ug/L	1,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U		
Methyliodide in ug/L		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U		
n-Butylbenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
n-Propylbenzene in ug/L	5,200	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	11		
p-Isopropyltoluene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
sec-Butylbenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Styrene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
tert-Butylbenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Tetrachloroethene (PCE) in ug/L	8.9	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Toluene in ug/L	520	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U		
trans-1,2-Dichloroethene in ug/L	4,000	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
trans-1,3-Dichloropropene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Trichloroethene (TCE) in ug/L	7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Trichlorofluoromethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Vinyl acetate in ug/L		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U		
Vinyl chloride in ug/L	1.6	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
m,p-Xylenes in ug/L		0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	4 U		
o-Xylene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U		
Naphthalene in ug/L	90	1.6 U	1.6 U	1.6 U	1.6 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.6 U	16 U		
Polychlorinated Biphenyls (PCBs)																	
Aroclor 1016 in ug/L											0.047 U						
Aroclor 1221 in ug/L											0.047 U						
Aroclor 1232 in ug/L											0.047 U						
Aroclor 1242 in ug/L											0.047 U						
Aroclor 1248 in ug/L											0.047 U						
Aroclor 1254 in ug/L											0.047 U						
Aroclor 1260 in ug/L											0.047 U						

Notes
Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

M - Hydrocarbons in the gasoline range are impacting the diesel range result.
U - Analyte was not detected at or above the reported result.

Table B-9 - PSE Tacoma LNG Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	B-10 5/22/14	B-12 5/30/14	B-13 5/30/14	B-14 5/30/14	B-16 6/2/14	B-17 5/28/14	B-19 5/29/14	B-21 5/28/14	B-24 5/27/14
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup										
Gasoline Range Hydrocarbons in ug/L	800		100 U	150	100 U	100 U	100 U	100 U	400 U	100 U
Diesel Range Hydrocarbons in ug/L	500		480	240 U	780		290 U	280 U	260 U	260 U
Oil Range Hydrocarbons in ug/L	500		880	390 U	1,300		470 U	450 U	420 U	410 U
Total TPHs D+O (ND=1/2U) in ug/L	500		1,360	ND U	2,080		ND U	ND U	ND U	ND U
Dissolved Metals										
Arsenic in ug/L	5	6	3 U	3 U	3 U	22	3 U	3 U	3 U	3 U
Cadmium in ug/L		4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Chromium (Total) in ug/L		59	10 U	10 U	10 U	110	37	10 U	10 U	10 U
Copper in ug/L	2.4	45	10 U	10 U	12	150	19	10 U	10 U	10 U
Lead in ug/L	8.1	4.7	1 U	1 U	2	18	1.5	1 U	1 U	1 U
Mercury in ug/L		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TCLP Metals										
Dissolved Mercury in ug/L		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Polycyclic Aromatic Hydrocarbons (PAHs)										
Acenaphthene in ug/L	90						0.095 U			
Acenaphthylene in ug/L							0.095 U			
Anthracene in ug/L	400						0.095 U			
Benzo(g,h,i)perylene in ug/L							0.0095 U			
Benzo(j,k)fluoranthene in ug/L							0.0095 U			
Dibenzofuran in ug/L							0.95 U			
Fluoranthene in ug/L	20						0.095 U			
Fluorene in ug/L	70						0.095 U			
Phenanthrene in ug/L							0.095 U			
Pyrene in ug/L	30						0.095 U			
1-Methylnaphthalene in ug/L							0.095 U			
2-Methylnaphthalene in ug/L							0.095 U			
Naphthalene in ug/L	4,710						0.095 U			
Benz(a)anthracene in ug/L	0.02						0.012			
Benzo(a)pyrene in ug/L	0.02						0.0095 U			
Benzo(b)fluoranthene in ug/L	0.02						0.0095 U			
Chrysene in ug/L	0.03						0.0095 U			
Dibenzo(a,h)anthracene in ug/L	0.02						0.0095 U			
Indeno(1,2,3-cd)pyrene in ug/L	0.02						0.0095 U			
Other (Non-PAH) Semivolatiles										
1,2,4-Trichlorobenzene in ug/L							0.95 U			
1,2-Dichlorobenzene in ug/L							0.95 U			
1,2-Dinitrobenzene in ug/L							0.95 U			
1,2-Diphenylhydrazine in ug/L							0.95 U			
1,3-Dichlorobenzene in ug/L							0.95 U			
1,3-Dinitrobenzene in ug/L							0.95 U			
1,4-Dichlorobenzene in ug/L							0.95 U			
1,4-Dinitrobenzene in ug/L							0.95 U			
2,3,4,6-Tetrachlorophenol in ug/L							0.95 U			
2,3,5,6-Tetrachlorophenol in ug/L							0.95 U			
2,3-Dichloroaniline in ug/L							0.95 U			
2,4,5-Trichlorophenol in ug/L							0.95 U			
2,4,6-Trichlorophenol in ug/L							0.95 U			
2,4-Dichlorophenol in ug/L							0.95 U			
2,4-Dimethylphenol in ug/L							0.95 U			
2,4-Dinitrophenol in ug/L							4.7 U			
2-Chloronaphthalene in ug/L							0.95 U			
2-Chlorophenol in ug/L							0.95 U			
2-Methylphenol in ug/L							0.95 U			
2-Nitroaniline in ug/L							0.95 U			
2-Nitrophenol in ug/L							0.95 U			
3 & 4 Methylphenol in ug/L							0.95 U			
3,3'-Dichlorobenzidine in ug/L							0.95 U			
3-Nitroaniline in ug/L							0.95 U			
4,6-Dinitro-2-methylphenol in ug/L							4.7 U			
4-Bromophenyl phenyl ether in ug/L							0.95 U			
4-Chloro-3-methylphenol in ug/L							0.95 U			
4-Chloroaniline in ug/L							0.95 U			
4-Chlorophenyl phenyl ether in ug/L							0.95 U			
4-Nitroaniline in ug/L							0.95 U			
4-Nitrophenol in ug/L							0.95 U			
Aniline in ug/L							4.7 U			
Benzidine in ug/L							4.7 U			
Benzyl alcohol in ug/L							0.95 U			
Benzyl butyl phthalate in ug/L							0.95 U			
Bis(2-chloroethoxy)methane in ug/L							0.95 U			
Bis(2-chloroethyl) ether in ug/L							0.95 U			
bis(2-Chloroisopropyl)ether in ug/L							0.95 U			
Bis(2-ethylhexyl) adipate in ug/L							4.7 U			
Bis(2-ethylhexyl) phthalate in ug/L	1						2.4			
Carbazole in ug/L							0.95 U			
Diethyl phthalate in ug/L	600						0.95 U			
Dimethyl phthalate in ug/L	2,000						0.95 U			
Di-n-butyl phthalate in ug/L							0.95 U			
Di-n-octyl phthalate in ug/L							0.95 U			
Hexachlorobenzene in ug/L	0.2						0.19 U			
Hexachlorobutadiene in ug/L	0.2						0.95 U			
Hexachlorocyclopentadiene in ug/L							0.95 U			
Hexachloroethane in ug/L							0.95 U			
Isophorone in ug/L							0.95 U			
Nitrobenzene in ug/L							0.95 U			
N-Nitrosodimethylamine in ug/L							0.95 U			
N-Nitroso-di-n-propylamine in ug/L							0.95 U			
N-Nitrosodiphenylamine in ug/L							0.95 U			
Pentachlorophenol in ug/L	1						0.95 U			
Phenol in ug/L	300,000						0.95 U			
Pyridine in ug/L							0.95 U			
2,4-Dinitrotoluene in ug/L							0.95 U			
2,6-Dinitrotoluene in ug/L							0.95 U			
Volatile Organic Compounds (VOC)										
1,1,1,2-Tetrachloroethane in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
1,1,1-Trichloroethane in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U

Table B-9

Aspect Consulting

3/1/2016

Table B-9 - PSE Tacoma LNG Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	B-10 5/22/14	B-12 5/30/14	B-13 5/30/14	B-14 5/30/14	B-16 6/2/14	B-17 5/28/14	B-19 5/29/14	B-21 5/28/14	B-24 5/27/14
1,1,2,2-Tetrachloroethane in ug/L	3	0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
1,1,2-Trichloroethane in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
1,1-Dichloroethane in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
1,1-Dichloroethene in ug/L	3.2	0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
1,1-Dichloropropene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
1,2,3-Trichlorobenzene in ug/L		0.31 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.6 U
1,2,3-Trichloropropane in ug/L		0.2 U	0.2 U	5 U	0.25 U	0.2 U	0.25 U	0.2 U	2.5 U	0.4 U
1,2,4-Trichlorobenzene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
1,2,4-Trimethylbenzene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
1,2-Dibromo-3-chloropropane in ug/L		1 U	1 U	20 U	1 U	1 U	1 U	1 U	10 U	2 U
1,2-Dibromoethane (EDB) in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
1,2-Dichlorobenzene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
1,2-Dichloroethane (EDC) in ug/L	99	0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	1 U	2 U	0.4 U
1,2-Dichloropropane in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
1,3,5-Trimethylbenzene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
1,3-Dichlorobenzene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
1,3-Dichloropropane in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
1,4-Dichlorobenzene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
2,2-Dichloropropane in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
2-Butanone in ug/L		5 U	5 U	100 U	5 U	5 U	5 U	5 U	50 U	10 U
2-Chloroethyl Vinyl Ether in ug/L		1.3 U	1 U	20 U	1 U	1 U	1 U	1 U	10 U	8.6 U
2-Chlorotoluene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
2-Hexanone in ug/L		2.6 U	2 U	40 U	2 U	2 U	2 U	2 U	20 U	4 U
4-Chlorotoluene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
4-Methyl-2-pentanone in ug/L		2 U	2 U	40 U	2 U	2 U	2 U	2 U	20 U	4 U
Acetone in ug/L		5 U	5 U	100 U	5 U	5 U	5 U	5 U	50 U	10 U
Benzene in ug/L	58	0.2 U	64	510	15	6.4	0.2 U	0.2 U	390	78
Bromobenzene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Bromochloromethane in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Bromodichloromethane in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Bromoform in ug/L		1 U	1 U	20 U	1 U	1 U	1 U	1 U	10 U	2 U
Bromomethane in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Carbon disulfide in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Carbon tetrachloride in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Chlorobenzene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Chloroethane in ug/L		1 U	1 U	20 U	1 U	1 U	1 U	1 U	10 U	2 U
Chloroform in ug/L	470	0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Chloromethane in ug/L		1 U	1 U	20 U	1 U	1 U	1 U	1 U	10 U	2 U
cis-1,2-Dichloroethene (DCE) in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
cis-1,3-Dichloropropene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Dibromochloromethane in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Dibromomethane in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Dichlorodifluoromethane in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Ethylbenzene in ug/L	130	0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Hexachlorobutadiene in ug/L	0.2	0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Isopropylbenzene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Methyl tert-butyl ether (MTBE) in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Methylene chloride in ug/L	1,000	1 U	1 U	20 U	1 U	1 U	1 U	1 U	10 U	2 U
Methyliodide in ug/L		1 U	1 U	20 U	1 U	1 U	1 U	1 U	10 U	2 U
n-Butylbenzene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
n-Propylbenzene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
p-Isopropyltoluene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
sec-Butylbenzene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Styrene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
tert-Butylbenzene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Tetrachloroethene (PCE) in ug/L	8.9	0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Toluene in ug/L	520	1 U	1.4	20 U	1 U	1 U	1 U	1 U	10 U	2.5
trans-1,2-Dichloroethene in ug/L	4,000	0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
trans-1,3-Dichloropropene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Trichloroethene (TCE) in ug/L	7	0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Trichlorofluoromethane in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Vinyl acetate in ug/L		1 U	1 U	20 U	1 U	1 U	1 U	1 U	10 U	2 U
Vinyl chloride in ug/L	1.6	0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
m,p-Xylenes in ug/L		0.4 U	0.4 U	8 U	0.4 U	0.4 U	0.4 U	0.4 U	4 U	0.8 U
o-Xylene in ug/L		0.2 U	0.2 U	4 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	0.4 U
Naphthalene in ug/L	4,710	1.6 U	1 U	20 U	1 U	1 U	1 U	1 U	10 U	3.2 U
Polychlorinated Biphenyls (PCBs)										
Aroclor 1016 in ug/L							0.047 U			
Aroclor 1221 in ug/L							0.047 U			
Aroclor 1232 in ug/L							0.047 U			
Aroclor 1242 in ug/L							0.047 U			
Aroclor 1248 in ug/L							0.047 U			
Aroclor 1254 in ug/L							0.047 U			
Aroclor 1260 in ug/L							0.047 U			

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

U - Analyte was not detected at or above the reported result.

Table B-10 - PSE Tacoma LNG Groundwater Data - 50 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	B-10 5/22/14	B-16 6/2/14	B-19 5/29/14	B-21 5/28/14
Dissolved Metals					
Arsenic in ug/L	5	9.3	270	3 U	3 U
Cadmium in ug/L		4 U	4.2	4 U	4 U
Chromium (Total) in ug/L		100	12,000	10 U	10 U
Copper in ug/L	2.4	52	2,600	10 U	10 U
Lead in ug/L	8.1	9.1	270	1 U	1 U
Mercury in ug/L		0.5 U	1.8	0.5 U	0.5 U
TCLP Metals					
Dissolved Mercury in ug/L		0.5 U	1.8	0.5 U	0.5 U
Volatile Organic Compounds (VOC)					
1,1,1,2-Tetrachloroethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
1,1,1-Trichloroethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
1,1,2,2-Tetrachloroethane in ug/L	3	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloroethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethene in ug/L	3.2	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloropropene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
1,2,3-Trichlorobenzene in ug/L		0.31 U	0.2 U	0.2 U	0.2 U
1,2,3-Trichloropropane in ug/L		0.2 U	0.2 U	0.2 U	0.25 U
1,2,4-Trichlorobenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
1,2,4-Trimethylbenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dibromo-3-chloropropane in ug/L		1 U	1 U	1 U	1 U
1,2-Dibromoethane (EDB) in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloroethane (EDC) in ug/L	99	0.2 U	0.2 U	1 U	0.2 U
1,2-Dichloropropane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
1,3,5-Trimethylbenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichlorobenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichloropropane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
1,4-Dichlorobenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
2,2-Dichloropropane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
2-Butanone in ug/L		5 U	5 U	5 U	5 U
2-Chloroethyl Vinyl Ether in ug/L		1.3 U	1 U	1 U	1 U
2-Chlorotoluene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
2-Hexanone in ug/L		2.6 U	2.6 Y	2 U	2 U
4-Chlorotoluene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
4-Methyl-2-pentanone in ug/L		2 U	2 U	2 U	2 U
Acetone in ug/L		5 U	5 Y	5 U	5 U
Benzene in ug/L	58	0.2 U	0.8	0.2 U	1.4
Bromobenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
Bromochloromethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
Bromodichloromethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
Bromoform in ug/L		1 U	1 U	1 U	1 U
Bromomethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
Carbon disulfide in ug/L		0.28 Y	1.2	0.26	0.45
Carbon tetrachloride in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
Chlorobenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
Chloroethane in ug/L		1 U	1 U	1 U	1 U
Chloroform in ug/L	470	0.2 U	0.2 U	0.2 U	0.2 U
Chloromethane in ug/L		1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene (DCE) in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
cis-1,3-Dichloropropene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
Dibromochloromethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
Dibromomethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
Dichlorodifluoromethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
Ethylbenzene in ug/L	130	0.2 U	0.2 U	0.2 U	0.2 U
Hexachlorobutadiene in ug/L	0.2	0.2 U	0.2 U	0.2 U	0.2 U
Isopropylbenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
Methyl tert-butyl ether (MTBE) in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
Methylene chloride in ug/L	1,000	1 U	1 U	1 U	1 U
Methyl iodide in ug/L		1 U	1 U	1 U	1 U
n-Butylbenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
n-Propylbenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
p-Isopropyltoluene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
sec-Butylbenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
Styrene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
tert-Butylbenzene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
Tetrachloroethene (PCE) in ug/L	8.9	0.2 U	0.2 U	0.2 U	0.2 U
Toluene in ug/L	520	1 U	1 U	2.5	1 U
trans-1,2-Dichloroethene in ug/L	4,000	0.2 U	0.2 U	0.2 U	0.2 U
trans-1,3-Dichloropropene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethene (TCE) in ug/L	7	0.2 U	0.2 U	0.2 U	0.2 U
Trichlorofluoromethane in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
Vinyl acetate in ug/L		1 U	1 U	1 U	1 U
Vinyl chloride in ug/L	1.6	0.2 U	0.2 U	0.2 U	0.2 U
m,p-Xylenes in ug/L		0.4 U	0.4 U	0.4 U	0.4 U
o-Xylene in ug/L		0.2 U	0.2 U	0.2 U	0.2 U
Naphthalene in ug/L	4,710	1.6 U	1 U	1 U	1 U

Notes
Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

U - Analyte was not detected at or above the reported result.
Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-01 5/16/12 (4-5 ft.)	709-BH-01 5/16/12 (6-7 ft.)	709-BH-01 5/16/12 (15-16 ft.)	709-BH-01 5/16/12 (23-24 ft.)	709-BH-02 5/16/12 (1.5-3.5 ft.)	709-BH-02 5/16/12 (6.5-7.5 ft.)	709-BH-02 5/16/12 (15-16 ft.)	709-BH-02 5/16/12 (23-24 ft.)	709-BH-03 5/16/12 (1.5-2.5 ft.)	709-BH-03 5/16/12 (6-7 ft.)	709-BH-03 5/16/12 (9-10 ft.)	709-BH-03 5/16/12 (23-24 ft.)	709-BH-04 5/16/12 (1.5-2.5 ft.)	709-BH-04 5/16/12 (6.5-7.5 ft.)	709-BH-04 5/16/12 (9-10 ft.)	709-BH-04 5/16/12 (23-24 ft.)	709-BH-05 5/17/12 (4-5 ft.)	709-BH-05 5/17/12 (7-8.5 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
#2 Diesel in mg/kg																			
Gasoline Range Hydrocarbons in mg/kg	30													2.9 U	2,400	17	3.4 U	2,200	2,400
Diesel Range Hydrocarbons in mg/kg	2,000													250	7,500	20 J	32 U	12,000 J	11,000
Oil Range Hydrocarbons in mg/kg	2,000													110	170	130 U	130 U	340	80 J
Total TPHs D+O (ND=1/2U) in ug/L	2,000													360	7,670	85 J	ND	12,340 J	11,080 J
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in mg/kg	2,000																		
Oil Range Hydrocarbons in mg/kg	2,000																		
Total TPHs D+O (ND=1/2U) in ug/L	2,000																		
Metals																			
Aluminum in mg/kg		3,850	3,850	4,480	4,450	5,070	4,480	4,710	4,640	4,630	4,440	4,670	5,240	5,540	5,410	5,000	4,770	4,890	5,830
Antimony in mg/kg		0.045 J	0.019 J	0.019 J	0.06 UJ	0.144 J	0.056 UJ	0.015 J	0.059 UJ	0.051 UJ	0.016 J	0.028 J	0.022 J	2.36 J	0.039 J	0.025 J	0.03 J	0.022 J	0.029 J
Arsenic in mg/kg	20	1.14	1.27	1.11	0.52 J	2.49	1.01	0.86	0.86	2.18	1.15	0.83	0.5 J	12	1.02	2.88	1.15	1.08	1.4
Cadmium in mg/kg		0.026	0.017 J	0.028	0.012 J	0.098	0.018 J	0.03	0.017 J	0.101	0.164	0.029	0.02 J	0.646	0.032	0.023	0.017 J	0.016 J	0.02 J
Chromium (Total) in mg/kg		6.76	6.52	6.96	6.45	6.84	8.19	7.51	7.15	6.93	6.17	6.8	6.94	20.6	7.84	7.02	7.61	7.01	7.1
Copper in mg/kg	36	9.66	8.66	9.44	9	11.5	9.1	9.7	10.2	11.1	8.12	9.49	10.6	75.5	8.05	8.63	9.94	7.44	8.77
Iron in mg/kg		8,120	6,940	8,290	9,330	10,100	8,790	8,740	9,490	8,410	8,730	8,560	9,550	45,600	10,400	9,250	9,070	8,090	8,490
Lead in mg/kg	1,000	1.08	1.07	1.01	1.08	4.57	1.07	1.04	1.16	5.53	1.33	1.05	1.22	450	7.8	1.13	1.21	4.08	3.59
Mercury in mg/kg		0.004 J	0.004 J	0.007 J	0.004 J	0.012 J	0.005 J	0.006 J	0.007 J	0.014 J	0.004 J	0.005 J	0.006 J	0.017 J	0.007 J	0.012 J	0.019 J	0.01 J	0.012 J
Nickel in mg/kg	48	6.98	6.44	7.18	6.65	7.63	7.17	7.53	7.87	7.3	7.85	7.09	7.57	10.7	9.17	6.93	7.6	6.65	6.76
Silicon in mg/kg		914 J	1,040 J	792 J	704 J	723 J	826 J	1,000 J	891 J	817 J	864 J	988 J	990 J	1,680 J	1,450 J	1,450 J	1,270 J	1,300 J	1,720 J
Silver in mg/kg		0.013 J	0.011 J	0.013 J	0.024 U	0.021	0.023 U	0.013 J	0.013 J	0.02 U	0.012 J	0.011 J	0.011 J	0.392	0.023 U	0.025 U	0.024 U	0.008 J	0.024 U
Sodium in mg/kg																			
Tetraethyl Lead in mg/kg	0.35	1.1 U	1.2 U	12 U	1.2 U	1.1 U	1.2 U	1.2 U	1.2 U	1.1 U	1.1 U	1.2 U	1.3 U	5.4 U	24 U	1.2 U	1.2 U	22 U	23 U
Thallium in mg/kg		0.032	0.023 J	0.05	0.014 J	0.031	0.035	0.032	0.019 J	0.03	0.022 J	0.025	0.02 J	0.0394	0.026	0.0265	0.0266	0.0231	0.0291
Zinc in mg/kg	85	14	13	14.3	14.8	19.6	14.1	13.7	14.4	17.6	35.8	14.9	15.8	617	14.5	15.8	16.1	13.1	14.2
Organometals																			
Tetraethyl Lead in mg/kg	0.35	1.1 U	1.2 U	12 U	1.2 U	1.1 U	1.2 U	1.2 U	1.2 U	1.1 U	1.1 U	1.2 U	1.3 U	5.4 U	24 U	1.2 U	1.2 U	22 U	23 U
Conventional Chemistry Parameters																			
Chloride in mg/kg																			
pH in pH Units																			
Sodium in mg/kg																			
Sulfide in mg/kg																			
Total Organic Carbon in %																			
Total Solids in %																			
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in mg/kg																			
1,1,1-Trichloroethane in mg/kg																			
1,1,2 - Trichlorotrifluoroethane in mg/kg																			
1,1,2,2-Tetrachloroethane in mg/kg	700	0.0054 U	0.0054 U	0.0051 U	0.0053 U	0.0055 U	0.0054 U	0.0053 U	0.0058 U	0.0052 U	0.0056 U	0.0055 UJ	0.0048 U	0.0073 U	0.16 U	0.0054 UJ	0.006 U	0.55 UJ	0.81 UJ
1,1,2-Trichloroethane in mg/kg		0.0054 U	0.0054 U	0.0051 U	0.0053 U	0.0055 U	0.0054 U	0.0053 U	0.0058 U	0.0052 U	0.0056 U	0.0055 UJ	0.0048 U	0.0073 U	0.16 U	0.0054 UJ	0.006 U	0.55 UJ	0.81 UJ
1,1-Dichloroethane in mg/kg																			
1,1-Dichloroethene in mg/kg	175,000	0.0054 U	0.0054 U	0.0051 U	0.0053 U	0.0055 U	0.0054 U	0.0053 U	0.0058 U	0.0052 U	0.0056 U	0.0055 UJ	0.0048 U	0.0073 U	0.16 U	0.0054 UJ	0.006 U	0.14 UJ	0.17 UJ
1,1-Dichloropropene in mg/kg																			
1,2,3-Trichlorobenzene in mg/kg																			
1,2,3-Trichloropropane in mg/kg																			
1,2,4-Trichlorobenzene in mg/kg																			
1,2,4-Trimethylbenzene in mg/kg																			
1,2-Dibromo-3-chloropropane in mg/kg																			
1,2-Dibromoethane (EDB) in mg/kg																			
1,2-Dichlorobenzene in mg/kg																			
1,2-Dichloroethane (EDC) in mg/kg	1,000																		
1,2-Dichloropropane in mg/kg																			
1,3,5-Trimethylbenzene in mg/kg	35,000																		
1,3-Dichlorobenzene in mg/kg																			
1,3-Dichloropropane in mg/kg																			
1,4-Dichloro-2-Butene in mg/kg																			
1,4-Dichlorobenzene in mg/kg																			
2,2-Dichloropropane in mg/kg																			

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2/26/2016

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Table B-11

RI

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Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-01 5/16/12 (4-5 ft.)	709-BH-01 5/16/12 (6-7 ft.)	709-BH-01 5/16/12 (15-16 ft.)	709-BH-01 5/16/12 (23-24 ft.)	709-BH-02 5/16/12 (1.5-3.5 ft.)	709-BH-02 5/16/12 (6.5-7.5 ft.)	709-BH-02 5/16/12 (15-16 ft.)	709-BH-02 5/16/12 (23-24 ft.)	709-BH-03 5/16/12 (1.5-2.5 ft.)	709-BH-03 5/16/12 (6-7 ft.)	709-BH-03 5/16/12 (9-10 ft.)	709-BH-03 5/16/12 (23-24 ft.)	709-BH-04 5/16/12 (1.5-2.5 ft.)	709-BH-04 5/16/12 (6.5-7.5 ft.)	709-BH-04 5/16/12 (9-10 ft.)	709-BH-04 5/16/12 (23-24 ft.)	709-BH-05 5/17/12 (4-5 ft.)	709-BH-05 5/17/12 (7-8.5 ft.)
2-Butanone in mg/kg																			
2-Chloroethyl Vinyl Ether in mg/kg																			
2-Chlorotoluene in mg/kg																			
2-Hexanone in mg/kg																			
4-Chlorotoluene in mg/kg																			
4-Methyl-2-pentanone in mg/kg																			
Acetone in mg/kg	3,150,000																		
Acrolein in mg/kg																			
Acrylonitrile in mg/kg	1																		
Benzene in mg/kg	0.02	0.0004 J	0.00024 J	0.00023 J	0.0022 J	0.00011 J	0.00024 J	0.00074 J	0.019	0.00088 J	0.0004 J	0.0002 J	0.0049	0.0044 J	0.26 U	0.0054 UJ	0.035	0.14 UJ	0.17 UJ
Bromobenzene in mg/kg																			
Bromochloromethane in mg/kg																			
Bromodichloromethane in mg/kg																			
Bromoethane in mg/kg																			
Bromoform in mg/kg																			
Bromomethane in mg/kg																			
Carbon disulfide in mg/kg																			
Carbon tetrachloride in mg/kg		0.0054 U	0.0054 U	0.0051 U	0.0053 U	0.0055 U	0.0054 U	0.0053 U	0.0058 U	0.0052 U	0.0056 U	0.0055 UJ	0.0048 U	0.0073 U	0.16 U	0.0054 UJ	0.006 U	0.14 UJ	0.17 UJ
Chlorobenzene in mg/kg																			
Chloroethane in mg/kg																			
Chloroform in mg/kg	4,000	0.0054 U	0.0054 U	0.0051 U	0.0053 U	0.0055 U	0.0054 U	0.0053 U	0.0058 U	0.0052 U	0.0056 U	0.0055 UJ	0.0048 U	0.0073 U	0.16 U	0.0054 UJ	0.006 U	0.14 UJ	0.17 UJ
Chloromethane in mg/kg																			
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.0054 U	0.0054 U	0.0051 U	0.0053 U	0.0055 U	0.0054 U	0.0053 U	0.0012 J	0.00089 J	0.0056 U	0.0055 UJ	0.0048 U	0.0073 U	0.16 U	0.0054 UJ	0.006 U	0.14 UJ	0.17 UJ
cis-1,3-Dichloropropene in mg/kg																			
Dibromochloromethane in mg/kg																			
Dibromomethane in mg/kg																			
Dichlorodifluoromethane in mg/kg																			
Ethylbenzene in mg/kg	0.06	0.0054 U	0.0054 U	0.00022 J	0.0053 U	0.0055 U	0.0054 U	0.00059 J	0.0058 U	0.00029 J	0.0056 U	0.0055 UJ	0.0048 U	0.0073 U	11 J	0.089 J	0.0012 J	5.6 J	1.1 J
Hexachlorobutadiene in mg/kg	0.01																		
Isopropylbenzene in mg/kg	350,000																		
Methyl tert-butyl ether (MTBE) in mg/kg																			
Methylene chloride in mg/kg	20,000	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.012 U	0.011 U	0.012 U	0.011 UJ	0.0095 U	0.015 U	1.5 U	0.02 UJ	0.012 U	0.55 UJ	0.21 J
Methyliodide in mg/kg																			
n-Butylbenzene in mg/kg	175,000																		
n-Propylbenzene in mg/kg	350,000																		
p-Isopropyltoluene in mg/kg																			
sec-Butylbenzene in mg/kg	350,000																		
Styrene in mg/kg																			
tert-Butylbenzene in mg/kg																			
Tetrachloroethene (PCE) in mg/kg	0.005	0.0038 J	0.008	0.065	0.00058 J	0.0026 J	0.0035 J	0.056	0.0058 U	0.023	0.0068	0.024 J	0.00035 J	0.00068 J	0.16 UJ	0.0054 UJ	0.00043 J	0.55 UJ	0.81 UJ
Toluene in mg/kg	280,000	0.0054 U	0.0054 U	0.00032 J	0.0053 U	0.00045 J	0.00055 J	0.00064 J	0.00056 J	0.00033 J	0.0056 U	0.00027 J	0.0048 U	0.0049 J	1.7 J	0.0054 UJ	0.006 U	0.14 UJ	0.17 UJ
trans-1,2-Dichloroethene in mg/kg	70,000	0.0054 U	0.0054 U	0.0051 U	0.0053 U	0.0055 U	0.0054 U	0.0053 U	0.0015 J	0.0052 U	0.0056 U	0.0055 UJ	0.00052 J	0.0073 U	0.16 U	0.0054 UJ	0.006 U	0.14 UJ	0.17 UJ
trans-1,3-Dichloropropene in mg/kg																			
Trichloroethene (TCE) in mg/kg	0.005	0.0011 J	0.00092 J	0.0018 J	0.00045 J	0.0012 J	0.0019 J	0.0039 J	0.002 J	0.0059	0.0015 J	0.0011 J	0.0004 J	0.0073 U	0.16 U	0.0054 UJ	0.006 U	0.14 UJ	0.17 UJ
Trichlorofluoromethane in mg/kg																			
Vinyl acetate in mg/kg																			
Vinyl chloride in mg/kg	0.005	0.0054 U	0.0054 U	0.0051 U	0.0053 U	0.0055 U	0.0054 U	0.0053 U	0.00086 J	0.0052 U	0.0056 U	0.0055 UJ	0.0048 U	0.0073 U	0.16 U	0.0054 UJ	0.006 U	0.14 UJ	0.17 UJ
m,p-Xylenes in mg/kg		0.0002 J	0.00033 J	0.00037 J	0.0053 U	0.0055 U	0.00021 J	0.0013 J	0.00018 J	0.00052 J	0.0056 U	0.0055 UJ	0.0048 U	0.0022 J	22 J	0.18 J	0.00059 J	13 J	3 UJ
o-Xylene in mg/kg		0.0054 U	0.0054 U	0.0051 U	0.0053 U	0.0055 U	0.0054 U	0.00025 J	0.0058 U	0.0052 U	0.0056 U	0.0055 UJ	0.0048 U	0.0008 J	0.68 J	0.013 J	0.00049 J	0.34 J	0.81 UJ
Total Xylenes in mg/kg		0.0029 J	0.003 J	0.0029 J	ND	ND	0.0029 J	0.0016 J	0.0031 J	0.0031 J	ND	ND	ND	0.003 J	23 J	0.19 J	0.0011 J	13 J	ND
Xylenes (total) in mg/kg	700,000																		
Naphthalene in mg/kg	6																		

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-05 5/20/12 (17-18 ft.)	709-BH-05 5/17/12 (23-24 ft.)	709-BH-06 5/17/12 (2.5-4 ft.)	709-BH-06 5/17/12 (10-11 ft.)	709-MW-06-15 5/19/12 (15 ft.)	709-BH-06 5/20/12 (16-17 ft.)	709-BH-06 5/17/12 (23-24 ft.)	709-BH-07 5/17/12 (3.75-5 ft.)	709-BH-07 5/17/12 (6.25-7.5 ft.)	709-BH-07 5/17/12 (15-16 ft.)	709-BH-07 5/17/12 (23-24 ft.)	709-BH-08 5/18/12 (3.75-4.75 ft.)	709-BH-08 5/18/12 (6.5-7.5 ft.)	709-BH-08 5/18/12 (16-17 ft.)	709-BH-08 5/18/12 (23-24 ft.)	709-BH-09 5/18/12 (3.75-5 ft.)	709-BH-09 5/18/12 (6.5-7.5 ft.)	709-BH-09 5/18/12 (17-18 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
#2 Diesel in mg/kg																			
Gasoline Range Hydrocarbons in mg/kg	30	3 U	1.7 J	5.9 UJ	12 U		4 U	3.5 U	260	1,100	14 U	3.9 U	3.8 U	1,200	4.9 U	3.3 U	8.6 U	3,100	9.8 U
Diesel Range Hydrocarbons in mg/kg	2,000	6.4 J	32 U	5,900 J	740		6.2 J	2.5 J	6,500	10,000	19 J	2.9 J	1,400	12,000	5.9 J	33 U	2,500	9,600	7.4 J
Oil Range Hydrocarbons in mg/kg	2,000	9.2 J	130 U	180 J	28 J		8.1 J	110 U	190	180	17 J	130 U	39 J	280	5.9 J	130 U	110 J	290	9.8 J
Total TPHs D+O (ND=1/2U) in ug/L	2,000	15.6 J	ND	6,080 J	768 J		14.3 J	57.5 J	6,690	10,180	36 J	67.9 J	1,439 J	12,280	11.8 J	ND	2,610 J	9,890	17.2 J
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in mg/kg	2,000																		
Oil Range Hydrocarbons in mg/kg	2,000																		
Total TPHs D+O (ND=1/2U) in ug/L	2,000																		
Metals																			
Aluminum in mg/kg		7,790	5,910	5,220	5,030	8,240	7,250	5,470	5,080	5,030	10,900	5,480	5,240	6,050	6,860	11,000	6,070	5,030	11,000
Antimony in mg/kg		0.035 J	0.163 J	0.015 J	0.028 J	1.25 J	0.031 J	0.019 J	0.064 J	0.033 J	0.039 J	0.012 J	0.019 J	0.026 J	0.023 J	0.027 J	0.106 J	0.029 J	0.03 J
Arsenic in mg/kg	20	4.16	2.39	0.96	1.37	8.25	4.16	1.31	0.54	0.62	2.97	0.71	0.55	0.55	3.99	2.97	0.88	1.02	3.65
Cadmium in mg/kg		0.018 U	0.061	0.032	0.021 J	0.243	0.018 U	0.017 J	0.036	0.019 J	0.109	0.016 J	0.018 J	0.035	0.055	0.05	0.063	0.026	0.13
Chromium (Total) in mg/kg		8.38	9.33	7.34	7.6	9.04	8.12	6.65	5.98	5.56	12.1	7.12	6.85	6.9	7.39	11.4	7.2	7.22	13.4
Copper in mg/kg	36	14.7	12.6	8.55	8.21	15.7	14.4	9.6	7.88	7.59	22.4	10.2	8.65	8.57	12.7	23.3	9.24	8.9	26
Iron in mg/kg		12,100	9,960	7,920	9,170	13,000	11,700	9,630	7,450	8,470	15,800	10,400	7,750	8,480	11,100	15,000	9,180	9,740	16,800
Lead in mg/kg	1,000	2.3	1.32	1.85 J	1.3	59.3	2.11	1.57	2.37	1.76	2.98	1.2	3.26	2.05	1.85	2.35	9.89	4.87	3.15
Mercury in mg/kg		0.026	0.009 J	0.008 J	0.016 J	0.067	0.024	0.008 J	0.003 J	0.005 J	0.021 J	0.007 J	0.003 J	0.021 U	0.018	0.026	0.006 J	0.006 J	0.03
Nickel in mg/kg	48	8.06	8.02	7.49	6.56	10.7	7.54	7.09	7.74	6.9	10.4	7.46	5.92	7.78	7.33	11.6	8.22	7.46	11.4
Silicon in mg/kg		1,430 J	1,950 J	1,590 J	1,560 J	1,920	1,430 J	1,670 J	1,010 J	1,370 J	2,120 J	1,140 J	1,190 J	1,630 J	1,240 J	1,450 J	1,430 J	1,010 J	1,740 J
Silver in mg/kg		0.027	0.024 U	0.022 U	0.024 U	0.078	0.028	0.024 U	0.014 J	0.024 U	0.039	0.009 J	0.021 U	0.008 J	0.02	0.031	0.012 J	0.008 J	0.043
Sodium in mg/kg																			
Tetraethyl Lead in mg/kg	0.35	1.2 U	1.2 U	1.2 U	1.2 U		1.3 U	1.2 U	13 U	6.7 U	1.4 U	1.4 U	5.4 U	1.1 J	1.2 U	1.3 U	12 U	6.2 U	1.4 U
Thallium in mg/kg		0.11	0.0467	0.0292	0.0274	0.034	0.132	0.0287	0.023	0.025	0.073	0.027	0.025	0.027	0.12	0.052	0.027	0.043	0.088
Zinc in mg/kg	85	18.1	16.3	15.7	13.7	45.2 J	16.6	15.2	18.9	11.8	22.8	14.5	14.3	16.2	16.1	23.9	21.8	14.6	25.1
Organometals																			
Tetraethyl Lead in mg/kg	0.35	1.2 U	1.2 U	1.2 U	1.2 U		1.3 U	1.2 U	13 U	6.7 U	1.4 U	1.4 U	5.4 U	1.1 J	1.2 U	1.3 U	12 U	6.2 U	1.4 U
Conventional Chemistry Parameters																			
Chloride in mg/kg																			
pH in pH Units																			
Sodium in mg/kg																			
Sulfide in mg/kg																			
Total Organic Carbon in %																			
Total Solids in %																			
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in mg/kg																			
1,1,1-Trichloroethane in mg/kg																			
1,1,2 - Trichlorotrifluoroethane in mg/kg																			
1,1,2,2-Tetrachloroethane in mg/kg	700	0.0049 UJ	0.0048 U	0.13 U	0.0056 U		0.0054 U	0.0054 U	0.0067 U	0.071 UJ	0.0055 U	0.006 U	0.0064 UJ	0.31 U	0.0045 UJ	0.0055 UJ	0.071 U	0.13 UJ	0.0063 U
1,1,2-Trichloroethane in mg/kg		0.0049 U	0.0048 U	0.13 U	0.0056 U		0.0054 U	0.0054 U	0.0067 U	0.071 UJ	0.0055 U	0.006 U	0.0064 U	0.31 U	0.0045 U	0.0055 U	0.071 U	0.13 UJ	0.0063 U
1,1-Dichloroethane in mg/kg																			
1,1-Dichloroethene in mg/kg	175,000	0.0049 U	0.0048 U	0.13 U	0.0056 U		0.00042 J	0.0054 U	0.0067 U	0.071 UJ	0.0055 U	0.006 U	0.0064 U	0.31 U	0.0045 U	0.0055 U	0.071 U	0.13 UJ	0.0063 U
1,1-Dichloropropene in mg/kg																			
1,2,3-Trichlorobenzene in mg/kg																			
1,2,3-Trichloropropane in mg/kg																			
1,2,4-Trichlorobenzene in mg/kg																			
1,2,4-Trimethylbenzene in mg/kg																			
1,2-Dibromo-3-chloropropane in mg/kg																			
1,2-Dibromoethane (EDB) in mg/kg																			
1,2-Dichlorobenzene in mg/kg																			
1,2-Dichloroethane (EDC) in mg/kg	1,000																		
1,2-Dichloropropane in mg/kg																			
1,3,5-Trimethylbenzene in mg/kg	35,000																		
1,3-Dichlorobenzene in mg/kg																			
1,3-Dichloropropane in mg/kg																			
1,4-Dichloro-2-Butene in mg/kg																			
1,4-Dichlorobenzene in mg/kg																			
2,2-Dichloropropane in mg/kg																			

Table B-11

Aspect Consulting

2/26/2016

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RI

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-05 5/20/12 (17-18 ft.)	709-BH-05 5/17/12 (23-24 ft.)	709-BH-06 5/17/12 (2.5-4 ft.)	709-BH-06 5/17/12 (10-11 ft.)	709-MW-06-15 5/19/12 (15 ft.)	709-BH-06 5/20/12 (16-17 ft.)	709-BH-06 5/17/12 (23-24 ft.)	709-BH-07 5/17/12 (3.75-5 ft.)	709-BH-07 5/17/12 (6.25-7.5 ft.)	709-BH-07 5/17/12 (15-16 ft.)	709-BH-07 5/17/12 (23-24 ft.)	709-BH-08 5/18/12 (3.75-4.75 ft.)	709-BH-08 5/18/12 (6.5-7.5 ft.)	709-BH-08 5/18/12 (16-17 ft.)	709-BH-08 5/18/12 (23-24 ft.)	709-BH-09 5/18/12 (3.75-5 ft.)	709-BH-09 5/18/12 (6.5-7.5 ft.)	709-BH-09 5/18/12 (17-18 ft.)	
2-Butanone in mg/kg																				
2-Chloroethyl Vinyl Ether in mg/kg																				
2-Chlorotoluene in mg/kg																				
2-Hexanone in mg/kg																				
4-Chlorotoluene in mg/kg																				
4-Methyl-2-pentanone in mg/kg																				
Acetone in mg/kg	3,150,000																			
Acrolein in mg/kg																				
Acrylonitrile in mg/kg	1																			
Benzene in mg/kg	0.02	0.000078 J	0.01	0.13 U	0.0014 J		0.025	0.0066	0.0067 U	0.071 UJ	0.053	0.068	0.00023 J	0.31 U	0.14	0.071	0.071 U	0.34 UJ	0.011	
Bromobenzene in mg/kg																				
Bromochloromethane in mg/kg																				
Bromodichloromethane in mg/kg																				
Bromoethane in mg/kg																				
Bromoform in mg/kg																				
Bromomethane in mg/kg																				
Carbon disulfide in mg/kg																				
Carbon tetrachloride in mg/kg		0.0049 U	0.0048 U	0.13 U	0.0056 U		0.0054 U	0.0054 U	0.0067 U	0.071 UJ	0.0055 U	0.006 U	0.0064 U	0.31 U	0.0045 U	0.0055 U	0.071 U	0.13 UJ	0.0063 U	
Chlorobenzene in mg/kg																				
Chloroethane in mg/kg																				
Chloroform in mg/kg	4,000	0.0049 U	0.0048 U	0.13 U	0.0056 U		0.0054 U	0.0054 U	0.0067 U	0.17 UJ	0.0055 U	0.006 U	0.0064 U	0.31 U	0.0045 U	0.0055 U	0.071 U	0.22 UJ	0.0063 U	
Chloromethane in mg/kg																				
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.0087	0.015	0.13 U	0.0056 U		0.042	0.0097	0.0067 U	0.071 UJ	0.0055 U	0.006 U	0.0064 U	0.31 U	0.0045 U	0.0055 U	0.071 U	0.13 UJ	0.0037 J	
cis-1,3-Dichloropropene in mg/kg																				
Dibromochloromethane in mg/kg																				
Dibromomethane in mg/kg																				
Dichlorodifluoromethane in mg/kg																				
Ethylbenzene in mg/kg	0.06	0.0049 U	0.0048 U	0.059 J	0.1 J		0.00041 J	0.00093 J	0.036 J	4.9 J	0.055	0.0098	0.0064 U	4.3	0.0039 J	0.0055 U	0.071 U	9.7 J	0.0038 J	
Hexachlorobutadiene in mg/kg	0.01																			
Isopropylbenzene in mg/kg	350,000																			
Methyl tert-butyl ether (MTBE) in mg/kg																				
Methylene chloride in mg/kg	20,000	0.0098 U	0.0095 U	0.51 U	0.012 U		0.011 U	0.011 U	0.039 U	0.73 UJ	0.015 U	0.012 U	0.013 U	1.3 U	0.009 U	0.011 U	0.035 J	1.9 UJ	0.013 U	
Methyliodide in mg/kg																				
n-Butylbenzene in mg/kg	175,000																			
n-Propylbenzene in mg/kg	350,000																			
p-Isopropyltoluene in mg/kg																				
sec-Butylbenzene in mg/kg	350,000																			
Styrene in mg/kg																				
tert-Butylbenzene in mg/kg																				
Tetrachloroethene (PCE) in mg/kg	0.005	0.0049 U	0.0048 U	0.13 U	0.00042 J		0.0054 U	0.0054 U	0.0016 J	0.071 UJ	0.0055 U	0.006 U	0.00073 J	0.31 U	0.001 J	0.00057 J	0.071 U	0.13 UJ	0.0063 U	
Toluene in mg/kg	280,000	0.0049 U	0.0048 U	0.13 U	0.0056 J		0.00063 J	0.00046 J	0.014 J	0.28 J	0.014	0.0014 J	0.00063 J	0.66	0.0012 J	0.0008 J	0.0084 J	1.7 J	0.0012 J	
trans-1,2-Dichloroethene in mg/kg	70,000	0.00072 J	0.0011 J	0.13 U	0.0056 U		0.0071	0.0054 U	0.0067 U	0.071 UJ	0.001 J	0.006 U	0.0064 U	0.31 U	0.0045 U	0.0055 U	0.071 U	0.13 UJ	0.011	
trans-1,3-Dichloropropene in mg/kg																				
Trichloroethene (TCE) in mg/kg	0.005	0.0049 U	0.0048 U	0.13 U	0.00089 J		0.0054 U	0.0054 U	0.0067 U	0.071 UJ	0.0055 U	0.00053 J	0.0064 U	0.31 U	0.0045 U	0.00037 J	0.071 U	0.13 UJ	0.0063 U	
Trichlorofluoromethane in mg/kg																				
Vinyl acetate in mg/kg																				
Vinyl chloride in mg/kg	0.005	0.0044 J	0.0004 J	0.13 U	0.0056 U		0.00042 J	0.0054 U	0.0067 U	0.071 UJ	0.0055 U	0.006 U	0.0064 U	0.31 U	0.00033 J	0.0055 U	0.071 U	0.13 UJ	0.025	
m,p-Xylenes in mg/kg		0.0049 U	0.0048 U	10 J	0.12 J		0.00025 J	0.0016 J	0.075 J	10 J	0.025	0.0027 J	0.0004 J	6.9	0.001 J	0.0055 U	0.071 U	19 J	0.0017 J	
o-Xylene in mg/kg		0.0049 U	0.0048 U	0.025 J	0.0016 J		0.00056 J	0.0054 U	0.026 U	1.9 J	0.0055 U	0.00031 J	0.00024 J	6.7	0.0017 J	0.0055 U	0.071 U	0.24 J	0.00076 J	
Total Xylenes in mg/kg		ND	ND	0.16 J	0.12 J		0.00081 J	0.0043 J	0.088 J	12 J	0.028	0.003 J	0.00064 J	14	0.0027 J	ND	ND	19 J	0.0025 J	
Xylenes (total) in mg/kg	700,000																			
Naphthalene in mg/kg	6																			

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-09 5/18/12 (23-24 ft.)	709-BH-10 5/18/12 (4-5 ft.)	709-BH-10 5/18/12 (7.25-8.75 ft.)	709-BH-10 5/18/12 (16-17 ft.)	709-BH-10 5/18/12 (23-24 ft.)	709-BH-11 6/1/12 (1.5-3 ft.)	709-BH-11 6/1/12 (5.5-6.75 ft.)	709-BH-11 6/1/12 (7.5-8.5 ft.)	709-BH-11 6/1/12 (14-15 ft.)	709-BH-11 6/1/12 (23-24 ft.)	709-MW18(BH-12) 6/3/12 (2-3 ft.)	709-MW18(BH-12) 6/3/12 (7.5-9 ft.)	709-MW18(BH-12) 6/3/12 (15-16 ft.)	709-MW18(BH-12) 6/3/12 (22-24 ft.)	709-BH-12B 10/2/12 (5 ft.)	709-BH-12B 10/2/12 (9 ft.)	709-BH-12B 10/2/12 (14 ft.)	709-BH-12B 10/2/12 (18.5 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
#2 Diesel in mg/kg																			
Gasoline Range Hydrocarbons in mg/kg	30	4.6 U	3.2 U	610	4.3 U	3.8 U	3.1 U	2,200		3.6 U	3.6 U	2.9 U	3.2 U	3.9 U	3.5 U	4.6 U	3.5 U	3.8 U	3.2 U
Diesel Range Hydrocarbons in mg/kg	2,000	34 U	6 J	6,100	6.7 J	33 U	38	17,000	5,700	5.9 J	30 U	2.6 J	25 J	34 U	4.3 J	27 U	30 U	2.5 J	2.4 J
Oil Range Hydrocarbons in mg/kg	2,000	140 U	4.2 J	170	12 J	130 U	110 U	600	250 U	130 U	120 U	110 U	52 J	140 U	130 U	110 U	120 U	140 U	130 U
Total TPHs D+O (ND=1/2U) in ug/L	2,000	ND	10.2 J	6,270	18.7 J	ND	93	17,600	5,825	70.9 J	ND	57.6 J	77 J	ND	69.3 J	ND	ND	72.5 J	67.4 J
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in mg/kg	2,000																		
Oil Range Hydrocarbons in mg/kg	2,000																		
Total TPHs D+O (ND=1/2U) in ug/L	2,000																		
Metals																			
Aluminum in mg/kg		5,030	4,910	5,000	10,800	5,360	5,900	6,550		6,100	6,730	6,060	4,840	8,480	5,080	3,820	4,280	5,970	6,070
Antimony in mg/kg		0.011 J	0.035 J	0.027 J	0.021 J	0.054 UJ	0.011 J	0.013 J		0.012 J	0.01 J	0.349 J	0.035 J	0.032 J	0.055 UJ	0.079 J	0.284 J	0.064 J	0.041 J
Arsenic in mg/kg	20	1.45	1.05	0.86	2.69	1.09	0.85	1.12		1.11	1.05	3.05	0.95	2.38	0.53 J	1.09	1.04	1.69	3.74
Cadmium in mg/kg		0.026	0.022	0.023 J	0.114	0.019 J	0.041	0.02		0.025	0.019 J	0.129	0.019 U	0.09 U	0.022 U	0.027	0.018 J	0.05	0.053
Chromium (Total) in mg/kg		6.89	6.39	6.71	12.2	7.16	6.17	6.12		5.7	6.28	9.21	5.49	10.1	6.56	5.88	5.65	7.15	7.27
Copper in mg/kg	36	10	9.34	9.75	23.2	10.7	8.5	10.3		9.45	10.2	12.8	7.01	18.7	9.01	8.77	7.51	12.7	12.2
Iron in mg/kg		9,340	9,190	9,130	15,900	9,910	9,150	9,620		8,620	10,600	10,700	7,950	12,600	9,700	8,300	9,230	9,800	10,600
Lead in mg/kg	1,000	1.07	2.21	2.48	2.96	1.29	3.09	2.65		0.98	1.24	51.5	0.948	2.42	1.23	1.07	0.829	1.66	1.59
Mercury in mg/kg		0.007 J	0.004 J	0.007 J	0.02 J	0.007 J	0.003 J	0.004 J		0.005 J	0.01 J	0.017 J	0.003 J	0.016 J	0.009 J	0.005 J	0.014 J	0.017	0.017
Nickel in mg/kg	48	6.32	6.96	7.26	10.7	7.35	6.64	6.8		6.32	7.22	9.04	5.63	8.94	6.6	6	6.78	7.39	7.26
Silicon in mg/kg		978 J	1,080 J	1,280 J	1,760 J	1,440 J	1,510	1,890		1,170	2,010	1,120 J	1,250 J	1,050 J	1,370 J	518	607	759	569
Silver in mg/kg		0.012 J	0.021 U	0.024 U	0.042	0.01 J	0.011 J	0.011 J		0.014 J	0.012 J	0.029	0.013 J	0.04	0.016 J	0.026	0.041	0.019 J	0.022
Sodium in mg/kg																			
Tetraethyl Lead in mg/kg	0.35	1.3 U	1.1 U	5.6 U	1.4 U	1.4 U	1 U	22 U		1.3 U	1.3 U	1 U	1.2 U	1.4 U	1.2 U	1 U	1.2 U	1.3 U	1.2 U
Thallium in mg/kg		0.035	0.027	0.028	0.069	0.021 J	0.026	0.021		0.029	0.023	0.041	0.023	0.065	0.021 J	0.039	0.042	0.042	0.126
Zinc in mg/kg	85	12.6	13.6	14.4	22.9	15	11.8	11.5 J		10.7 J	12.9 J	75.5	11.4	19.7	14	12.6	11.2	15.3	14.4
Organometals																			
Tetraethyl Lead in mg/kg	0.35	1.3 U	1.1 U	5.6 U	1.4 U	1.4 U	1 U	22 U		1.3 U	1.3 U	1 U	1.2 U	1.4 U	1.2 U	1 U	1.2 U	1.3 U	1.2 U
Conventional Chemistry Parameters																			
Chloride in mg/kg																			
pH in pH Units																			
Sodium in mg/kg																			
Sulfide in mg/kg																			
Total Organic Carbon in %																			
Total Solids in %																			
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in mg/kg																			
1,1,1-Trichloroethane in mg/kg																			
1,1,2-Trichlorotrifluoroethane in mg/kg																			
1,1,2,2-Tetrachloroethane in mg/kg	700	0.006 UJ	0.0052 UJ	0.0056 UJ	0.0065 UJ	0.0063 UJ	0.0055 U	0.33 U		0.0055 U	0.0058 U	0.0059 U	0.0053 U	0.0062 U	0.0066 U	0.0059 U	0.0058 U	0.0056 U	0.064 U
1,1,2-Trichloroethane in mg/kg		0.006 U	0.0052 U	0.0056 U	0.0065 U	0.0063 U	0.0055 U	0.33 U		0.0055 U	0.0058 U	0.0059 U	0.0053 U	0.0062 U	0.0066 U	0.0059 U	0.0058 U	0.0056 U	0.064 U
1,1-Dichloroethane in mg/kg																			
1,1-Dichloroethene in mg/kg	175,000	0.006 U	0.0052 U	0.0056 U	0.00043 J	0.0063 U	0.0055 U	0.33 U		0.0055 U	0.0058 U	0.0059 U	0.0053 U	0.0038 J	0.0015 J	0.0059 U	0.0058 U	0.0005 J	0.064 U
1,1-Dichloropropene in mg/kg																			
1,2,3-Trichlorobenzene in mg/kg																			
1,2,3-Trichloropropane in mg/kg																			
1,2,4-Trichlorobenzene in mg/kg																			
1,2,4-Trimethylbenzene in mg/kg																			
1,2-Dibromo-3-chloropropane in mg/kg																			
1,2-Dibromoethane (EDB) in mg/kg																			
1,2-Dichlorobenzene in mg/kg																			
1,2-Dichloroethane (EDC) in mg/kg	1,000																		
1,2-Dichloropropane in mg/kg																			
1,3,5-Trimethylbenzene in mg/kg	35,000																		
1,3-Dichlorobenzene in mg/kg																			
1,3-Dichloropropane in mg/kg																			
1,4-Dichloro-2-Butene in mg/kg																			
1,4-Dichlorobenzene in mg/kg																			
2,2-Dichloropropane in mg/kg																			

Table B-11

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RI

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-09 5/18/12 (23-24 ft.)	709-BH-10 5/18/12 (4-5 ft.)	709-BH-10 5/18/12 (7.25-8.75 ft.)	709-BH-10 5/18/12 (16-17 ft.)	709-BH-10 5/18/12 (23-24 ft.)	709-BH-11 6/1/12 (1.5-3 ft.)	709-BH-11 6/1/12 (5.5-6.75 ft.)	709-BH-11 6/1/12 (7.5-8.5 ft.)	709-BH-11 6/1/12 (14-15 ft.)	709-BH-11 6/1/12 (23-24 ft.)	709-MW18(BH-12) 6/3/12 (2-3 ft.)	709-MW18(BH-12) 6/3/12 (7.5-9 ft.)	709-MW18(BH-12) 6/3/12 (15-16 ft.)	709-MW18(BH-12) 6/3/12 (22-24 ft.)	709-BH-12B 10/2/12 (5 ft.)	709-BH-12B 10/2/12 (9 ft.)	709-BH-12B 10/2/12 (14 ft.)	709-BH-12B 10/2/12 (18.5 ft.)
2-Butanone in mg/kg																			
2-Chloroethyl Vinyl Ether in mg/kg																			
2-Chlorotoluene in mg/kg																			
2-Hexanone in mg/kg																			
4-Chlorotoluene in mg/kg																			
4-Methyl-2-pentanone in mg/kg																			
Acetone in mg/kg	3,150,000																		
Acrolein in mg/kg																			
Acrylonitrile in mg/kg	1																		
Benzene in mg/kg	0.02	0.022	0.00032 J	0.0018 J	0.023	0.0063 J	0.00039 J	0.33 U		0.023	0.093	0.0011 J	0.00026 J	0.0009 J	0.00077 J	0.0059 U	0.0058 U	0.0056 U	0.064 U
Bromobenzene in mg/kg																			
Bromochloromethane in mg/kg																			
Bromodichloromethane in mg/kg																			
Bromoethane in mg/kg																			
Bromoform in mg/kg																			
Bromomethane in mg/kg																			
Carbon disulfide in mg/kg																			
Carbon tetrachloride in mg/kg		0.006 U	0.0052 U	0.0056 U	0.0065 U	0.0063 U	0.0055 U	0.33 U		0.0055 U	0.0058 U	0.0059 U	0.0053 U	0.0062 U	0.0066 U	0.0059 U	0.0058 U	0.0056 U	0.064 U
Chlorobenzene in mg/kg																			
Chloroethane in mg/kg																			
Chloroform in mg/kg	4,000	0.006 U	0.0052 U	0.0056 U	0.0065 U	0.0063 U	0.0055 U	0.33 U		0.0055 U	0.0058 U	0.0059 U	0.0053 U	0.0062 U	0.0066 U	0.0059 U	0.0058 U	0.0056 U	0.064 U
Chloromethane in mg/kg																			
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.00028 J	0.0052 U	0.0056 U	0.01	0.0063 U	0.0055 U	0.33 U		0.0055 U	0.00045 J	0.0059 U	0.0053 U	0.35	0.32	0.0059 U	0.00043 J	0.025	2.3
cis-1,3-Dichloropropene in mg/kg																			
Dibromochloromethane in mg/kg																			
Dibromomethane in mg/kg																			
Dichlorodifluoromethane in mg/kg																			
Ethylbenzene in mg/kg	0.06	0.002 J	0.00045 J	0.0056 U	0.0028 J	0.00014 J	0.0055 U	15 J		0.041	0.0058 U	0.0059 U	0.0053 U	0.0062 U	0.0066 U	0.00028 J	0.0058 U	0.00035 J	0.064 U
Hexachlorobutadiene in mg/kg	0.01																		
Isopropylbenzene in mg/kg	350,000																		
Methyl tert-butyl ether (MTBE) in mg/kg																			
Methylene chloride in mg/kg	20,000	0.012 U	0.011 U	0.012 U	0.013 U	0.013 U	0.011 U	0.28 J		0.011 U	0.012 U	0.012 U	0.011 U	0.013 U	0.014 U	0.012 U	0.012 U	0.012 U	0.12 J
Methyliodide in mg/kg																			
n-Butylbenzene in mg/kg	175,000																		
n-Propylbenzene in mg/kg	350,000																		
p-Isopropyltoluene in mg/kg																			
sec-Butylbenzene in mg/kg	350,000																		
Styrene in mg/kg																			
tert-Butylbenzene in mg/kg																			
Tetrachloroethene (PCE) in mg/kg	0.005	0.00055 J	0.00038 J	0.0012 J	0.00049 J	0.00045 J	0.00071 J	0.33 U		0.0055 U	0.0011 J	0.0024 J	0.0019 J	0.0028 J	0.0015 J	0.0059 J	0.0044 J	0.00069 J	0.064 U
Toluene in mg/kg	280,000	0.0015 J	0.00027 J	0.0056 U	0.0054 J	0.00045 J	0.00055 J	0.053 J		0.0054 J	0.00068 J	0.00089 J	0.00041 J	0.00023 J	0.00059 J	0.0013 J	0.00052 J	0.0014 J	0.056 J
trans-1,2-Dichloroethene in mg/kg	70,000	0.00055 J	0.0052 U	0.0056 U	0.011	0.0063 U	0.0055 U	0.33 U		0.0055 U	0.0058 U	0.0059 U	0.0053 U	0.066	0.0076	0.0059 U	0.0058 U	0.013	0.13
trans-1,3-Dichloropropene in mg/kg																			
Trichloroethene (TCE) in mg/kg	0.005	0.00047 J	0.00031 J	0.00044 J	0.00069 J	0.0063 U	0.0055 U	0.33 U		0.00021 J	0.00053 J	0.0006 J	0.0018 J	0.01	0.00063 J	0.00092 J	0.0016 J	0.0009 J	0.064 U
Trichlorofluoromethane in mg/kg																			
Vinyl acetate in mg/kg																			
Vinyl chloride in mg/kg	0.005	0.0041 J	0.0052 U	0.0056 U	0.0045 J	0.0014 J	0.0055 U	0.33 U		0.0055 U	0.0058 U	0.0059 U	0.0053 U	0.019	0.0053 J	0.00036 J	0.00037 J	0.00029 J	0.064 U
m,p-Xylenes in mg/kg		0.0015 J	0.0007 J	0.0056 U	0.0012 J	0.00034 J	0.00093 J	0.33 U		0.014	0.0058 U	0.00044 J	0.0053 U	0.0062 U	0.0066 U	0.00024 J	0.0058 U	0.00021 J	0.064 U
o-Xylene in mg/kg		0.00065 J	0.00019 J	0.0056 U	0.0004 J	0.0063 U	0.00028 J	0.33 U		0.0017 J	0.0058 U	0.0059 U	0.0053 U	0.0062 U	0.0066 U	0.0059 U	0.0058 U	0.0056 U	0.064 U
Total Xylenes in mg/kg		0.0022 J	0.00089 J	ND	0.0016 J	0.0035 J	0.0031 J	ND		0.016	ND	0.0034 J	ND	ND	ND	0.0032 J	ND	0.003 J	ND
Xylenes (total) in mg/kg	700,000																		
Naphthalene in mg/kg	6																		

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UU - Analyte was not detected at or above the reported estimate

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-12B 10/2/12 (24.5 ft.)	709-MW-06-15 5/19/12 (15 ft.)	709-MW-20 6/2/12 (1.5-2.5 ft.)	709-MW-20 6/2/12 (5-6 ft.)	709-MW-20 6/2/12 (10-11 ft.)	709-MW-20 6/2/12 (15-16 ft.)	709-MW-20 6/2/12 (20-21 ft.)	709-MW-20 6/2/12 (24.5-25.5 ft.)	709-MW-21 6/1/12 (2.5-3.5 ft.)	709-MW-21 6/1/12 (4-5 ft.)	709-MW-21 6/1/12 (9-10 ft.)	709-MW-21 6/1/12 (14-15 ft.)	709-MW-21 6/1/12 (23-24 ft.)	721-MW5-50 6/28/04 (50 ft.)	721-MW6-50 7/1/04 (50 ft.)	721-MW7-15 6/30/04 (15 ft.)	721-MW8-15 6/30/04 (15 ft.)	721-MW9-50 6/29/04 (50 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
#2 Diesel in mg/kg																			
Gasoline Range Hydrocarbons in mg/kg	30	3.8 U								3 U		14	5 U	3.7 U					
Diesel Range Hydrocarbons in mg/kg	2,000	31 U								8.3 J	2,000	290	2.7 J	2.4 J					
Oil Range Hydrocarbons in mg/kg	2,000	130 U								120 U	250 U	130 U	140 UJ	130 U					
Total TPHs D+O (ND=1/2U) in ug/L	2,000	ND								68.3 J	2,125	355	72.7 J	67.4 J					
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in mg/kg	2,000																		
Oil Range Hydrocarbons in mg/kg	2,000																		
Total TPHs D+O (ND=1/2U) in ug/L	2,000																		
Metals																			
Aluminum in mg/kg		4,160	8,240	7,500	7,450	5,150	5,450	6,380	4,910	5,980		5,990	6,470	6,190					
Antimony in mg/kg		0.024 J	1.25 J	1.2 J	1.79 J	0.064 J	0.091 J	0.034 J	0.018 J	0.073 J		0.019 J	0.05 UJ	0.011 J					
Arsenic in mg/kg	20	0.81	8.25	4.49	5.24	1.55	2.04	4.05	0.53	0.9		1	1.03	0.5					
Cadmium in mg/kg		0.017 J	0.243	0.141	0.176	0.218	0.043 U	0.054 U	0.021 U	0.033		0.027	0.019 J	0.014 J					
Chromium (Total) in mg/kg		6.37	9.04	11.1	68.1	13.1	6.94	6.95	6.52	5.95		6.44	5.9	6.17					
Copper in mg/kg	36	10.2	15.7	19.7	18.6	9.76	9.64	11.4	10.5	7.69		8.19	8.66	8.66					
Iron in mg/kg		8,560	13,000	11,700	12,800	9,210	9,430	11,400	9,800	8,840		8,690	8,920	10,300					
Lead in mg/kg	1,000	1.17	59.3	1,200	1,130	12	1.33	1.98	1.27	1.76		1.29	0.867	1.13					
Mercury in mg/kg		0.007 J	0.067	0.047	0.058	0.016 J	0.012 J	0.021	0.01 J	0.004 J		0.004 J	0.003 J	0.006 J					
Nickel in mg/kg	48	5.94	10.7	39.9	25.7	8.13	8.5	7.07	7.63	6.31		6.89	6.35	6.42					
Silicon in mg/kg		461	1,920	1,010 J	1,340 J	1,090 J	1,180 J	1,200 J	1,050 J	1,770		1,610	1,490	1,400					
Silver in mg/kg		0.011 J	0.078	0.089	0.117	0.139	0.02 J	0.028	0.011 J	0.013 J		0.012 J	0.011 J	0.012 J					
Sodium in mg/kg																			
Tetraethyl Lead in mg/kg	0.35	1.2 U								1.1 U		1.2 U	1.3 U	1.3 U					
Thallium in mg/kg		0.035	0.034	0.099	0.032	0.022	0.041	0.069	0.021	0.026		0.025	0.031	0.016 J					
Zinc in mg/kg	85	13.5	45.2 J	60.3	82.5	40.2	13.9	15.8	15.4	12 J		11.4 J	12 J	11.6 J					
Organometals																			
Tetraethyl Lead in mg/kg	0.35	1.2 U								1.1 U		1.2 U	1.3 U	1.3 U					
Conventional Chemistry Parameters																			
Chloride in mg/kg																			
pH in pH Units															6.49	5.77	7.31	8.14	7.66
Sodium in mg/kg																			
Sulfide in mg/kg																			
Total Organic Carbon in %																			
Total Solids in %																			
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in mg/kg															0.13 U	0.0063 U	0.15 U	0.15 U	0.0008 U
1,1,1-Trichloroethane in mg/kg															0.13 U	0.16 U	0.001 U	0.0009 U	0.0008 U
1,1,2 - Trichlorotrifluoroethane in mg/kg															0.026 U	0.013 U	0.29 U	0.3 U	0.0016 U
1,1,2,2-Tetrachloroethane in mg/kg	700	0.075 U								0.0057 U		0.0056 U	0.006 U	0.0057 U	0.13 U	0.0063 U	0.001 U	0.15 U	0.0008 U
1,1,2-Trichloroethane in mg/kg		0.075 U								0.0057 U		0.0056 U	0.006 U	0.0057 U	0.13 U	0.0063 U	0.15 U	0.0009 U	0.0008 U
1,1-Dichloroethane in mg/kg															0.13 U	0.0012 U	0.15 U	0.15 U	0.0008 U
1,1-Dichloroethene in mg/kg	175,000	0.075 U								0.0057 U		0.0056 U	0.006 U	0.0057 U	0.13 U	0.0063 U	0.15 U	0.15 U	0.0008 U
1,1-Dichloropropene in mg/kg															0.13 U	0.16 U	0.15 U	0.0009 U	0.0008 U
1,2,3-Trichlorobenzene in mg/kg															0.67 U	0.032 U	0.73 U	0.0043 U	0.004 U
1,2,3-Trichloropropane in mg/kg															0.27 U	0.013 U	0.0021 U	0.3 U	0.0016 U
1,2,4-Trichlorobenzene in mg/kg																			
1,2,4-Trimethylbenzene in mg/kg																			
1,2-Dibromo-3-chloropropane in mg/kg															0.67 U	0.032 U	0.0052 U	0.75 U	0.004 U
1,2-Dibromoethane (EDB) in mg/kg															0.13 U	0.0012 U	0.001 U	0.0009 U	0.0008 U
1,2-Dichlorobenzene in mg/kg																			
1,2-Dichloroethane (EDC) in mg/kg	1,000														0.13 U	0.0012 U	0.001 U	0.0009 U	0.0008 U
1,2-Dichloropropane in mg/kg															0.13 U	0.0063 U	0.15 U	0.0009 U	0.0008 U
1,3,5-Trimethylbenzene in mg/kg	35,000																		
1,3-Dichlorobenzene in mg/kg																			
1,3-Dichloropropane in mg/kg															0.13 U	0.16 U	0.15 U	0.69 U	0.0008 U
1,4-Dichloro-2-Butene in mg/kg															0.67 U	0.032 U	0.0051 U	3.4 U	0.004 U
1,4-Dichlorobenzene in mg/kg																			
2,2-Dichloropropane in mg/kg															0.13 U	0.16 U	0.15 U	0.0009 U	0.0008 U

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Table B-11

RI

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Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-12B 10/2/12 (24.5 ft.)	709-MW-06-15 5/19/12 (15 ft.)	709-MW-20 6/2/12 (1.5-2.5 ft.)	709-MW-20 6/2/12 (5-6 ft.)	709-MW-20 6/2/12 (10-11 ft.)	709-MW-20 6/2/12 (15-16 ft.)	709-MW-20 6/2/12 (20-21 ft.)	709-MW-20 6/2/12 (24.5-25.5 ft.)	709-MW-21 6/1/12 (2.5-3.5 ft.)	709-MW-21 6/1/12 (4-5 ft.)	709-MW-21 6/1/12 (9-10 ft.)	709-MW-21 6/1/12 (14-15 ft.)	709-MW-21 6/1/12 (23-24 ft.)	721-MW5-50 6/28/04 (50 ft.)	721-MW6-50 7/1/04 (50 ft.)	721-MW7-15 6/30/04 (15 ft.)	721-MW8-15 6/30/04 (15 ft.)	721-MW9-50 6/29/04 (50 ft.)
2-Butanone in mg/kg															0.82	0.032 U	0.0052 U	0.75 U	0.004 U
2-Chloroethyl Vinyl Ether in mg/kg															0.67 U	0.032 U	0.73 U	3.4 U	0.004 U
2-Chlorotoluene in mg/kg															0.13 U	0.0063 U	0.001 U	0.15 U	0.0008 U
2-Hexanone in mg/kg															0.67 U	0.8 U	0.73 U	0.75 U	0.004 U
4-Chlorotoluene in mg/kg															0.13 U	0.0012 U	0.15 U	0.69 U	0.001 U
4-Methyl-2-pentanone in mg/kg															0.67 U	0.0062 U	0.0051 U	0.0043 U	0.004 U
Acetone in mg/kg	3,150,000														0.066 U	0.8 U	0.0051 U	0.0043 U	0.004 U
Acrolein in mg/kg															6.7 U	8 U	0.051 U	0.043 U	0.04 U
Acrylonitrile in mg/kg	1														0.67 U	0.032 U	0.73 U	0.0043 U	0.0048 U
Benzene in mg/kg	0.02	0.075 U								0.0014 J		0.01	0.0049 J	0.065	0.13 U	0.16 U	0.001 U	0.0009 U	0.0008 U
Bromobenzene in mg/kg															0.13 U	0.0063 U	0.001 U	0.69 U	0.0008 U
Bromochloromethane in mg/kg															0.013 U	0.16 U	0.15 U	0.15 U	0.0008 U
Bromodichloromethane in mg/kg															0.013 U	0.0012 U	0.15 U	0.15 U	0.0008 U
Bromoethane in mg/kg															0.026 U	0.32 U	0.29 U	0.3 U	0.0016 U
Bromoform in mg/kg															0.013 U	0.16 U	0.15 U	0.15 U	0.0008 U
Bromomethane in mg/kg															0.13 U	0.16 U	0.15 U	0.0009 U	0.0008 U
Carbon disulfide in mg/kg															0.013 U	0.16 U	0.15 U	0.15 U	0.0008 U
Carbon tetrachloride in mg/kg		0.075 U								0.0057 U		0.0056 U	0.006 U	0.0057 U	0.13 U	0.16 U	0.15 U	0.0009 U	0.0008 U
Chlorobenzene in mg/kg															0.13 U	0.0063 U	0.001 U	0.69 U	0.0008 U
Chloroethane in mg/kg															0.013 U	0.16 U	0.15 U	0.15 U	0.0008 U
Chloroform in mg/kg	4,000	0.075 U								0.0057 U		0.0056 U	0.006 U	0.0057 U	0.13 U	0.16 U	0.001 U	0.0009 U	0.0008 U
Chloromethane in mg/kg															0.13 U	0.16 U	0.001 U	0.15 U	0.0008 U
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.9								0.0057 U		0.0056 U	0.006 U	0.0057 U	0.13 U	0.16 U	0.15 U	0.15 U	0.0008 U
cis-1,3-Dichloropropene in mg/kg															0.13 U	0.16 U	0.15 U	0.0009 U	0.001 U
Dibromochloromethane in mg/kg															0.13 U	0.16 U	0.001 U	0.69 U	0.0008 U
Dibromomethane in mg/kg															0.013 U	0.16 U	0.15 U	0.15 U	0.0008 U
Dichlorodifluoromethane in mg/kg																			
Ethylbenzene in mg/kg	0.06	0.075 U								0.001 J		0.28	0.0019 J	0.00029 J	1.1	0.0063 U	0.001 U	0.0009 U	0.001 U
Hexachlorobutadiene in mg/kg	0.01																		
Isopropylbenzene in mg/kg	350,000														0.4	0.0063 U	0.0013	0.38	0.0008 U
Methyl tert-butyl ether (MTBE) in mg/kg																			
Methylene chloride in mg/kg	20,000	0.025 J								0.012 U		0.027 U	0.013 U	0.012 U	0.026 U	0.32 U	0.29 U	0.3 U	0.0016 U
Methyliodide in mg/kg															0.013 U	0.0063 U	0.15 U	0.15 U	0.0008 U
n-Butylbenzene in mg/kg	175,000														4.1 M	1 M	2.3 M	0.0009 U	0.001 U
n-Propylbenzene in mg/kg	350,000														1.7	0.62 M	1.6 M	0.0009 U	0.001 U
p-Isopropyltoluene in mg/kg															1.1	0.0063 U	0.001 U	0.0009 U	0.0008 U
sec-Butylbenzene in mg/kg	350,000														0.13 U	0.58 M	1.7 M	1.3 M	0.0008 U
Styrene in mg/kg															0.13 U	0.0063 U	0.15 U	0.0009 U	0.001 U
tert-Butylbenzene in mg/kg															0.13 U	0.0063 U	0.001 U	0.15 U	0.0008 U
Tetrachloroethene (PCE) in mg/kg	0.005	0.075 U								0.0057 U		0.0008 J	0.00094 J	0.0011 J	0.13 U	0.16 U	0.15 U	0.69 U	0.0008 U
Toluene in mg/kg	280,000	0.013 J								0.001 J		0.019	0.0033 J	0.0012 J	0.13 U	0.0063 U	0.001 U	0.0009 U	0.001 U
trans-1,2-Dichloroethene in mg/kg	70,000	0.075 U								0.0057 U		0.0056 U	0.006 U	0.0057 U	0.13 U	0.16 U	0.15 U	0.15 U	0.0008 U
trans-1,3-Dichloropropene in mg/kg															0.13 U	0.16 U	0.15 U	0.0009 U	0.001 U
Trichloroethene (TCE) in mg/kg	0.005	0.075 U								0.0057 U		0.0056 U	0.006 U	0.0057 U	0.13 U	0.0063 U	0.15 U	0.15 U	0.0008 U
Trichlorofluoromethane in mg/kg															0.13 U	0.0063 U	0.15 U	0.15 U	0.0008 U
Vinyl acetate in mg/kg															0.67 U	0.8 U	0.0051 U	0.0043 U	0.004 U
Vinyl chloride in mg/kg	0.005	0.068 J								0.0057 U		0.0056 U	0.006 U	0.0057 U	0.13 U	0.0012 U	0.15 U	0.15 U	0.0008 U
m,p-Xylenes in mg/kg		0.075 U								0.0035 J		0.034	0.013	0.00042 J					
o-Xylene in mg/kg		0.075 U								0.0012 J		0.0048 J	0.0031 J	0.00028 J	0.28	0.0063 U	0.15 U	0.15 U	0.0008 U
Total Xylenes in mg/kg		ND								0.0047 J		0.039	0.016	0.0007 J					
Xylenes (total) in mg/kg	700,000																		
Naphthalene in mg/kg	6																		

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-MW10 6/5/12 (2-3 ft.)	721-MW10 6/5/12 (5-6 ft.)	721-MW10 6/5/12 (9-10 ft.)	721-MW10 6/5/12 (10-11 ft.)	721-MW10 6/5/12 (14.5-15.5 ft.)	721-MW10 6/5/12 (19.5-20.5 ft.)	721-MW10 6/5/12 (24-25 ft.)	721-MW11 7/12/12 (12.5 ft.)	721-MW11 7/12/12 (25 ft.)	721-MW11 7/13/12 (64 ft.)	721-MW11 7/13/12 (75 ft.)	721-BH-01 5/30/12 (3.5-4.5 ft.)	721-BH-01 5/30/12 (9.5-10.5 ft.)	721-BH-01 5/30/12 (19-20 ft.)	721-BH-01 5/30/12 (23-24 ft.)	721-BH-02 5/23/12 (3-4 ft.)	721-BH-02 5/23/12 (8.5-8.75 ft.)	721-BH-02 5/23/12 (9-10 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
#2 Diesel in mg/kg				5.1					38	3.9 U	3.6 U	3.8 U	3.2 U	1,100	1.9 J	4.4 U			
Gasoline Range Hydrocarbons in mg/kg	30			8,400					35 U	30 U	30 U	31 U	26 U	1,400	30 U	31 U			
Diesel Range Hydrocarbons in mg/kg	2,000			250 U					140 U	120 U	120 U	5.2 J	110 U	94 J	120 U	130 U			
Oil Range Hydrocarbons in mg/kg	2,000			8,525					ND	ND	ND	20.7 J	ND	1,494 J	ND	ND			
Total TPHs D+O (ND=1/2U) in ug/L	2,000																		
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in mg/kg	2,000																		18,000
Oil Range Hydrocarbons in mg/kg	2,000																		1,400 x
Total TPHs D+O (ND=1/2U) in ug/L	2,000																		19,400
Metals																			
Aluminum in mg/kg		9,110	5,620		5,440	7,120	5,620	6,080	9,160	4,630	5,030	6,570	7,990	8,070	8,580	7,910	5,640		6,350
Antimony in mg/kg		0.433 J	0.11 J		0.063 J	0.046 J	0.026 J	0.027 J	0.049 UJ	0.049 UJ	0.058 U	0.061 U	0.014 J	0.028 J	0.028 J	0.011 J	0.012 J		0.051 UJ
Arsenic in mg/kg	20	2.88	1.17		1.42	2.04	0.26 J	2.39	2.68	0.39 J	0.57	1.14	1.37	1.23	3.05	0.36 J	1.09		1.21
Cadmium in mg/kg		0.179	0.048		0.033	0.055	0.02 U	0.08	0.099	0.017 U	0.017 U	0.03 U	0.028	0.025	0.034	0.014 J	0.023		0.059
Chromium (Total) in mg/kg		13.2	7.43		8.88	7.85	5.97	7.46	11.6	6.85	6.66	9.96	6.16	6.45	7.2	6.32	7.43		7.41
Copper in mg/kg	36	34.7	8.79		8.35	12.1	8.36	11	19.9	8.68	9.73	13.1	8.98	9.05	12	9.86	8.84		9.79
Iron in mg/kg		14,100	8,920		9,750	12,300	10,800	11,000	15,700	9,120	9,900	10,800	11,200	10,500	13,300	10,700	9,920		9,160
Lead in mg/kg	1,000	103	18.7		5.07	1.55	1.14	1.33	2.51	1.02	1.17	1.41	1.22	5.15	1.53	1.11	11.1		8.36
Mercury in mg/kg		0.109	0.006 J		0.005 J	0.01 J	0.003 J	0.005 J	0.011 J	0.003 J	0.008 J	0.008 J	0.004 J	0.004 J	0.009 J	0.007 J	0.006 J		0.005 J
Nickel in mg/kg	48	14.4	7.37		8.51	7.07	6.25	6.63	9.53	6.79	6.25	8.71	8.93	9.48	9.88	9.43	5.04		12.2
Silicon in mg/kg		2,000	1,090		1,220	1,590	1,070	1,350	1,500	872	975	1,370	1,660 J	1,800 J	1,720 J	1,740 J	1,170 J		1,340 J
Silver in mg/kg		0.065	0.016 J		0.015 J	0.02	0.008 J	0.02	0.031	0.02 U	0.023 U	0.014 J	0.01 J	0.01 J	0.014 J	0.009 J	0.011 J		0.013 J
Sodium in mg/kg																			
Tetraethyl Lead in mg/kg	0.35								1.3 U	1.2 U	1.3 U	1.3 U	1 U	2.1	1.2 U	1.2 U	1 U		25 U
Thallium in mg/kg		0.043	0.052		0.052	0.048	0.011 J	0.084	0.068	0.017	0.021	0.033	0.031	0.045	0.037	0.025	0.037		0.03
Zinc in mg/kg	85	59.3 J	15.4 J		13.7 J	14.7 J	13.2 J	14.6 J	22.1	17.4	16.7 U	18.5 U	13.8	13.4	15.4	16.7	12.4		16.6
Organometals																			
Tetraethyl Lead in mg/kg	0.35								1.3 U	1.2 U	1.3 U	1.3 U	1 U	2.1	1.2 U	1.2 U	1 U		25 U
Conventional Chemistry Parameters																			
Chloride in mg/kg																			
pH in pH Units																			
Sodium in mg/kg																			
Sulfide in mg/kg																			
Total Organic Carbon in %																			
Total Solids in %																			
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in mg/kg																			
1,1,1-Trichloroethane in mg/kg																			
1,1,2 - Trichlorotrifluoroethane in mg/kg																			
1,1,2,2-Tetrachloroethane in mg/kg	700								0.0064 U	0.0064 U	0.0055 U	0.0058 U	0.0055 U	0.34 U	0.0079 U	0.0065 U	0.0054 U		0.2 U
1,1,2-Trichloroethane in mg/kg									0.0064 U	0.0064 U	0.0055 U	0.0058 U	0.0055 U	0.34 U	0.0079 U	0.0065 U	0.0054 U		0.2 U
1,1-Dichloroethane in mg/kg																			
1,1-Dichloroethene in mg/kg	175,000								0.0064 U	0.0064 U	0.0055 U	0.0058 U	0.0055 U	0.34 U	0.0012 J	0.0013 J	0.0054 U		0.2 U
1,1-Dichloropropene in mg/kg																			
1,2,3-Trichlorobenzene in mg/kg																			
1,2,3-Trichloropropane in mg/kg																			
1,2,4-Trichlorobenzene in mg/kg																			
1,2,4-Trimethylbenzene in mg/kg																			
1,2-Dibromo-3-chloropropane in mg/kg																			
1,2-Dibromoethane (EDB) in mg/kg																			
1,2-Dichlorobenzene in mg/kg																			
1,2-Dichloroethane (EDC) in mg/kg	1,000																		
1,2-Dichloropropane in mg/kg																			
1,3,5-Trimethylbenzene in mg/kg	35,000																		
1,3-Dichlorobenzene in mg/kg																			
1,3-Dichloropropane in mg/kg																			
1,4-Dichloro-2-Butene in mg/kg																			
1,4-Dichlorobenzene in mg/kg																			
2,2-Dichloropropane in mg/kg																			

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-MW10 6/5/12 (2-3 ft.)	721-MW10 6/5/12 (5-6 ft.)	721-MW10 6/5/12 (9-10 ft.)	721-MW10 6/5/12 (10-11 ft.)	721-MW10 6/5/12 (14.5-15.5 ft.)	721-MW10 6/5/12 (19.5-20.5 ft.)	721-MW10 6/5/12 (24-25 ft.)	721-MW11 7/12/12 (12.5 ft.)	721-MW11 7/12/12 (25 ft.)	721-MW11 7/13/12 (64 ft.)	721-MW11 7/13/12 (75 ft.)	721-BH-01 5/30/12 (3.5-4.5 ft.)	721-BH-01 5/30/12 (9.5-10.5 ft.)	721-BH-01 5/30/12 (19-20 ft.)	721-BH-01 5/30/12 (23-24 ft.)	721-BH-02 5/23/12 (3-4 ft.)	721-BH-02 5/23/12 (8.5-8.75 ft.)	721-BH-02 5/23/12 (9-10 ft.)
2-Butanone in mg/kg																			
2-Chloroethyl Vinyl Ether in mg/kg																			
2-Chlorotoluene in mg/kg																			
2-Hexanone in mg/kg																			
4-Chlorotoluene in mg/kg																			
4-Methyl-2-pentanone in mg/kg																			
Acetone in mg/kg	3,150,000																		
Acrolein in mg/kg																			
Acrylonitrile in mg/kg	1																		
Benzene in mg/kg	0.02			0.02 U					0.12	0.015	0.0002 J	0.00008 J	0.0055 U	0.34 U	0.035	0.031	0.000085 J		1.6
Bromobenzene in mg/kg																			
Bromochloromethane in mg/kg																			
Bromodichloromethane in mg/kg																			
Bromoethane in mg/kg																			
Bromoform in mg/kg																			
Bromomethane in mg/kg																			
Carbon disulfide in mg/kg																			
Carbon tetrachloride in mg/kg									0.0064 U	0.0064 U	0.0055 U	0.0058 U	0.0055 U	0.34 U	0.0079 U	0.0065 U	0.0054 U		0.2 U
Chlorobenzene in mg/kg																			
Chloroethane in mg/kg																			
Chloroform in mg/kg	4,000								0.0064 U	0.0064 U	0.0055 U	0.0058 U	0.0055 U	0.34 U	0.0079 U	0.0065 U	0.0054 U		0.2 U
Chloromethane in mg/kg																			
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000								0.0064 U	0.0064 U	0.0055 U	0.0058 U	0.0055 U	0.34 U	0.019	0.011	0.0054 U		0.2 U
cis-1,3-Dichloropropene in mg/kg																			
Dibromochloromethane in mg/kg																			
Dibromomethane in mg/kg																			
Dichlorodifluoromethane in mg/kg																			
Ethylbenzene in mg/kg	0.06			0.02 U					0.002 J	0.00038 J	0.00032 J	0.0058 U	0.0055 U	0.34 U	0.0079 U	0.00098 J	0.0054 U		1
Hexachlorobutadiene in mg/kg	0.01																		
Isopropylbenzene in mg/kg	350,000																		
Methyl tert-butyl ether (MTBE) in mg/kg																			
Methylene chloride in mg/kg	20,000								0.013 U	0.013 U	0.011 U	0.012 U	0.011 U	0.31 J	0.016 U	0.013 U	0.011 U		0.79 U
Methyliodide in mg/kg																			
n-Butylbenzene in mg/kg	175,000																		
n-Propylbenzene in mg/kg	350,000																		
p-Isopropyltoluene in mg/kg																			
sec-Butylbenzene in mg/kg	350,000																		
Styrene in mg/kg																			
tert-Butylbenzene in mg/kg																			
Tetrachloroethene (PCE) in mg/kg	0.005								0.00024 J	0.0064 U	0.0055 U	0.0058 U	0.0023 J	0.34 U	0.0035 J	0.0027 J	0.0013 J		0.2 U
Toluene in mg/kg	280,000			0.02 U					0.0046 J	0.0013 J	0.00087 J	0.00044 J	0.00032 J	0.34 U	0.00064 J	0.00082 J	0.00024 J		0.27
trans-1,2-Dichloroethene in mg/kg	70,000								0.0064 U	0.0064 U	0.0055 U	0.0058 U	0.0055 U	0.34 U	0.0079 U	0.0065 U	0.0054 U		0.2 U
trans-1,3-Dichloropropene in mg/kg																			
Trichloroethene (TCE) in mg/kg	0.005								0.0064 U	0.0064 U	0.0055 U	0.0058 U	0.00044 J	0.34 U	0.0016 J	0.00068 J	0.0054 U		0.2 U
Trichlorofluoromethane in mg/kg																			
Vinyl acetate in mg/kg																			
Vinyl chloride in mg/kg	0.005								0.0064 U	0.0064 U	0.0055 U	0.0058 U	0.0055 U	0.34 U	0.00058 J	0.0065 U	0.0054 U		0.2 U
m,p-Xylenes in mg/kg									0.014	0.0064 U	0.0055 U	0.0058 U	0.00032 J	0.34 U	0.00067 J	0.00099 J	0.00042 J		0.047 J
o-Xylene in mg/kg									0.0064 U	0.00032 J	0.0055 U	0.0058 U	0.0055 U	0.34 U	0.00036 J	0.00071 J	0.0054 U		0.094 J
Total Xylenes in mg/kg									0.017	0.0035 J	ND	ND	0.0031 J	ND	0.001 J	0.0017 J	0.0031 J		0.14 J
Xylenes (total) in mg/kg	700,000			0.06 U															
Naphthalene in mg/kg	6																		

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-02 5/23/12 (16.5-17.5 ft.)	721-BH-02 5/23/12 (23-24 ft.)	721-BH-03 5/31/12 (0.5-1.5 ft.)	721-BH-03 5/31/12 (7.5-8.5 ft.)	721-BH-04 5/22/12 (3.5-4.5 ft.)	721-BH-04 5/22/12 (6-7 ft.)	721-BH-04 5/22/12 (7.5-8.5 ft.)	721-BH-04 5/22/12 (16-17 ft.)	721-BH-04 5/22/12 (23-24 ft.)	721-BH-05 5/31/12 (2.5-3.5 ft.)	721-BH-05 5/31/12 (5-6 ft.)	721-BH-07 5/30/12 (3-4 ft.)	721-BH-07 5/30/12 (5-6 ft.)	721-BH-07 5/30/12 (16-17 ft.)	721-BH-07 5/30/12 (23-24 ft.)	721-BH-08 5/31/12 (2.5-3.5 ft.)	721-BH-08 5/31/12 (4-5 ft.)	721-BH-09 6/19/12 (0-5 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
#2 Diesel in mg/kg																			
Gasoline Range Hydrocarbons in mg/kg	30			530	3,100	3.3 U		1,100	4.9 U	3.2 U	2.8 U	3,500	3.4 U	5,200	4.2 U	3.3 U	12	420	510
Diesel Range Hydrocarbons in mg/kg	2,000			11,000	3,500	670		4,700	10 J	2 J	130	7,900	28 U	6,700	8.9 J	31 U	65	28,000	1,500
Oil Range Hydrocarbons in mg/kg	2,000			10,000	260	78 J		310	19 J	4.1 J	480	270	120 U	1,100	15 J	130 U	180	3,300	990
Total TPHs D+O (ND=1/2U) in ug/L	2,000			21,000	3,760	748 J		5,010	29 J	6.1 J	610	8,170	ND	7,800	23.9 J	ND	245	31,300	2,490
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in mg/kg	2,000							54,000											
Oil Range Hydrocarbons in mg/kg	2,000							390 x											
Total TPHs D+O (ND=1/2U) in ug/L	2,000							54,390											
Metals																			
Aluminum in mg/kg		15,100	5,790	6,250	6,340	5,520		5,430	15,800	8,540	7,160	9,990	7,490	8,270	16,000	8,540	7,320	6,260	8,010
Antimony in mg/kg		0.048 J	0.053 UJ	0.615 J	0.016 J	0.357 J		0.053 UJ	0.039 J	0.026 J	2.51 J	0.069 J	0.044 UJ	0.021 J	0.052 J	0.049 UJ	0.733 J	0.404 J	0.489 J
Arsenic in mg/kg	20	5.5	0.56	6.38	1.25	3.37		0.78	5.4	2.13	5.87	0.91	1.09	2.19	5.87	2.09	3.06	1.64	3.21
Cadmium in mg/kg		0.177	0.022	0.165	0.04	0.037		0.058	0.184	0.091	0.416	0.033	0.014 J	0.118	0.191	0.024	0.12	0.067	0.136
Chromium (Total) in mg/kg		18.1	7.81	16.4	5.66	7.16		6.98	14.2	9.49	10.6	5.69	6.72	8.92	13.5	7.94	8.56	7.23	9.71
Copper in mg/kg	36	35	10	17.4	8.55	8.8		8.17	30.1	15.4	283	8.31	8.44	12.8	33.3	11.8	16.6	9.92	14.3
Iron in mg/kg		20,300	10,100	9,380	9,920	8,400		8,680	21,900	11,800	14,500	13,300	9,100	8,710	20,100	12,900	8,110	7,990	9,430
Lead in mg/kg	1,000	5.2	1.36	112	3.85	21.8		5.93	5.06	1.82	899	4.6	0.939	6.66	5.12	1.48	39.6	19.9	26.8
Mercury in mg/kg		0.043	0.008 J	0.018 J	0.005 J	0.01 J		0.007 J	0.053	0.01 J	0.026	0.004 J	0.005 J	0.005 J	0.043	0.007 J	0.015 J	0.008 J	0.013 J
Nickel in mg/kg	48	16	7.5	17	11.1	6.1		9.75	12.1	8.27	6.98	7.2	6.64	25.3	16.4	10.9	6.48	7.84	6.94
Silicon in mg/kg		2,050 J	1,390 J	1,550	1,570	1,270 J		1,470 J	1,930 J	1,180 J	2,250	2,040	1,700 J	1,640 J	1,730 J	1,510 J	1,870	1,610	2,250
Silver in mg/kg		0.066	0.01 J	0.045	0.014 J	0.013 J		0.01 J	0.076	0.029	0.178	0.02	0.01 J	0.013 J	0.073	0.01 J	0.039	0.021	0.027
Sodium in mg/kg																			
Tetraethyl Lead in mg/kg	0.35	1.4 U	1.2 U	210 U	13 U	5.5 U		6.1 U	1.5 U	1.2 U	21 U	12 U	1.1 U	25 U	1.4 U	1.2 U	21 U	87 U	11 U
Thallium in mg/kg		0.097	0.023	0.044	0.027	0.032		0.027	0.127	0.078	0.041	0.023	0.027	0.059	0.121	0.025	0.036	0.029	0.035
Zinc in mg/kg	85	35.4	16.7	40.9 J	13.9 J	28.6		14.1	30.7	18.8	438 J	15 J	12.2	28.1	24.2	20.9	42.4 J	22.6 J	38.1
Organometals																			
Tetraethyl Lead in mg/kg	0.35	1.4 U	1.2 U	210 U	13 U	5.5 U		6.1 U	1.5 U	1.2 U	21 U	12 U	1.1 U	25 U	1.4 U	1.2 U	21 U	87 U	11 U
Conventional Chemistry Parameters																			
Chloride in mg/kg																			
pH in pH Units																			
Sulfide in mg/kg																			
Total Organic Carbon in %																			
Total Solids in %																			
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in mg/kg																			
1,1,1-Trichloroethane in mg/kg																			
1,1,2 - Trichlorotrifluoroethane in mg/kg																			
1,1,2,2-Tetrachloroethane in mg/kg	700	0.0069 U	0.0059 U	0.065 U	3.1	0.0055 U		0.36 U	0.0069 U	0.005 U	0.0055 U	1.2 U	0.0064 U	0.75 UJ	0.0066 U	0.0065 U	0.0052 U	0.062 U	0.27 U
1,1,2-Trichloroethane in mg/kg		0.0069 U	0.0059 U	0.065 U	1.5 U	0.0055 U		0.36 U	0.0069 U	0.005 U	0.0055 U	1.2 U	0.0064 U	0.75 UJ	0.0066 U	0.0065 U	0.0052 U	0.062 U	0.27 U
1,1-Dichloroethane in mg/kg																			
1,1-Dichloroethene in mg/kg	175,000	0.0069 U	0.0059 U	0.065 U	1.5 U	0.0055 U		0.36 U	0.0069 U	0.005 U	0.0055 U	1.2 U	0.0064 U	0.75 UJ	0.0066 U	0.0065 U	0.0052 U	0.062 U	0.27 U
1,1-Dichloropropene in mg/kg																			
1,2,3-Trichlorobenzene in mg/kg																			
1,2,3-Trichloropropane in mg/kg																			
1,2,4-Trichlorobenzene in mg/kg																			
1,2,4-Trimethylbenzene in mg/kg																			
1,2-Dibromo-3-chloropropane in mg/kg																			
1,2-Dibromoethane (EDB) in mg/kg																			
1,2-Dichlorobenzene in mg/kg																			
1,2-Dichloroethane (EDC) in mg/kg	1,000																		
1,2-Dichloropropane in mg/kg																			
1,3,5-Trimethylbenzene in mg/kg	35,000																		
1,3-Dichlorobenzene in mg/kg																			
1,3-Dichloropropane in mg/kg																			
1,4-Dichloro-2-Butene in mg/kg																			
1,4-Dichlorobenzene in mg/kg																			
2,2-Dichloropropane in mg/kg																			

Table B-11

Aspect Consulting

2/26/2016

\\seastore2.aspect.local\projects\Port of Tacoma\Alexander Avenue Petroleum Tank Facilities\Draft Reports\RI\Appendices\Appendix B - Data Tables\B-11 to B-15 Pre-RI Data 2000-2013.xlsx

RI

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-02 5/23/12 (16.5-17.5 ft.)	721-BH-02 5/23/12 (23-24 ft.)	721-BH-03 5/31/12 (0.5-1.5 ft.)	721-BH-03 5/31/12 (7.5-8.5 ft.)	721-BH-04 5/22/12 (3.5-4.5 ft.)	721-BH-04 5/22/12 (6-7 ft.)	721-BH-04 5/22/12 (7.5-8.5 ft.)	721-BH-04 5/22/12 (16-17 ft.)	721-BH-04 5/22/12 (23-24 ft.)	721-BH-05 5/31/12 (2.5-3.5 ft.)	721-BH-05 5/31/12 (5-6 ft.)	721-BH-07 5/30/12 (3-4 ft.)	721-BH-07 5/30/12 (5-6 ft.)	721-BH-07 5/30/12 (16-17 ft.)	721-BH-07 5/30/12 (23-24 ft.)	721-BH-08 5/31/12 (2.5-3.5 ft.)	721-BH-08 5/31/12 (4-5 ft.)	721-BH-09 6/19/12 (0-5 ft.)	
2-Butanone in mg/kg																				
2-Chloroethyl Vinyl Ether in mg/kg																				
2-Chlorotoluene in mg/kg																				
2-Hexanone in mg/kg																				
4-Chlorotoluene in mg/kg																				
4-Methyl-2-pentanone in mg/kg																				
Acetone in mg/kg	3,150,000																			
Acrolein in mg/kg																				
Acrylonitrile in mg/kg	1																			
Benzene in mg/kg	0.02	0.012	0.00025 J	0.009 J	5.4	0.00018 J		0.36 U	0.15	0.019	0.00066 J	0.85 J	0.00013 J	0.75 UJ	0.34	0.045	0.037	1.5	0.68	
Bromobenzene in mg/kg																				
Bromochloromethane in mg/kg																				
Bromodichloromethane in mg/kg																				
Bromoethane in mg/kg																				
Bromoform in mg/kg																				
Bromomethane in mg/kg																				
Carbon disulfide in mg/kg																				
Carbon tetrachloride in mg/kg		0.0069 U	0.0059 U	0.065 U	1.5 U	0.0055 U		0.36 U	0.0069 U	0.005 U	0.0055 U	1.2 U	0.0064 U	0.75 UJ	0.0066 U	0.0065 U	0.0052 U	0.062 U	0.27 U	
Chlorobenzene in mg/kg																				
Chloroethane in mg/kg																				
Chloroform in mg/kg	4,000	0.0069 U	0.0059 U	0.065 U	1.5 U	0.0055 U		0.36 U	0.0069 U	0.005 U	0.0055 U	1.2 U	0.0064 U	0.75 UJ	0.0066 U	0.0065 U	0.0052 U	0.062 U	0.27 U	
Chloromethane in mg/kg																				
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.0069 U	0.0059 U	0.065 U	1.5 U	0.0055 U		0.36 U	0.0072	0.005 U	0.0055 U	1.2 U	0.0064 U	0.75 UJ	0.0066 U	0.0065 U	0.0052 U	0.062 U	0.27 U	
cis-1,3-Dichloropropene in mg/kg																				
Dibromochloromethane in mg/kg																				
Dibromomethane in mg/kg																				
Dichlorodifluoromethane in mg/kg																				
Ethylbenzene in mg/kg	0.06	0.0069 U	0.0059 U	0.065 U	14	0.0055 U		0.36 U	0.00069 J	0.00038 J	0.00033 J	48	0.0064 U	23 J	0.0066 U	0.0065 U	0.053	4.9	4	
Hexachlorobutadiene in mg/kg	0.01																			
Isopropylbenzene in mg/kg	350,000																			
Methyl tert-butyl ether (MTBE) in mg/kg																				
Methylene chloride in mg/kg	20,000	0.014 U	0.012 U	0.26 U	1.3 J	0.011 U		0.13 J	0.014 U	0.01 U	0.011 U	1.1 J	0.013 U	3 UJ	0.014 U	0.013 U	0.011 U	0.25 U	1.1 U	
Methyliodide in mg/kg																				
n-Butylbenzene in mg/kg	175,000																			
n-Propylbenzene in mg/kg	350,000																			
p-Isopropyltoluene in mg/kg																				
sec-Butylbenzene in mg/kg	350,000																			
Styrene in mg/kg																				
tert-Butylbenzene in mg/kg																				
Tetrachloroethene (PCE) in mg/kg	0.005	0.002 J	0.0012 J	0.026 J	1.5 U	0.002 J		0.36 U	0.0023 J	0.002 J	0.00086 J	1.2 U	0.0018 J	0.75 UJ	0.0015 J	0.004 J	0.00072 J	0.062 U	0.27 U	
Toluene in mg/kg	280,000	0.0069 U	0.00027 J	0.012 J	0.25 J	0.00026 J		0.36 U	0.0026 J	0.00072 J	0.00033 J	2.9	0.00029 J	1.8 J	0.0066 U	0.00093 J	0.0061	0.62	0.42 U	
trans-1,2-Dichloroethene in mg/kg	70,000	0.0069 U	0.0059 U	0.065 U	1.5 U	0.0055 U		0.36 U	0.0004 J	0.005 U	0.0055 U	1.2 U	0.0064 U	0.75 UJ	0.0066 U	0.0065 U	0.0052 U	0.062 U	0.27 U	
trans-1,3-Dichloropropene in mg/kg																				
Trichloroethene (TCE) in mg/kg	0.005	0.0069 U	0.0059 U	0.065 U	1.5 U	0.0055 U		0.36 U	0.00048 J	0.005 U	0.0055 U	1.2 U	0.0064 U	0.75 UJ	0.0066 U	0.00067 J	0.0052 U	0.062 U	0.27 U	
Trichlorofluoromethane in mg/kg																				
Vinyl acetate in mg/kg																				
Vinyl chloride in mg/kg	0.005	0.002 J	0.0059 U	0.065 U	1.5 U	0.0055 U		0.36 U	0.012	0.005 U	0.0055 U	1.2 U	0.0064 U	0.75 UJ	0.0066 U	0.0065 U	0.0052 U	0.062 U	0.27 U	
m,p-Xylenes in mg/kg		0.00043 J	0.00082 J	0.036 J	0.87 J	0.00038 J		0.36 U	0.0069 U	0.005 U	0.00054 J	78	0.00037 J	1.8 J	0.00036 J	0.00049 J	0.14	14	11	
o-Xylene in mg/kg		0.0069 U	0.00025 J	0.037 J	1.5 U	0.0055 U		0.36 U	0.0017 J	0.005 U	0.0055 U	5.4	0.0064 U	0.58 J	0.0066 U	0.00043 J	0.042	4.6	2.1	
Total Xylenes in mg/kg		0.0039 J	0.0011 J	0.073 J	1.6 J	0.0031 J		ND	0.0052 J	ND	0.0033 J	83	0.0036 J	2.4 J	0.0037 J	0.00092 J	0.18	19	13	
Xylenes (total) in mg/kg	700,000																			
Naphthalene in mg/kg	6																			

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-09 6/19/12 (5-10 ft.)	721-BH-09 6/19/12 (10-15 ft.)	721-BH-10 5/31/12 (3-4 ft.)	721-BH-10 5/31/12 (6-7 ft.)	721-BH-11 5/21/12 (3-4 ft.)	721-BH-11 5/21/12 (7-8 ft.)	721-BH-11 5/21/12 (16-17 ft.)	721-BH-11 5/21/12 (23-24 ft.)	721-BH-12 5/23/12 (3.75-4.75 ft.)	721-BH-12 5/23/12 (5-6 ft.)	721-BH-12 5/23/12 (16-17 ft.)	721-BH-12 5/23/12 (23-24 ft.)	721-BH-13 5/21/12 (4-5 ft.)	721-BH-13 5/21/12 (6-7.25 ft.)	721-BH-13 5/21/12 (9-10 ft.)	721-BH-13 5/21/12 (16-17 ft.)	721-BH-13 5/21/12 (23-24 ft.)	721-BH-14 5/20/12 (2-3 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
#2 Diesel in mg/kg																			
Gasoline Range Hydrocarbons in mg/kg	30	420	100	11	1,800														3.5 U
Diesel Range Hydrocarbons in mg/kg	2,000	15,000	470	320	18,000														27 U
Oil Range Hydrocarbons in mg/kg	2,000	250	100 J	1,800	280														110 U
Total TPHs D+O (ND=1/2U) in ug/L	2,000	15,250	570 J	2,120	18,280														ND
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in mg/kg	2,000																		50 U
Oil Range Hydrocarbons in mg/kg	2,000																		250 U
Total TPHs D+O (ND=1/2U) in ug/L	2,000																		ND
Metals																			
Aluminum in mg/kg		8,000	7,690	8,380	6,550	5,270	6,030	12,300	5,810	5,390	5,610	12,500	6,200	5,200	5,910		12,300	7,100	5,940
Antimony in mg/kg		0.049 UJ	0.05 UJ	0.692 J	0.261 J	0.011 J	0.017 J	0.042 J	0.063 UJ	0.357 J	0.016 J	0.029 J	0.055 UJ	0.509 J	0.037 J		0.043 J	0.018 J	0.011 J
Arsenic in mg/kg	20	0.86	0.91	4.61	0.87	0.82	1.07	5.21	0.61	2.64	0.55	4.04	1.21	3.25	0.53 J		3.12	1.52	1.08
Cadmium in mg/kg		0.029	0.021 U	0.251	0.026	0.011 J	0.038	0.202	0.014 J	0.081	0.031	0.178	0.038	0.706	0.053		0.123	0.032	0.031
Chromium (Total) in mg/kg		7.03	7.88	9.38	5.92	6.45	5.44	15.7	6.24	8.43	8.08	16.4	8.12	8.64	6.68		13.3	8.8	7.09
Copper in mg/kg	36	8.57	8.43	17.7	7.64	8.84	8.29	34.6	10.3	10.3	8.31	30.5	14.7	12.7	8.03		26.5	16.9	9.3
Iron in mg/kg		9,060	10,900	12,000	8,560	7,900	8,950	19,000	10,300	8,540	8,610	19,000	10,000	7,990	8,840		19,200	12,200	9,430
Lead in mg/kg	1,000	1.43	1.19	31.1	1.44	0.941	0.856	4.76	1.09	10.8	2.41	4.01	1.45	56.1	3.24		4.13	1.74	0.963
Mercury in mg/kg		0.005 J	0.004 J	0.024	0.004 J	0.004 J	0.004 J	0.032	0.005 J	0.01 J	0.004 J	0.031	0.009 J	0.016 J	0.005 J		0.026	0.015 J	0.005 J
Nickel in mg/kg	48	7.66	7.16	9.62	6.98	5.14	7.63	13.6	6.59	5.21	7.72	13	8.41	6.84	8.21		11.8	9.58	7.94
Silicon in mg/kg		2,170	2,170	2,120	1,860	1,580 J	1,770 J	1,320 J	1,380 J	1,250 J	1,050 J	1,660 J	1,670 J	724 J	2,020 J		1,730 J	1,120 J	1,460 J
Silver in mg/kg		0.01 J	0.009 J	0.257 J	0.064 J	0.022 U	0.024 U	0.058	0.025 U	0.023	0.014 J	0.058	0.013 J	0.026	0.023 U		0.048	0.014	0.011 J
Sodium in mg/kg																			
Tetraethyl Lead in mg/kg	0.35	5.8 U	1.2 U	21 U	23 U	1.1 U	1.2 U	1.4 U	1.3 U	1.1 U	23 U	1.4 U	1.3 U	5.5 U	1.8 J		1.5 U	1.3 U	1.1 U
Thallium in mg/kg		0.028	0.027	0.046	0.035	0.03	0.025 U	0.115	0.024 U	0.032	0.026	0.099	0.031	0.035	0.024 U		0.082	0.044	0.03
Zinc in mg/kg	85	14.3 U	14.2 U	33.6 J	12.4 J	17	17.8	31.7	13.6	20	15	30.6	16.9	38.7	15.3		26.4	19.1	15
Organometals																			
Tetraethyl Lead in mg/kg	0.35	5.8 U	1.2 U	21 U	23 U	1.1 U	1.2 U	1.4 U	1.3 U	1.1 U	23 U	1.4 U	1.3 U	5.5 U	1.8 J		1.5 U	1.3 U	1.1 U
Conventional Chemistry Parameters																			
Chloride in mg/kg																			
pH in pH Units																			
Sodium in mg/kg																			
Sulfide in mg/kg																			
Total Organic Carbon in %																			
Total Solids in %																			
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in mg/kg																			
1,1,1-Trichloroethane in mg/kg																			
1,1,2-Trichlorotrifluoroethane in mg/kg																			
1,1,2,2-Tetrachloroethane in mg/kg	700	0.37 U	0.0059 UJ	0.0054 UJ	1.4 U	0.0055 U	0.0055 U	0.081 U	0.071 U	0.065 U	0.17 U	0.0068 U	0.0056 U	0.086 U	0.42 U		0.0061 U	0.006 U	0.0056 UJ
1,1,2-Trichloroethane in mg/kg		0.39 U	0.0059 UJ	0.0054 UJ	1.4 U	0.0055 U	0.0055 U	0.081 U	0.071 U	0.065 U	0.17 U	0.0068 U	0.0056 U	0.086 U	0.42 U		0.0061 U	0.006 U	0.0058 U
1,1-Dichloroethane in mg/kg																			
1,1-Dichloroethene in mg/kg	175,000	0.37 U	0.0059 UJ	0.0054 UJ	1.4 U	0.0055 U	0.0055 U	0.081 U	0.071 U	0.065 U	0.17 U	0.0068 U	0.0056 U	0.086 U	0.083 U		0.0061 U	0.006 U	0.0058 U
1,1-Dichloropropene in mg/kg																			
1,2,3-Trichlorobenzene in mg/kg																			
1,2,3-Trichloropropane in mg/kg																			
1,2,4-Trichlorobenzene in mg/kg																			
1,2,4-Trimethylbenzene in mg/kg																			
1,2-Dibromo-3-chloropropane in mg/kg																			
1,2-Dibromoethane (EDB) in mg/kg																			
1,2-Dichlorobenzene in mg/kg																			
1,2-Dichloroethane (EDC) in mg/kg	1,000																		
1,2-Dichloropropane in mg/kg																			
1,3,5-Trimethylbenzene in mg/kg	35,000																		
1,3-Dichlorobenzene in mg/kg																			
1,3-Dichloropropane in mg/kg																			
1,4-Dichloro-2-Butene in mg/kg																			
1,4-Dichlorobenzene in mg/kg																			
2,2-Dichloropropane in mg/kg																			

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-09 6/19/12 (5-10 ft.)	721-BH-09 6/19/12 (10-15 ft.)	721-BH-10 5/31/12 (3-4 ft.)	721-BH-10 5/31/12 (6-7 ft.)	721-BH-11 5/21/12 (3-4 ft.)	721-BH-11 5/21/12 (7-8 ft.)	721-BH-11 5/21/12 (16-17 ft.)	721-BH-11 5/21/12 (23-24 ft.)	721-BH-12 5/23/12 (3.75-4.75 ft.)	721-BH-12 5/23/12 (5-6 ft.)	721-BH-12 5/23/12 (16-17 ft.)	721-BH-12 5/23/12 (23-24 ft.)	721-BH-13 5/21/12 (4-5 ft.)	721-BH-13 5/21/12 (6-7.25 ft.)	721-BH-13 5/21/12 (9-10 ft.)	721-BH-13 5/21/12 (16-17 ft.)	721-BH-13 5/21/12 (23-24 ft.)	721-BH-14 5/20/12 (2-3 ft.)	
2-Butanone in mg/kg																				
2-Chloroethyl Vinyl Ether in mg/kg																				
2-Chlorotoluene in mg/kg																				
2-Hexanone in mg/kg																				
4-Chlorotoluene in mg/kg																				
4-Methyl-2-pentanone in mg/kg																				
Acetone in mg/kg	3,150,000																			
Acrolein in mg/kg																				
Acrylonitrile in mg/kg	1																			
Benzene in mg/kg	0.02	0.66	0.087 J	0.25 J	8	0.00031 J	0.0055 U	3.7	1.6 J	0.17	3.3	1.4	0.19	2.1 J	8.6 J		0.85	0.18	0.00028 J	
Bromobenzene in mg/kg																				
Bromochloromethane in mg/kg																				
Bromodichloromethane in mg/kg																				
Bromoethane in mg/kg																				
Bromoform in mg/kg																				
Bromomethane in mg/kg																				
Carbon disulfide in mg/kg																				
Carbon tetrachloride in mg/kg		0.37 U	0.0059 UJ	0.0054 UJ	1.4 U	0.0055 U	0.0055 U	0.081 U	0.071 U	0.065 U	0.17 U	0.0068 U	0.0056 U	0.086 U	0.083 U		0.0061 U	0.006 U	0.0056 U	
Chlorobenzene in mg/kg																				
Chloroethane in mg/kg																				
Chloroform in mg/kg	4,000	0.37 U	0.0059 UJ	0.0054 UJ	1.4 U	0.0055 U	0.0055 U	0.081 U	0.071 U	0.065 U	0.17 U	0.0068 U	0.0056 U	0.086 U	0.083 U		0.0061 U	0.006 U	0.0058 U	
Chloromethane in mg/kg																				
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.37 U	0.0059 UJ	0.0054 UJ	1.4 U	0.0055 U	0.0055 U	0.081 U	0.071 U	0.065 U	0.17 U	0.0068 U	0.0056 U	0.086 U	0.083 U		0.0061 U	0.006 U	0.0056 U	
cis-1,3-Dichloropropene in mg/kg																				
Dibromochloromethane in mg/kg																				
Dibromomethane in mg/kg																				
Dichlorodifluoromethane in mg/kg																				
Ethylbenzene in mg/kg	0.06	3.4	0.22 J	0.18 J	17	0.0055 U	0.0055 U	0.081 U	0.02 J	1.2	11	0.011	0.0056 U	6.1 J	14 J		0.0073	0.0011 J	0.0056 U	
Hexachlorobutadiene in mg/kg	0.01																			
Isopropylbenzene in mg/kg	350,000																			
Methyl tert-butyl ether (MTBE) in mg/kg																				
Methylene chloride in mg/kg	20,000	1.5 U	0.058 UJ	0.27 UJ	1.2 J	0.011 U	0.011 U	0.33 U	0.29 U	0.26 U	0.67 U	0.014 U	0.012 U	0.35 U	0.33 U		0.013 U	0.012 U	0.012 U	
Methyliodide in mg/kg																				
n-Butylbenzene in mg/kg	175,000																			
n-Propylbenzene in mg/kg	350,000																			
p-Isopropyltoluene in mg/kg																				
sec-Butylbenzene in mg/kg	350,000																			
Styrene in mg/kg																				
tert-Butylbenzene in mg/kg																				
Tetrachloroethene (PCE) in mg/kg	0.005	0.37 U	0.00045 J	0.0054 UJ	1.4 U	0.0055 U	0.00059 J	0.081 U	0.071 U	0.014 J	0.17 U	0.002 J	0.0007 J	0.086 U	0.17 J		0.0061 U	0.0019 J	0.00063 J	
Toluene in mg/kg	280,000	0.42 U	0.045 J	0.21 J	2.9	0.00043 J	0.00065 J	0.0096 J	0.03 J	0.19	1.3	0.005 J	0.00054 J	0.95 J	2.2 J		0.022	0.0015 J	0.00067 J	
trans-1,2-Dichloroethene in mg/kg	70,000	0.37 U	0.0059 UJ	0.0054 UJ	1.4 U	0.0055 U	0.0055 U	0.081 U	0.071 U	0.065 U	0.17 U	0.0068 U	0.0056 U	0.086 U	0.083 U		0.0061 U	0.006 U	0.0056 U	
trans-1,3-Dichloropropene in mg/kg																				
Trichloroethene (TCE) in mg/kg	0.005	0.37 U	0.0059 UJ	0.0054 UJ	1.4 U	0.0055 U	0.0055 U	0.081 U	0.071 U	0.065 U	0.17 U	0.00077 J	0.0056 U	0.086 U	0.083 U		0.0061 U	0.00056 J	0.00038 J	
Trichlorofluoromethane in mg/kg																				
Vinyl acetate in mg/kg																				
Vinyl chloride in mg/kg	0.005	0.37 U	0.0059 UJ	0.0054 UJ	1.4 U	0.0055 U	0.0055 U	0.081 U	0.071 U	0.065 U	0.17 U	0.0068 U	0.0056 U	0.086 U	0.083 U		0.0061 U	0.006 U	0.0058 U	
m,p-Xylenes in mg/kg		6.3	0.43 J	0.77 J	57	0.00029 J	0.00028 J	0.081 U	0.028 J	4.2	24	0.019	0.00029 J	19 J	33 J		0.074	0.014	0.0056 U	
o-Xylene in mg/kg		0.33 J	0.032 J	0.25 J	2.3	0.0055 U	0.0055 U	0.081 U	0.02 J	1.2	1.7	0.0098	0.0056 U	5.1 J	3 J		0.011	0.0015 J	0.0058 U	
Total Xylenes in mg/kg		6.6	0.46 J	1.0 J	59	0.003 J	0.003 J	ND	0.048 J	5.4	26	0.029	0.0031 J	24 J	200 J		0.085	0.016	ND	
Xylenes (total) in mg/kg	700,000																			
Naphthalene in mg/kg	6																			

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-14 5/20/12 (7-8 ft.)	721-BH-14 5/20/12 (16-17 ft.)	721-BH-14 5/20/12 (23-24 ft.)	721-BH-15 5/22/12 (3.75-4.75 ft.)	721-BH-15 5/22/12 (5-6 ft.)	721-BH-15 5/22/12 (7.5-8.5 ft.)	721-BH-15 5/22/12 (17.5-18.5 ft.)	721-BH-15 5/22/12 (23-24 ft.)	721-BH-16 5/20/12 (0.25-1.25 ft.)	721-BH-16 5/20/12 (6.25-7.25 ft.)	721-BH-16 5/20/12 (17.5-18.5 ft.)	721-BH-16 5/20/12 (23-24 ft.)	721-BH-17 10/1/12 (5 ft.)	721-BH-17 10/1/12 (9.5 ft.)	721-BH-17 10/1/12 (14 ft.)	721-BH-17 10/1/12 (19 ft.)	721-BH-17 10/1/12 (24.8 ft.)	721-BH-17 10/1/12 (30 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
#2 Diesel in mg/kg																			
Gasoline Range Hydrocarbons in mg/kg	30	4 U	4.9 U	3.6 U	59	2,400		16	3.6 U	2.8 U	1,500	22	3.6 U	350	3.8 J	9.5	3.1 U	2.8 J	2.4 J
Diesel Range Hydrocarbons in mg/kg	2,000	31 U	5.3 J	31 U	40	17,000		13 J	1,700	46	25,000	6.9 J	32 U	3,000	7.5 J	4.5 J	3.7 J	29 U	4.7 J
Oil Range Hydrocarbons in mg/kg	2,000	130 U	12 J	130 U	110 U	650		7 J	150	500	890	6.9 J	130 U	140	130 U	140 U	130 U	120 U	9.3 J
Total TPHs D+O (ND=1/2U) in ug/L	2,000	ND	17.3 J	ND	95	17,650		20 J	1,850	546	25,890	13.8 J	ND	3,140	72.5 J	74.5 J	68.7 J	ND	14 J
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in mg/kg	2,000						15,000												
Oil Range Hydrocarbons in mg/kg	2,000						630 x												
Total TPHs D+O (ND=1/2U) in ug/L	2,000						15,630												
Metals																			
Aluminum in mg/kg		5,040	10,400	6,150	5,680	5,490		9,210	5,990	9,310	4,960	7,590	4,910	4,900	5,020	5,140	7,610	5,280	6,610
Antimony in mg/kg		0.061 UJ	0.033 J	0.045 J	0.021 J	0.048 J		0.028 J	0.013 J	0.104 J	0.017 J	0.033 J	0.052 UJ	0.047 J	0.178 J	0.032 UJ	0.037 J	0.037 UJ	0.07 J
Arsenic in mg/kg	20	0.78	3.1	1	0.93	1.09		2.31	0.63	1.99	0.98	4.15	0.84	1.25	0.94	0.8	4.49	1.02	3.73
Cadmium in mg/kg		0.032	0.023 U	0.024 U	0.036	0.029		0.085	0.013 J	0.021 U	0.024 U	0.017 U	0.021 U	0.023	0.022	0.02	0.067	0.019	0.114
Chromium (Total) in mg/kg		5.41	11.3	7.78	6.7	7.07		10.9	7.55	11	6.7	8.06	7.55	6.85	6.67	5.62	8.32	6.59	13.2
Copper in mg/kg	36	7.63	21.2	12.4	8.19	8.29		18.4	9.23	13.5	7.89	14	10.1	9.91	8.82	7.93	13.2	9.93	25.5
Iron in mg/kg		6,180	14,800	11,300	9,490	9,330		13,000	10,800	14,000	9,540	12,900	10,700	9,560	8,470	8,070	11,700	10,200	18,300
Lead in mg/kg	1,000	0.846	2.74	1.44	1.36	2.54		2.58	1.19	7	2.01	2.02	1.16	2.7 J	1.13 J	0.863 J	1.79 J	1.19 J	1.73 J
Mercury in mg/kg		0.023 U	0.026	0.008 J	0.004 J	0.004 J		0.016 J	0.006 J	0.01 J	0.004 J	0.021	0.006 J	0.006 J	0.004 J	0.005 J	0.017 J	0.005 J	0.013 J
Nickel in mg/kg	48	6.97	9.79	8.18	9.81	8.77		9.53	7.17	11	6.64	7.96	7.39	7.23	6.67	5.57	8.22	6.5	11.1
Silicon in mg/kg		1,180 J	2,210 J	1,520 J	1,500 J	1,270 J		1,250 J	1,380 J	1,410 J	1,320 J	1,470 J	1,160 J	914	1,030	910	868	917	1,190
Silver in mg/kg		0.017 J	0.041	0.012 J	0.009 J	0.013 J		0.032	0.011 J	0.026	0.024 U	0.026	0.021 U	0.011 J	0.035	0.01 J	0.023	0.01 J	0.03
Sodium in mg/kg																			
Tetraethyl Lead in mg/kg	0.35	1.2 U	1.4 U	1.2 U	1 U	2.1 J		1.3 U	1.2 U	10 U	140 U	1.3 U	1.3 U	0.32 J	1.3 U	1.4 U	1.2 U	1.3 U	1.6 U
Thallium in mg/kg		0.02 J	0.081	0.056	0.03	0.034		0.066	0.024	0.037	0.023 J	0.128	0.023	0.037	0.04	0.027	0.131	0.04	0.05
Zinc in mg/kg	85	15.4	21.7	16.7	21.5	13.7		21.3	15.1	27.3	12.1	16.7	15	14.4	12.1	11.6	17	14	19.5
Organometals																			
Tetraethyl Lead in mg/kg	0.35	1.2 U	1.4 U	1.2 U	1 U	2.1 J		1.3 U	1.2 U	10 U	140 U	1.3 U	1.3 U	0.32 J	1.3 U	1.4 U	1.2 U	1.3 U	1.6 U
Conventional Chemistry Parameters																			
Chloride in mg/kg																			
pH in pH Units																			
Sodium in mg/kg																			
Sulfide in mg/kg																			
Total Organic Carbon in %																			
Total Solids in %																			
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in mg/kg																			
1,1,1-Trichloroethane in mg/kg																			
1,1,2 - Trichlorotrifluoroethane in mg/kg																			
1,1,2,2-Tetrachloroethane in mg/kg	700	0.0059 UJ	0.0077 U	0.0057 UJ	0.0054 U	0.16 U		0.0061 U	0.0059 U	0.0045 U	0.17 U	0.0048 U	0.0052 U	0.0056 U	0.0055 U	0.0058 U	0.062 U	0.0046 U	0.13 U
1,1,2-Trichloroethane in mg/kg		0.0059 U	0.0077 U	0.0057 U	0.0054 U	0.16 U		0.0061 U	0.0059 U	0.0045 U	0.17 U	0.0048 U	0.0052 U	0.0056 U	0.0055 U	0.0058 U	0.062 U	0.0046 U	0.13 U
1,1-Dichloroethane in mg/kg																			
1,1-Dichloroethene in mg/kg	175,000	0.0059 U	0.0077 U	0.0057 U	0.0054 U	0.16 U		0.0061 U	0.0059 U	0.0045 U	0.17 U	0.0048 U	0.0052 U	0.0056 U	0.0055 U	0.0058 U	0.062 U	0.0046 U	0.13 U
1,1-Dichloropropene in mg/kg																			
1,2,3-Trichlorobenzene in mg/kg																			
1,2,3-Trichloropropane in mg/kg																			
1,2,4-Trichlorobenzene in mg/kg																			
1,2,4-Trimethylbenzene in mg/kg																			
1,2-Dibromo-3-chloropropane in mg/kg																			
1,2-Dibromoethane (EDB) in mg/kg																			
1,2-Dichlorobenzene in mg/kg																			
1,2-Dichloroethane (EDC) in mg/kg	1,000																		
1,2-Dichloropropane in mg/kg																			
1,3,5-Trimethylbenzene in mg/kg	35,000																		
1,3-Dichlorobenzene in mg/kg																			
1,3-Dichloropropane in mg/kg																			
1,4-Dichloro-2-Butene in mg/kg																			
1,4-Dichlorobenzene in mg/kg																			
2,2-Dichloropropane in mg/kg																			

Aspect Consulting

2/26/2016

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Table B-11

RI

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-14 5/20/12 (7-8 ft.)	721-BH-14 5/20/12 (16-17 ft.)	721-BH-14 5/20/12 (23-24 ft.)	721-BH-15 5/22/12 (3.75-4.75 ft.)	721-BH-15 5/22/12 (5-6 ft.)	721-BH-15 5/22/12 (7.5-8.5 ft.)	721-BH-15 5/22/12 (17.5-18.5 ft.)	721-BH-15 5/22/12 (23-24 ft.)	721-BH-16 5/20/12 (0.25-1.25 ft.)	721-BH-16 5/20/12 (6.25-7.25 ft.)	721-BH-16 5/20/12 (17.5-18.5 ft.)	721-BH-16 5/20/12 (23-24 ft.)	721-BH-17 10/1/12 (5 ft.)	721-BH-17 10/1/12 (9.5 ft.)	721-BH-17 10/1/12 (14 ft.)	721-BH-17 10/1/12 (19 ft.)	721-BH-17 10/1/12 (24.8 ft.)	721-BH-17 10/1/12 (30 ft.)
2-Butanone in mg/kg																			
2-Chloroethyl Vinyl Ether in mg/kg																			
2-Chlorotoluene in mg/kg																			
2-Hexanone in mg/kg																			
4-Chlorotoluene in mg/kg																			
4-Methyl-2-pentanone in mg/kg																			
Acetone in mg/kg	3,150,000																		
Acrolein in mg/kg																			
Acrylonitrile in mg/kg	1																		
Benzene in mg/kg	0.02	0.00018 J	0.00032 J	0.00059 J	0.0053 J	5.9 J	0.044	0.086	0.00017 J	2.5 J	3	0.51	0.15 J	0.032 J	0.021 J	5.6	2.9	9.2	
Bromobenzene in mg/kg																			
Bromochloromethane in mg/kg																			
Bromodichloromethane in mg/kg																			
Bromoethane in mg/kg																			
Bromoform in mg/kg																			
Bromomethane in mg/kg																			
Carbon disulfide in mg/kg																			
Carbon tetrachloride in mg/kg		0.0059 U	0.0077 U	0.0057 U	0.0054 U	0.16 U		0.0061 U	0.0059 U	0.0045 U	0.17 U	0.0048 U	0.0052 U	0.0056 U	0.0055 U	0.0058 U	0.062 U	0.0046 U	0.13 U
Chlorobenzene in mg/kg																			
Chloroethane in mg/kg																			
Chloroform in mg/kg	4,000	0.0059 U	0.0077 U	0.0057 U	0.0054 U	0.16 U		0.0061 U	0.0059 U	0.0045 U	0.17 U	0.0048 U	0.0052 U	0.0056 U	0.0055 U	0.0058 U	0.062 U	0.0046 U	0.13 U
Chloromethane in mg/kg																			
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.0059 U	0.0077 U	0.0057 U	0.0054 U	0.16 U		0.0061 U	0.0059 U	0.0045 U	0.17 U	0.0048 U	0.0052 U	0.0056 U	0.0055 U	0.0058 U	0.062 U	0.0046 U	0.098 J
cis-1,3-Dichloropropene in mg/kg																			
Dibromochloromethane in mg/kg																			
Dibromomethane in mg/kg																			
Dichlorodifluoromethane in mg/kg																			
Ethylbenzene in mg/kg	0.06	0.0059 U	0.0077 U	0.0057 U	0.015	39 J		0.0061	0.0059 U	0.0045 U	10 J	0.012	0.008 J	2.3 J	0.039 J	0.05 J	0.062 U	0.0011 J	0.13 U
Hexachlorobutadiene in mg/kg	0.01																		
Isopropylbenzene in mg/kg	350,000																		
Methyl tert-butyl ether (MTBE) in mg/kg																			
Methylene chloride in mg/kg	20,000	0.012 U	0.016 U	0.012 U	0.011 U	0.63 U		0.023 U	0.012 U	0.0089 U	0.67 U	0.0095 U	0.011 U	0.037 U	0.025 U	0.021 U	0.019 J	0.0092 U	0.034 J
Methyliodide in mg/kg																			
n-Butylbenzene in mg/kg	175,000																		
n-Propylbenzene in mg/kg	350,000																		
p-Isopropyltoluene in mg/kg																			
sec-Butylbenzene in mg/kg	350,000																		
Styrene in mg/kg																			
tert-Butylbenzene in mg/kg																			
Tetrachloroethene (PCE) in mg/kg	0.005	0.00032 J	0.0077 U	0.00032 J	0.0018 J	0.075 J		0.0016 J	0.0017 J	0.0045 U	0.17 U	0.0048 U	0.0052 U	0.0056 U	0.00085 J	0.0009 J	0.062 U	0.00051 J	0.13 U
Toluene in mg/kg	280,000	0.00022 J	0.00034 J	0.00047 J	0.00081 J	1.3 J		0.017	0.0015 J	0.0045 U	0.46 J	0.02	0.0049 J	0.05 J	0.0041 J	0.0082 J	0.015 J	0.0046 J	0.037 J
trans-1,2-Dichloroethene in mg/kg	70,000	0.0059 U	0.0077 U	0.0057 U	0.0054 U	0.16 U		0.0061 U	0.0059 U	0.0045 U	0.17 U	0.0048 U	0.0052 U	0.0056 U	0.0055 U	0.0058 U	0.062 U	0.0046 U	0.13 U
trans-1,3-Dichloropropene in mg/kg																			
Trichloroethene (TCE) in mg/kg	0.005	0.0059 U	0.0077 U	0.0057 U	0.00037 J	0.16 U		0.0061 U	0.0059 U	0.0045 U	0.17 U	0.0048 U	0.0052 U	0.0056 U	0.0055 U	0.0058 U	0.062 U	0.0046 U	0.13 U
Trichlorofluoromethane in mg/kg																			
Vinyl acetate in mg/kg																			
Vinyl chloride in mg/kg	0.005	0.0059 U	0.0077 U	0.0057 U	0.0054 U	0.16 U		0.0061 U	0.0025 J	0.0045 U	0.17 U	0.0048 U	0.0052 U	0.0056 U	0.0055 U	0.0058 U	0.062 U	0.0046 U	0.027 J
m,p-Xylenes in mg/kg		0.00022 J	0.0077 U	0.00039 J	0.0049 J	14 J		0.075	0.00048 J	0.0045 U	2.5 J	0.1	0.007 J	0.047 J	0.016 J	0.031 J	0.062 U	0.00037 J	0.13 U
o-Xylene in mg/kg		0.0059 U	0.0077 U	0.0057 U	0.00032 J	0.56 J		0.0076	0.0059 U	0.0045 U	0.3 J	0.0074	0.0067 J	0.008 J	0.0013 J	0.0026 J	0.062 U	0.001 J	0.13 U
Total Xylenes in mg/kg		0.0032 J	ND	0.0032 J	0.0052 J	15 J		0.083	0.0034 J	ND	2.8 J	0.11	0.014 J	0.055 J	0.017 J	0.034 J	ND	0.0014 J	ND
Xylenes (total) in mg/kg	700,000																		
Naphthalene in mg/kg	6																		

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UU - Analyte was not detected at or above the reported estimate

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-18 6/19/12 (5 ft.)	721-BH-18 6/19/12 (7.5 ft.)	721-BH-18 6/19/12 (15 ft.)	721-BH-18 6/19/12 (22.5 ft.)	721-GP5 6/23/04	HC08-B113 10/1/08 (2.5-4 ft.)	HC08-B114 9/30/08 (2-4 ft.)	HC08-EP17 10/24/08 (0.5-2.5 ft.)	HC08-EP18 10/24/08 (1.5-3 ft.)	HC08-EP18 10/24/08 (8-9.5 ft.)	HC-N11-1 9/30/10 (8-10 ft.)	HC-N11-2 9/30/10 (8-10 ft.)	HC-N11-3 10/1/10 (6.5-9 ft.)	HC-N11-4 9/30/10 (6.5-9 ft.)	HC-N11-TP-1-2 9/26/11 (8.5-9.5 ft.)	HC-N11-TP-2-2 9/26/11 (7.5-8.5 ft.)	HC-N11-TP-3-2 9/26/11 (8-9 ft.)	HC-N11-TP-4-2 9/26/11 (8.5-9.5 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
#2 Diesel in mg/kg											19,000	1,400	220						
Gasoline Range Hydrocarbons in mg/kg	30	2.9 U	3.5 U	2.8 U	3.8 U					2,400	4,900	4.7 U	4,300	6.3 U	6.1 U	13 U	7.7 U	8.6 U	8.3 U
Diesel Range Hydrocarbons in mg/kg	2,000	21 J	30 U	3.4 J	4.2 J		1,500		5.1 U	6,000	10,000				30 U	5,600	33 U	38	34 U
Oil Range Hydrocarbons in mg/kg	2,000	190	19 J	130 U	130 U		7,500		10 U	540 U	660	790	220	60 U	59 U	260 U	67 U	67 U	67 U
Total TPHs D+O (ND=1/2U) in ug/L	2,000	211 J	34 J	68.4 J	69.2 J		9,000		ND	6,270	10,660	790	220	30	ND	5,730	ND	71.5	ND
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in mg/kg	2,000																		
Oil Range Hydrocarbons in mg/kg	2,000																		
Total TPHs D+O (ND=1/2U) in ug/L	2,000																		
Metals																			
Aluminum in mg/kg		8,780	7,760	10,800	8,000														
Antimony in mg/kg		0.018 J	0.018 J	0.02 J	0.053 U														
Arsenic in mg/kg	20	1.05	0.87	4.08	0.83		10 U		5 U	11	6 U								
Cadmium in mg/kg		0.023 U	0.022 U	0.063	0.021 U		1		0.2 U	0.6	0.2 U								
Chromium (Total) in mg/kg		11.4	6.94	8.36	6.42		25		16.3	44.9	17.7								
Copper in mg/kg	36	10	7.85	13.6	10.2		114		13.2	34.5	13								
Iron in mg/kg		10,700	8,990	13,000	10,500														
Lead in mg/kg	1,000	1.55	1.03	1.9	1.35		33,200		79 J	497	59					9.7		6.7 U	
Mercury in mg/kg		0.006 J	0.007 J	0.02 J	0.007 J		0.42		0.04 U	0.11	0.06 U								
Nickel in mg/kg	48	8.97	7.13	8.45	6.84		62		10	14	9								
Silicon in mg/kg		2,410	2,010	2,170	2,480														
Silver in mg/kg		0.011 J	0.012 J	0.027	0.01 J														
Sodium in mg/kg																			
Tetraethyl Lead in mg/kg	0.35	11 U	5.9 U	1.2 U	1.2 U														
Thallium in mg/kg		0.031	0.027	0.112	0.029														
Zinc in mg/kg	85	15.4 U	12.6 U	18.5	15.9 U		1,130		28	269	46								
Organometals																			
Tetraethyl Lead in mg/kg	0.35	11 U	5.9 U	1.2 U	1.2 U														
Conventional Chemistry Parameters																			
Chloride in mg/kg									1.6 J										
pH in pH Units						8.48 J	7.73	7.15	8.62	6.31	6.97								
Sodium in mg/kg																			
Sulfide in mg/kg								1.11 U											
Total Organic Carbon in %																			
Total Solids in %								95.7											
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in mg/kg						0.0009 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
1,1,1-Trichloroethane in mg/kg						0.0009 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
1,1,2 - Trichlorotrifluoroethane in mg/kg						0.0018 U	0.18 U		0.0024 U	1.1 U	2.6 U								
1,1,2,2-Tetrachloroethane in mg/kg	700	0.0055 U	0.0059 U	0.005 U	0.0059 U	0.0009 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
1,1,2-Trichloroethane in mg/kg		0.0055 U	0.0059 U	0.005 U	0.0059 U	0.00063 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
1,1-Dichloroethane in mg/kg						0.0009 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
1,1-Dichloroethene in mg/kg	175,000	0.0055 U	0.0059 U	0.005 U	0.0059 U	0.00099 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
1,1-Dichloropropene in mg/kg						0.001 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
1,2,3-Trichlorobenzene in mg/kg						0.0045 U	0.46 U		0.0059 U	2.8 U	6.6 U					0.14 U		0.0014 U	
1,2,3-Trichloropropane in mg/kg						0.0018 U	0.18 U		0.0024 U	1.1 U	2.6 U					0.14 U		0.0014 U	
1,2,4-Trichlorobenzene in mg/kg																0.14 U		0.0014 U	
1,2,4-Trimethylbenzene in mg/kg																1.1		0.0014 U	
1,2-Dibromo-3-chloropropane in mg/kg						0.0045 U	0.46 U		0.0059 U	2.8 U	6.6 U					0.72 U		0.0069 U	
1,2-Dibromoethane (EDB) in mg/kg						0.00077 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
1,2-Dichlorobenzene in mg/kg						0.00057 U										0.14 U		0.0014 U	
1,2-Dichloroethane (EDC) in mg/kg	1,000					0.00094 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
1,2-Dichloropropane in mg/kg						0.0009 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
1,3,5-Trimethylbenzene in mg/kg	35,000															0.14 U		0.0022	
1,3-Dichlorobenzene in mg/kg						0.0007 U										0.14 U		0.0014 U	
1,3-Dichloropropane in mg/kg						0.001 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
1,4-Dichloro-2-Butene in mg/kg						0.005 U	0.46 U		0.0059 U	2.8 U	6.6 U								
1,4-Dichlorobenzene in mg/kg						0.00069 U										0.14 U		0.0014 U	
2,2-Dichloropropane in mg/kg						0.001 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	

Table B-11

Aspect Consulting

2/26/2016

\\seastore2.aspect.local\projects\Port of Tacoma\Alexander Avenue Petroleum Tank Facilities\Draft Reports\RI\Appendices\Appendix B - Data Tables\B-11 to B-15 Pre-RI Data 2000-2013.xlsx

RI

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-18 6/19/12 (5 ft.)	721-BH-18 6/19/12 (7.5 ft.)	721-BH-18 6/19/12 (15 ft.)	721-BH-18 6/19/12 (22.5 ft.)	721-GP5 6/23/04	HC08-B113 10/1/08 (2.5-4 ft.)	HC08-B114 9/30/08 (2-4 ft.)	HC08-EP17 10/24/08 (0.5-2.5 ft.)	HC08-EP18 10/24/08 (1.5-3 ft.)	HC08-EP18 10/24/08 (8-9.5 ft.)	HC-N11-1 9/30/10 (8-10 ft.)	HC-N11-2 9/30/10 (8-10 ft.)	HC-N11-3 10/1/10 (6.5-9 ft.)	HC-N11-4 9/30/10 (6.5-9 ft.)	HC-N11-TP-1-2 9/26/11 (8.5-9.5 ft.)	HC-N11-TP-2-2 9/26/11 (7.5-8.5 ft.)	HC-N11-TP-3-2 9/26/11 (8-9 ft.)	HC-N11-TP-4-2 9/26/11 (8.5-9.5 ft.)
2-Butanone in mg/kg						0.00099 U	0.46 U		0.0059 U	2.8 U	6.6 U					0.72 U		0.0069 U	
2-Chloroethyl Vinyl Ether in mg/kg						0.005 U	0.46 U		0.0059 U	2.8 U	6.6 U					0.72 U		0.0069 U	
2-Chlorotoluene in mg/kg						0.001 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
2-Hexanone in mg/kg						0.0002 U	0.46 U		0.0059 U	2.8 U	6.6 U					0.72 U		0.0069 U	
4-Chlorotoluene in mg/kg						0.001 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
4-Methyl-2-pentanone in mg/kg						0.00204 U	0.46 U		0.0059 U	2.8 U	6.6 U					0.72 U		0.0069 U	
Acetone in mg/kg	3,150,000					0.047	0.58		0.034	2.8 U	6.6 U					0.72 U		0.0069 U	
Acrolein in mg/kg						0.05 U	4.6 U		0.059 U	28 U	66 U								
Acrylonitrile in mg/kg	1					0.005 U	0.46 U		0.0059 U	2.8 U	6.6 U								
Benzene in mg/kg	0.02	0.00032 J	0.0002 J	0.00014 J	0.043	0.0009 U	0.091 U		0.0012 U	0.74	1.3 U					0.14 U		0.0017	
Bromobenzene in mg/kg						0.001 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
Bromochloromethane in mg/kg						0.0009 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
Bromodichloromethane in mg/kg						0.0009 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
Bromoethane in mg/kg						0.0018 U	0.18 U		0.0024 U	1.1 U	2.6 U								
Bromoform in mg/kg						0.0009 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
Bromomethane in mg/kg						0.0009 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
Carbon disulfide in mg/kg						0.0009 U	0.091 U		0.0038	0.56 U	1.3 U					0.14 U		0.0014 U	
Carbon tetrachloride in mg/kg		0.0055 U	0.0059 U	0.005 U	0.0059 U	0.001 U	0.12		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
Chlorobenzene in mg/kg						0.00084 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
Chloroethane in mg/kg						0.0009 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.72 U		0.0069 U	
Chloroform in mg/kg	4,000	0.0055 U	0.0059 U	0.005 U	0.0059 U	0.00178 U	0.92		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
Chloromethane in mg/kg						0.001 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.72 U		0.0069 U	
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.0055 U	0.0059 U	0.005 U	0.0059 U	0.017	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
cis-1,3-Dichloropropene in mg/kg						0.00045 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
Dibromochloromethane in mg/kg						0.00094 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
Dibromomethane in mg/kg						0.0009 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
Dichlorodifluoromethane in mg/kg						0.00178 U										0.14 U		0.0014 U	
Ethylbenzene in mg/kg	0.06	0.0055 U	0.0059 U	0.005 U	0.0059 U	0.00085 U	0.091 U		0.0012 U	4.3	12					1.7		0.0026	
Hexachlorobutadiene in mg/kg	0.01															0.72 U		0.0069 U	
Isopropylbenzene in mg/kg	350,000					0.0009 U	0.091 U		0.0012 U	0.56 U	6.4					0.51		0.0071	
Methyl tert-butyl ether (MTBE) in mg/kg																0.14 U		0.0014 U	
Methylene chloride in mg/kg	20,000	0.0022 J	0.0023 J	0.0018 J	0.002 J	0.0018 U	0.22		0.0024 U	1.1 U	2.6 U					0.72 U		0.0069 U	
Methyliodide in mg/kg						0.0009 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.72 U		0.0069 U	
n-Butylbenzene in mg/kg	175,000					0.001 U	0.091 U		0.0012 U	0.86	7.1					1.7		0.011	
n-Propylbenzene in mg/kg	350,000					0.0018	0.091 U		0.0012 U	0.79	10					1.8		0.019	
p-Isopropyltoluene in mg/kg						0.0009 U	0.091 U		0.0012 U	0.61	7					0.63		0.0022	
sec-Butylbenzene in mg/kg	350,000					0.001 U	0.091 U		0.0012 U	0.56 U	3.6					0.65		0.005	
Styrene in mg/kg						0.00057 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
tert-Butylbenzene in mg/kg						0.0009 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
Tetrachloroethene (PCE) in mg/kg	0.005	0.0055 U	0.00089 J	0.0011 J	0.001 J	0.00067 U	12		0.0062	0.56 U	1.3 U					0.14 U		0.0014 U	
Toluene in mg/kg	280,000	0.0005 J	0.00021 J	0.0002 J	0.00022 J	0.00076 U	0.091 U		0.0012 U	4.2	1.3 U					0.72 U		0.0069 U	
trans-1,2-Dichloroethene in mg/kg	70,000	0.0055 U	0.0059 U	0.005 U	0.0059 U	0.00168 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
trans-1,3-Dichloropropene in mg/kg						0.00071 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
Trichloroethene (TCE) in mg/kg	0.005	0.0055 U	0.0059 U	0.005 U	0.0059 U	0.0009 U	0.68		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
Trichlorofluoromethane in mg/kg						0.0009 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
Vinyl acetate in mg/kg						0.005 U	0.46 U		0.0059 U	2.8 U	6.6 U					0.72 U		0.0069 U	
Vinyl chloride in mg/kg	0.005	0.0055 U	0.0059 U	0.005 U	0.0059 U	0.0009 U	0.091 U		0.0012 U	0.56 U	1.3 U					0.14 U		0.0014 U	
m,p-Xylenes in mg/kg		0.0055 U	0.0059 U	0.005 U	0.0059 U	0.00072 U										0.3		0.0028 U	
o-Xylene in mg/kg		0.0055 U	0.0059 U	0.005 U	0.0059 U	0.0009 U	0.091 U		0.0012 U	6	1.8					0.14 U		0.0014 U	
Total Xylenes in mg/kg		ND	ND	ND	ND	ND										0.37		ND	
Xylenes (total) in mg/kg	700,000																		
Naphthalene in mg/kg	6															2.5		0.0014 U	

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UU - Analyte was not detected at or above the reported estimate

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	HC-P24-1 9/24/10 (6-8 ft.)	HC-P24-2 9/24/10 (6-8 ft.)	HC-P24-3 9/24/10 (6-8 ft.)	HC-P24-4 9/24/10 (6-8 ft.)	HW-4 1/23/07 (8-10 ft.)	NL-05 6/7/04 (6-7.4 ft.)	NL-05 6/7/04 (10-12 ft.)	NL-05 6/7/04 (15.4-17.4 ft.)	NL-05 6/7/04 (20.4-22.4 ft.)	NL-06 5/31/05 (0-2 ft.)	NL-06 5/31/05 (3-4 ft.)	NL-06 5/31/05 (4-8 ft.)	NL-06 5/31/05 (8-9 ft.)	NL-06 5/31/05 (12-14 ft.)	NL-06 5/31/05 (16-17 ft.)	NL-06 5/31/05 (17-19 ft.)	NL-06 5/31/05 (23-25 ft.)	NL-07 5/31/05 (1-3 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
#2 Diesel in mg/kg																			
Gasoline Range Hydrocarbons in mg/kg	30	7.2 U	7 U	5.9 U	7.3 U														
Diesel Range Hydrocarbons in mg/kg	2,000	31 U	32 U	30 U	31 U														
Oil Range Hydrocarbons in mg/kg	2,000	62 U	63 U	61 U	63 U														
Total TPHs D+O (ND=1/2U) in ug/L	2,000	ND	ND	ND	ND														
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in mg/kg	2,000																		
Oil Range Hydrocarbons in mg/kg	2,000																		
Total TPHs D+O (ND=1/2U) in ug/L	2,000																		
Metals																			
Aluminum in mg/kg																			
Antimony in mg/kg																			
Arsenic in mg/kg	20										5.5	45.3	46.8	15.7	4.6	36.1	2.6		228
Cadmium in mg/kg																			
Chromium (Total) in mg/kg											19.7	48.1	37.2	386	9.9	7	8.8		8.9
Copper in mg/kg	36										58.1	1,200	196	343	20.3	34	14.7		136
Iron in mg/kg																			
Lead in mg/kg	1,000																		
Mercury in mg/kg							0.0112 U	0.0129 U	0.014 U	0.0127 U	0.1 U	6,600	24,600	5,660	4.6	21.4	4.2		59.5
Nickel in mg/kg	48										33	146	126	607	8.9	146	8.2		70.6
Silicon in mg/kg																			
Silver in mg/kg																			
Sodium in mg/kg																			
Tetraethyl Lead in mg/kg	0.35																		
Thallium in mg/kg											0.1 U	0.1 U	0.1 U	0.2 U	0.1 U	0.1 U	0.1 U		0.15
Zinc in mg/kg	85										75.3 J	247 J	535 J	308 J	29.1 J	57.1 J	22.6 J		106 J
Organometals																			
Tetraethyl Lead in mg/kg	0.35																		
Conventional Chemistry Parameters																			
Chloride in mg/kg																			
pH in pH Units																			
Sodium in mg/kg																			
Sulfide in mg/kg																			
Total Organic Carbon in %						0.17													
Total Solids in %																			
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in mg/kg																			
1,1,1-Trichloroethane in mg/kg																			
1,1,2 - Trichlorotrifluoroethane in mg/kg																			
1,1,2,2-Tetrachloroethane in mg/kg	700						0.00079 UJ	0.0009 UJ		0.00089 U	0.006 U	0.008 U	0.008 U	0.011 UJ		0.007 U	0.006 U	0.005 U	0.007 U
1,1,2-Trichloroethane in mg/kg							0.00052 UJ	0.00059 U	0.00065 UJ	0.00059 U	0.006 U	0.008 U	0.008 U	0.011 UJ	0.006 U	0.007 U	0.006 U	0.005 U	0.007 U
1,1-Dichloroethane in mg/kg																			
1,1-Dichloroethene in mg/kg	175,000						0.00085 UJ	0.00098 U	0.00106 UJ	0.00097 U	0.006 U	0.008 U	0.008 U	0.011 UJ	0.006 U	0.007 U	0.006 U	0.005 U	0.007 U
1,1-Dichloropropene in mg/kg																			
1,2,3-Trichlorobenzene in mg/kg																			
1,2,3-Trichloropropane in mg/kg																			
1,2,4-Trichlorobenzene in mg/kg																			
1,2,4-Trimethylbenzene in mg/kg																			
1,2-Dibromo-3-chloropropane in mg/kg																			
1,2-Dibromoethane (EDB) in mg/kg																			
1,2-Dichlorobenzene in mg/kg																			
1,2-Dichloroethane (EDC) in mg/kg	1,000																		
1,2-Dichloropropane in mg/kg																			
1,3,5-Trimethylbenzene in mg/kg	35,000																		
1,3-Dichlorobenzene in mg/kg																			
1,3-Dichloropropane in mg/kg																			
1,4-Dichloro-2-Butene in mg/kg																			
1,4-Dichlorobenzene in mg/kg																			
2,2-Dichloropropane in mg/kg																			

Table B-11

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	HC-P24-1 9/24/10 (6-8 ft.)	HC-P24-2 9/24/10 (6-8 ft.)	HC-P24-3 9/24/10 (6-8 ft.)	HC-P24-4 9/24/10 (6-8 ft.)	HW-4 1/23/07 (8-10 ft.)	NL-05 6/7/04 (6-7.4 ft.)	NL-05 6/7/04 (10-12 ft.)	NL-05 6/7/04 (15.4-17.4 ft.)	NL-05 6/7/04 (20.4-22.4 ft.)	NL-06 5/31/05 (0-2 ft.)	NL-06 5/31/05 (3-4 ft.)	NL-06 5/31/05 (4-8 ft.)	NL-06 5/31/05 (8-9 ft.)	NL-06 5/31/05 (12-14 ft.)	NL-06 5/31/05 (16-17 ft.)	NL-06 5/31/05 (17-19 ft.)	NL-06 5/31/05 (23-25 ft.)	NL-07 5/31/05 (1-3 ft.)	
2-Butanone in mg/kg																				
2-Chloroethyl Vinyl Ether in mg/kg																				
2-Chlorotoluene in mg/kg																				
2-Hexanone in mg/kg																				
4-Chlorotoluene in mg/kg																				
4-Methyl-2-pentanone in mg/kg																				
Acetone in mg/kg	3,150,000																			
Acrolein in mg/kg																				
Acrylonitrile in mg/kg	1																			
Benzene in mg/kg	0.02																			
Bromobenzene in mg/kg																				
Bromochloromethane in mg/kg																				
Bromodichloromethane in mg/kg																				
Bromoethane in mg/kg																				
Bromoform in mg/kg																				
Bromomethane in mg/kg																				
Carbon disulfide in mg/kg																				
Carbon tetrachloride in mg/kg							0.00086 UJ	0.00099 U	0.00108 UJ	0.00098 U	0.006 U	0.008 U	0.011	0.011 UJ	0.0018 J	0.007 U	0.006 U	0.005 U	0.007 U	
Chlorobenzene in mg/kg																				
Chloroethane in mg/kg																				
Chloroform in mg/kg	4,000						0.0069 J	0.00177 U	0.00193 UJ	0.00175 U	0.006 U	0.013	0.021	0.063 J	0.0092 J	0.007 U	0.006 U	0.005 U	0.0076 J	
Chloromethane in mg/kg																				
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000						0.00116 UJ	0.00133 U	0.0043 J	0.00131 U	0.006 U	0.008 U	0.008 U	0.015 J	0.013 J	0.007 U	0.006 U	0.005 U	0.007 U	
cis-1,3-Dichloropropene in mg/kg																				
Dibromochloromethane in mg/kg																				
Dibromomethane in mg/kg																				
Dichlorodifluoromethane in mg/kg																				
Ethylbenzene in mg/kg	0.06																			
Hexachlorobutadiene in mg/kg	0.01																			
Isopropylbenzene in mg/kg	350,000																			
Methyl tert-butyl ether (MTBE) in mg/kg																				
Methylene chloride in mg/kg	20,000						0.00495 UJ	0.00568 U	0.00617 UJ	0.0056 U	0.0035 J	0.008 U	0.008 U	0.024 J	0.0036 J	0.007 U	0.006 U	0.0083	0.022 J	
Methyliodide in mg/kg																				
n-Butylbenzene in mg/kg	175,000																			
n-Propylbenzene in mg/kg	350,000																			
p-Isopropyltoluene in mg/kg																				
sec-Butylbenzene in mg/kg	350,000																			
Styrene in mg/kg																				
tert-Butylbenzene in mg/kg																				
Tetrachloroethene (PCE) in mg/kg	0.005						0.011 J	0.00067 U	0.00073 UJ	0.00066 U	0.009	0.11	0.13	0.15 J	0.11 J	0.0026 J	0.006 U	0.0016 J	0.007 J	
Toluene in mg/kg	280,000																			
trans-1,2-Dichloroethene in mg/kg	70,000						0.00146 UJ	0.00167 U	0.00182 UJ	0.00165 U	0.006 U	0.008 U	0.008 U	0.011 UJ	0.006 U	0.007 U	0.006 U	0.005 U	0.007 U	
trans-1,3-Dichloropropene in mg/kg																				
Trichloroethene (TCE) in mg/kg	0.005						0.00077 UJ	0.00088 U	0.00096 UJ	0.00087 U	0.006 U	0.018	0.0063 J	0.039 J	0.027 J	0.007 U	0.006 U	0.005 U	0.005 J	
Trichlorofluoromethane in mg/kg																				
Vinyl acetate in mg/kg																				
Vinyl chloride in mg/kg	0.005									0.00205 U	0.006 U	0.008 U	0.008 U	0.011 UJ	0.006 U	0.007 U	0.006 U	0.005 U	0.007 U	
m,p-Xylenes in mg/kg																				
o-Xylene in mg/kg																				
Total Xylenes in mg/kg																				
Xylenes (total) in mg/kg	700,000																			
Naphthalene in mg/kg	6																			

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

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UJ - Analyte was not detected at or above the reported estimate

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-07 5/31/05 (3-4 ft.)	NL-07 5/31/05 (5-8 ft.)	NL-07 5/31/05 (12-14 ft.)	NL-07 5/31/05 (17-19 ft.)	NL-07 5/31/05 (23-25 ft.)	NL-08 5/31/05 (1-4 ft.)	NL-08 5/31/05 (10-11 ft.)	NL-08 6/1/05 (13-15 ft.)	NL-08 6/1/05 (18-20 ft.)	NL-08 6/1/05 (22-23 ft.)	NL-09 6/1/05 (1-2 ft.)	NL-09 6/1/05 (5-6 ft.)	NL-09 6/1/05 (13-15 ft.)	NL-09 6/1/05 (18-20 ft.)	NL-09 6/1/05 (20-21 ft.)	NL-13 12/20/05 (3-4.5 ft.)	NL-13 12/20/05 (6-7.5 ft.)	NL-13 12/20/05 (9-10.5 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
#2 Diesel in mg/kg																			
Gasoline Range Hydrocarbons in mg/kg	30																		
Diesel Range Hydrocarbons in mg/kg	2,000																		
Oil Range Hydrocarbons in mg/kg	2,000																		
Total TPHs D+O (ND=1/2U) in ug/L	2,000																		
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in mg/kg	2,000																		
Oil Range Hydrocarbons in mg/kg	2,000																		
Total TPHs D+O (ND=1/2U) in ug/L	2,000																		
Metals																			
Aluminum in mg/kg																			
Antimony in mg/kg																			
Arsenic in mg/kg	20	26.9	10.6	54.9	3.3	1.1	28.7	268	147	3.4	0.79	10.6	135	7.9	1.9	2.1	35.3	73.9	32.1
Cadmium in mg/kg																			
Chromium (Total) in mg/kg		196	146	20.3	9	8.3	2.8	9.7	14.2	9.9	5.6	18.4	25.1	6.5	3.7	9.7	78.1	114	70.5
Copper in mg/kg	36	7,070	1,300	144	13.1	11.7	20.1	194	42.2	14.1	10.5	213	493	26.4	10.2	23.3	356	346	227
Iron in mg/kg																			
Lead in mg/kg	1,000	1,370	221	438	13.3	1.2	49.2	66.4	189	2	1.4	239	1,340	1,080	72.8	832	35,500	32,400	37,500
Mercury in mg/kg		0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.23	0.1 U	0.1 U	0.1 U	0.0902	0.0307	0.0376
Nickel in mg/kg	48	870	712	474	12.6	7.7	129	261	523	8.2	7.2	37.9	962	6.5	4.4	6.2	285	327	307
Silicon in mg/kg																			
Silver in mg/kg																			
Sodium in mg/kg																			
Tetraethyl Lead in mg/kg	0.35																		
Thallium in mg/kg		0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.21	0.1 U	0.1 U	0.1 U	0.15	0.102	0.104
Zinc in mg/kg	85	2,540	640	214	30.2	17.4	96.6	41.8	488	27.5	21.2	69.3	1,000	24.8	19.4	11.2	201	177	288
Organometals																			
Tetraethyl Lead in mg/kg	0.35																		
Conventional Chemistry Parameters																			
Chloride in mg/kg																			
pH in pH Units																			
Sodium in mg/kg																			
Sulfide in mg/kg																			
Total Organic Carbon in %																			
Total Solids in %																			
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in mg/kg																			
1,1,1-Trichloroethane in mg/kg																			
1,1,2 - Trichlorotrifluoroethane in mg/kg																			
1,1,2,2-Tetrachloroethane in mg/kg	700	0.009 U	0.01 U	0.011 U	0.006 U	0.006 U	0.011 U	0.009 U	0.006 U	0.006 U	0.006 U	0.006 U	0.011 U	0.007 U	0.006 U	0.006 U	0.00323 U	0.00322 U	0.0695
1,1,2-Trichloroethane in mg/kg		0.009 U	0.01 U	0.011 U	0.006 U	0.006 U	0.008 U	0.011 U	0.009 U	0.006 U	0.006 U	0.006 U	0.011 U	0.007 U	0.006 U	0.006 U	0.00886 U	0.0157	0.00918 U
1,1-Dichloroethane in mg/kg																			
1,1-Dichloroethene in mg/kg	175,000	0.009 U	0.01 U	0.011 U	0.006 U	0.006 U	0.008 U	0.011 U	0.009 U	0.006 U	0.006 U	0.006 U	0.011 U	0.007 U	0.006 U	0.006 U	0.00305	0.00828	0.00364
1,1-Dichloropropene in mg/kg																			
1,2,3-Trichlorobenzene in mg/kg																			
1,2,3-Trichloropropane in mg/kg																			
1,2,4-Trichlorobenzene in mg/kg																			
1,2,4-Trimethylbenzene in mg/kg																			
1,2-Dibromo-3-chloropropane in mg/kg																			
1,2-Dibromoethane (EDB) in mg/kg																			
1,2-Dichlorobenzene in mg/kg																			
1,2-Dichloroethane (EDC) in mg/kg	1,000																		
1,2-Dichloropropane in mg/kg																			
1,3,5-Trimethylbenzene in mg/kg	35,000																		
1,3-Dichlorobenzene in mg/kg																			
1,3-Dichloropropane in mg/kg																			
1,4-Dichloro-2-Butene in mg/kg																			
1,4-Dichlorobenzene in mg/kg																			
2,2-Dichloropropane in mg/kg																			

Table B-11

Aspect Consulting

2/26/2016

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RI

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Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-07 5/31/05 (3-4 ft.)	NL-07 5/31/05 (5-8 ft.)	NL-07 5/31/05 (12-14 ft.)	NL-07 5/31/05 (17-19 ft.)	NL-07 5/31/05 (23-25 ft.)	NL-08 5/31/05 (1-4 ft.)	NL-08 5/31/05 (10-11 ft.)	NL-08 6/1/05 (13-15 ft.)	NL-08 6/1/05 (18-20 ft.)	NL-08 6/1/05 (22-23 ft.)	NL-09 6/1/05 (1-2 ft.)	NL-09 6/1/05 (5-6 ft.)	NL-09 6/1/05 (13-15 ft.)	NL-09 6/1/05 (18-20 ft.)	NL-09 6/1/05 (20-21 ft.)	NL-13 12/20/05 (3-4.5 ft.)	NL-13 12/20/05 (6-7.5 ft.)	NL-13 12/20/05 (9-10.5 ft.)
2-Butanone in mg/kg																			
2-Chloroethyl Vinyl Ether in mg/kg																			
2-Chlorotoluene in mg/kg																			
2-Hexanone in mg/kg																			
4-Chlorotoluene in mg/kg																			
4-Methyl-2-pentanone in mg/kg																			
Acetone in mg/kg	3,150,000																		
Acrolein in mg/kg																			
Acrylonitrile in mg/kg	1																		
Benzene in mg/kg	0.02																		
Bromobenzene in mg/kg																			
Bromochloromethane in mg/kg																			
Bromodichloromethane in mg/kg																			
Bromoethane in mg/kg																			
Bromoform in mg/kg																			
Bromomethane in mg/kg																			
Carbon disulfide in mg/kg																			
Carbon tetrachloride in mg/kg		0.009 U	0.01 U	0.011 UJ	0.006 U	0.006 U	0.008 U	0.011 UJ	0.009 U	0.006 U	0.006 U	0.006 U	0.011 UJ	0.007 U	0.006 U	0.006 U	0.0108	0.0122	0.00668 J
Chlorobenzene in mg/kg																			
Chloroethane in mg/kg																			
Chloroform in mg/kg	4,000	0.009 U	0.01 U	0.011 UJ	0.006 U	0.006 U	0.008 U	0.011 UJ	0.009 U	0.006 U	0.006 U	0.004 J	0.0074 J	0.007 U	0.006 U	0.006 U	0.688	1.16	0.417
Chloromethane in mg/kg																			
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.009 U	0.01 U	0.011 UJ	0.006 U	0.006 U	0.045 J	0.0064 J	0.009 U	0.006 U	0.006 U	0.006 U	0.011 UJ	0.007 U	0.006 U	0.006 U	0.122	0.423	0.133
cis-1,3-Dichloropropene in mg/kg																			
Dibromochloromethane in mg/kg																			
Dibromomethane in mg/kg																			
Dichlorodifluoromethane in mg/kg																			
Ethylbenzene in mg/kg	0.06																		
Hexachlorobutadiene in mg/kg	0.01																		
Isopropylbenzene in mg/kg	350,000																		
Methyl tert-butyl ether (MTBE) in mg/kg																			
Methylene chloride in mg/kg	20,000	0.0081 J	0.01 U	0.011 UJ	0.006 U	0.006 U	0.008 U	0.014 J	0.016 J	0.0063	0.007	0.023 J	0.011 UJ	0.007 U	0.006 U	0.006 U	0.00311 U	0.0031 U	0.00322 U
Methyliodide in mg/kg																			
n-Butylbenzene in mg/kg	175,000																		
n-Propylbenzene in mg/kg	350,000																		
p-Isopropyltoluene in mg/kg																			
sec-Butylbenzene in mg/kg	350,000																		
Styrene in mg/kg																			
tert-Butylbenzene in mg/kg																			
Tetrachloroethene (PCE) in mg/kg	0.005	0.0061 J	0.011	0.011 UJ	0.006 U	0.006 U	0.11 J	0.011 UJ	0.0056 J	0.0017 J	0.001 J	0.00097 J	0.0023 J	0.0025 J	0.006 U	0.006 U	2.92	5.95	2.06
Toluene in mg/kg	280,000																		
trans-1,2-Dichloroethene in mg/kg	70,000	0.009 U	0.01 U	0.011 UJ	0.006 U	0.006 U	0.008 U	0.011 UJ	0.009 U	0.006 U	0.006 U	0.006 U	0.011 UJ	0.007 U	0.006 U	0.006 U	0.00835 J	0.0354	0.0118
trans-1,3-Dichloropropene in mg/kg																			
Trichloroethene (TCE) in mg/kg	0.005	0.009 U	0.01 U	0.011 UJ	0.006 U	0.006 U	0.027 J	0.011 UJ	0.009 U	0.006 U	0.006 U	0.006 U	0.011 UJ	0.007 U	0.006 U	0.006 U	0.415	0.847	0.426
Trichlorofluoromethane in mg/kg																			
Vinyl acetate in mg/kg																			
Vinyl chloride in mg/kg	0.005	0.009 U	0.01 U	0.011 UJ	0.006 U	0.006 U	0.008 U	0.011 UJ	0.009 U	0.006 U	0.006 U	0.006 U	0.011 UJ	0.007 U	0.006 U	0.006 U	0.00498 J	0.0218	0.00464 J
m,p-Xylenes in mg/kg																			
o-Xylene in mg/kg																			
Total Xylenes in mg/kg																			
Xylenes (total) in mg/kg	700,000																		
Naphthalene in mg/kg	6																		

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-13 12/20/05 (12-13.5 ft.)	NL-13 12/21/05 (15-16.5 ft.)	NL-13 12/21/05 (18-19.5 ft.)	NL-13 12/21/05 (21-22.5 ft.)	NL-13 12/21/05 (24-25.5 ft.)	NL-13 12/21/05 (27-28.5 ft.)	NL-16 5/18/06 (5-7 ft.)	NL-16 5/18/06 (8-10 ft.)	NL-16 5/19/06 (11-13 ft.)	NL-16 5/19/06 (14-16 ft.)	NL-16 5/19/06 (17-19 ft.)	NL-16 5/19/06 (20-22 ft.)	NL-18 8/1/06 (2-4 ft.)	NL-18 8/1/06 (4-6 ft.)	NL-18 8/1/06 (8-10 ft.)	NL-18 8/1/06 (12-14 ft.)	NL-18 8/1/06 (18-20 ft.)	NL-18 8/1/06 (24-26 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
#2 Diesel in mg/kg																			
Gasoline Range Hydrocarbons in mg/kg	30																		
Diesel Range Hydrocarbons in mg/kg	2,000																		
Oil Range Hydrocarbons in mg/kg	2,000																		
Total TPHs D+O (ND=1/2U) in ug/L	2,000																		
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in mg/kg	2,000																		
Oil Range Hydrocarbons in mg/kg	2,000																		
Total TPHs D+O (ND=1/2U) in ug/L	2,000																		
Metals																			
Aluminum in mg/kg																			
Antimony in mg/kg																			
Arsenic in mg/kg	20	27.3 J	5.42	4.05	0.434	0.148 U	0.371	30	10	14	27	1.1	1	5.5	5.6	4.6	0.64	3.5	0.26 J
Cadmium in mg/kg																			
Chromium (Total) in mg/kg		191 J	10.9	10.6	11.2	11.9	15	63	33	11	18	4.5	6.7	34.7	9.6	34.2	2.6	6.1	3.1
Copper in mg/kg	36	145 J	24	18.5	11	10.2	17.1	320	95	18	80	9	12	29.8	25.5	49.2	4.9	12.3	7.1
Iron in mg/kg																			
Lead in mg/kg	1,000	4,890 J	304 J	108 J	3.44 J	2.61 J	4.66 J	5,300	1,900	5.4	690	48	2.1	1,140	70.5	589	0.63	2.1	0.84
Mercury in mg/kg		0.232	0.0278 UJ	0.00639 UJ	0.00492 UJ	0.0135 UJ	0.00528 UJ	0.22	0.16	0.012 U	0.33	0.011 U	0.01 U	0.22	0.092 U	0.1 U	0.03 U	0.035 U	0.038 U
Nickel in mg/kg	48	509 J	30.9	14.4	7.61	7.36	8.68	190	130	14	580	11	7.2	23.5	24.7	26.1	4.3	7.1	4.1
Silicon in mg/kg																			
Silver in mg/kg																			
Sodium in mg/kg																			
Tetraethyl Lead in mg/kg	0.35																		
Thallium in mg/kg		0.106 J	0.0553 U	0.105 U	0.0347 U	0.0407 U	0.0585 U	0.052 U	0.033 U	0.05 U	0.071 U	0.011 U	0.028 U	0.027 J	0.028 U	0.026 U	0.027 U	0.063 J	0.027 U
Zinc in mg/kg	85	301 J	41.1 J	20.5 J	16.1 J	16 J	18.5 J	590	200	22	140	9.7	14	85.5	51.9	353	10.7	18.2	9.9
Organometals																			
Tetraethyl Lead in mg/kg	0.35																		
Conventional Chemistry Parameters																			
Chloride in mg/kg																			
pH in pH Units																			
Sodium in mg/kg																			
Sulfide in mg/kg																			
Total Organic Carbon in %																0.26			
Total Solids in %																			
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in mg/kg																			
1,1,1-Trichloroethane in mg/kg																			
1,1,2 - Trichlorotrifluoroethane in mg/kg																			
1,1,2,2-Tetrachloroethane in mg/kg	700	0.0405	0.00279 U	0.00372 U	0.00314 U	0.0029 U	0.00306 U	0.01 U	0.0081 U	0.011 UJ	0.0099 U	0.0063 U	0.0068 U	0.0021 J	0.0016 U	0.0015 U	0.0016 U	0.0015 U	0.0016 U
1,1,2-Trichloroethane in mg/kg		0.165	0.0105 J	0.0102 U	0.00861 U	0.00796 U	0.0084 U	0.0096 U	0.0075 U	0.0097 U	0.0091 U	0.0058 U	0.0063 U	0.00056 U	0.00062 U	0.00059 U	0.0006 U	0.00059 U	0.00061 U
1,1-Dichloroethane in mg/kg																			
1,1-Dichloroethene in mg/kg	175,000	0.0631	0.00182 U	0.00243 U	0.00206 U	0.0019 U	0.002 U	0.0089 U	0.0069 U	0.009 U	0.0084 U	0.0053 U	0.0058 U	0.00092 U	0.001 U	0.00096 U	0.00099 U	0.00098 U	0.001 U
1,1-Dichloropropene in mg/kg																			
1,2,3-Trichlorobenzene in mg/kg																			
1,2,3-Trichloropropane in mg/kg																			
1,2,4-Trichlorobenzene in mg/kg																			
1,2,4-Trimethylbenzene in mg/kg																			
1,2-Dibromo-3-chloropropane in mg/kg																			
1,2-Dibromoethane (EDB) in mg/kg																			
1,2-Dichlorobenzene in mg/kg																			
1,2-Dichloroethane (EDC) in mg/kg	1,000																		
1,2-Dichloropropane in mg/kg																			
1,3,5-Trimethylbenzene in mg/kg	35,000																		
1,3-Dichlorobenzene in mg/kg																			
1,3-Dichloropropane in mg/kg																			
1,4-Dichloro-2-Butene in mg/kg																			
1,4-Dichlorobenzene in mg/kg																			
2,2-Dichloropropane in mg/kg																			

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-13 12/20/05 (12-13.5 ft.)	NL-13 12/21/05 (15-16.5 ft.)	NL-13 12/21/05 (18-19.5 ft.)	NL-13 12/21/05 (21-22.5 ft.)	NL-13 12/21/05 (24-25.5 ft.)	NL-13 12/21/05 (27-28.5 ft.)	NL-16 5/18/06 (5-7 ft.)	NL-16 5/18/06 (8-10 ft.)	NL-16 5/19/06 (11-13 ft.)	NL-16 5/19/06 (14-16 ft.)	NL-16 5/19/06 (17-19 ft.)	NL-16 5/19/06 (20-22 ft.)	NL-18 8/1/06 (2-4 ft.)	NL-18 8/1/06 (4-6 ft.)	NL-18 8/1/06 (8-10 ft.)	NL-18 8/1/06 (12-14 ft.)	NL-18 8/1/06 (18-20 ft.)	NL-18 8/1/06 (24-26 ft.)	
2-Butanone in mg/kg																				
2-Chloroethyl Vinyl Ether in mg/kg																				
2-Chlorotoluene in mg/kg																				
2-Hexanone in mg/kg																				
4-Chlorotoluene in mg/kg																				
4-Methyl-2-pentanone in mg/kg																				
Acetone in mg/kg	3,150,000																			
Acrolein in mg/kg																				
Acrylonitrile in mg/kg	1																			
Benzene in mg/kg	0.02																			
Bromobenzene in mg/kg																				
Bromochloromethane in mg/kg																				
Bromodichloromethane in mg/kg																				
Bromoethane in mg/kg																				
Bromoform in mg/kg																				
Bromomethane in mg/kg																				
Carbon disulfide in mg/kg																				
Carbon tetrachloride in mg/kg		0.0047 U	0.00196 UJ	0.00261 U	0.00221 U	0.00204 U	0.00215 U	0.029	0.0041 U	0.0053 U	0.005 U	0.0031 U	0.0034 U	0.00093 U	0.001 U	0.00098 U	0.001 U	0.00099 U	0.001 U	
Chlorobenzene in mg/kg																				
Chloroethane in mg/kg																				
Chloroform in mg/kg	4,000	2.31	0.00174 UJ	0.00232 U	0.00196 U	0.00181 U	0.00191 U	0.43	0.082	0.0046 U	0.055	0.0064 J	0.003 U	0.0041 J	0.0019 U	0.0018 U	0.0018 U	0.0018 U	0.0018 UJ	
Chloromethane in mg/kg																				
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.0514	0.00176 UJ	0.00921 J	0.00198 U	0.00183 U	0.00193 U	0.0069 U	0.0053 U	0.027 J	0.0065 U	0.0041 U	0.0045 U	0.0012 U	0.0014 U	0.0013 U	0.0014 U	0.0013 U	0.0023 J	
cis-1,3-Dichloropropene in mg/kg																				
Dibromochloromethane in mg/kg																				
Dibromomethane in mg/kg																				
Dichlorodifluoromethane in mg/kg																				
Ethylbenzene in mg/kg	0.06																			
Hexachlorobutadiene in mg/kg	0.01																			
Isopropylbenzene in mg/kg	350,000																			
Methyl tert-butyl ether (MTBE) in mg/kg																				
Methylene chloride in mg/kg	20,000	0.00643 U	0.00268 U	0.00357 U	0.00302 U	0.00279 U	0.00294 U	0.0049 U	0.0038 U	0.0049 U	0.0046 U	0.0029 U	0.0032 U	0.0053 U	0.006 U	0.0061	0.0058 U	0.0057 U	0.0058 U	
Methyliodide in mg/kg																				
n-Butylbenzene in mg/kg	175,000																			
n-Propylbenzene in mg/kg	350,000																			
p-Isopropyltoluene in mg/kg																				
sec-Butylbenzene in mg/kg	350,000																			
Styrene in mg/kg																				
tert-Butylbenzene in mg/kg																				
Tetrachloroethene (PCE) in mg/kg	0.005	1.72	0.00379 J	0.0363	0.00213 U	0.00197 U	0.00208 U	0.3	0.064	0.0075 U	0.022	0.0045 U	0.0049 U	0.044	0.071	0.03	0.012	0.00067 U	0.0088	
Toluene in mg/kg	280,000																			
trans-1,2-Dichloroethene in mg/kg	70,000	0.125	0.00198 UJ	0.00742 J	0.00223 U	0.00206 U	0.00217 U	0.0057 U	0.0045 U	0.0058 U	0.0054 U	0.0034 U	0.0037 U	0.0016 U	0.0018 U	0.0016 U	0.0017 U	0.0017 U	0.0017 UJ	
trans-1,3-Dichloropropene in mg/kg																				
Trichloroethene (TCE) in mg/kg	0.005	1.92	0.0866 J	0.032	0.00209 U	0.00193 U	0.00204 U	0.013 J	0.0053 U	0.0069 U	0.0065 U	0.0041 U	0.0045 U	0.0091	0.0055 J	0.0029 J	0.0028 J	0.00088 U	0.0064 J	
Trichlorofluoromethane in mg/kg																				
Vinyl acetate in mg/kg																				
Vinyl chloride in mg/kg	0.005	0.0101 J	0.00221 U	0.00295 U	0.00249 U	0.0023 U	0.00243 U	0.0084 U	0.0065 U	0.0085 U	0.0079 U	0.005 U	0.0055 U	0.002 U	0.0022 U	0.002 U	0.0021 U	0.0021 U	0.0021 U	
m,p-Xylenes in mg/kg																				
o-Xylene in mg/kg																				
Total Xylenes in mg/kg																				
Xylenes (total) in mg/kg	700,000																			
Naphthalene in mg/kg	6																			

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-19 7/27/06 (2-4 ft.)	NL-19 7/27/06 (4-6 ft.)	NL-19 7/27/06 (8-10 ft.)	NL-19 7/27/06 (12-14 ft.)	NL-19 8/1/06 (18-20 ft.)	NL-19 8/1/06 (24-26 ft.)	NL-20 7/27/06 (2-4 ft.)	NL-20 7/27/06 (4-6 ft.)	NL-20 7/27/06 (8-10 ft.)	NL-20 7/27/06 (12-14 ft.)	NL-20 7/27/06 (18-20 ft.)	NL-20 7/27/06 (24-26 ft.)	NL-21 7/25/06 (2-4 ft.)	NL-21 7/25/06 (4-6 ft.)	NL-21 7/25/06 (8-10 ft.)	NL-21 7/25/06 (12-14 ft.)	NL-21 7/25/06 (18-20 ft.)	NL-21 7/25/06 (24-26 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
#2 Diesel in mg/kg																			
Gasoline Range Hydrocarbons in mg/kg	30																		
Diesel Range Hydrocarbons in mg/kg	2,000																		
Oil Range Hydrocarbons in mg/kg	2,000																		
Total TPHs D+O (ND=1/2U) in ug/L	2,000																		
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in mg/kg	2,000																		
Oil Range Hydrocarbons in mg/kg	2,000																		
Total TPHs D+O (ND=1/2U) in ug/L	2,000																		
Metals																			
Aluminum in mg/kg																			
Antimony in mg/kg																			
Arsenic in mg/kg	20	2	0.71	3.1	4	3	0.15 J	0.95	1.3	1.4	1.8	1.5	2	2.35	1.77	3.67	1.46	2.98	2.96
Cadmium in mg/kg																			
Chromium (Total) in mg/kg		6	1.9	2.9	4.3	7.4	2.2	5.5	5.1	3.4	7.1	2.5	11.5	9.48	7.84	6.02	1.88	10.5	10.8
Copper in mg/kg	36	10	5.1	4.6	6	8.9	5.8	7.1	12	11.7	7.7	4.7	13.5	13.8	9.75	4.08	2.98	12.1	20.4
Iron in mg/kg																			
Lead in mg/kg	1,000	21.5	2.6	4	14.6	1.2	0.72	6.4	4.5	173	154	0.71	1.3	23.1	18.3	41.3	14.5	1.86	2.44
Mercury in mg/kg		0.022 U	0.018 U	0.022 U	0.021 U	0.023 U	0.023 U	0.19	0.049 U	0.024 U	0.022 U	0.021 U	0.034 U	0.404 U	0.457 U	0.45 U	0.298 U	0.457 U	0.527 U
Nickel in mg/kg	48	6.2 J	3.2 J	37 J	28.1 J	9.6	3.5	7 J	7.8 J	8 J	13.1 J	3.3 J	7.6 J	9.69	5.04	2.17	0.857	11.3	9.99
Silicon in mg/kg																			
Silver in mg/kg																			
Sodium in mg/kg														1,480	1,390	767	471	5,900	11,100
Tetraethyl Lead in mg/kg	0.35																		
Thallium in mg/kg		0.023 U	0.023 U	0.029 J	0.026 U	0.032 J	0.026 U	0.025 U	0.024 U	0.027 U	0.028 U	0.026 U	0.084 J	0.584 U	0.55 U	0.749 U	0.516 U	0.617 U	0.73 U
Zinc in mg/kg	85	19.1 J	16.8 J	19 J	79.6 J	26.5	8	19.9 J	18.2 J	15.7 J	32 J	9.8 J	18.5 J	42.9	31	8.94	7.07	24.9	23.7
Organometals																			
Tetraethyl Lead in mg/kg	0.35																		
Conventional Chemistry Parameters																			
Chloride in mg/kg																			
pH in pH Units														9.94	8.2	3.87	6.58	11	11.2
Sodium in mg/kg														1,480	1,390	767	471	5,900	11,100
Sulfide in mg/kg																			
Total Organic Carbon in %																			
Total Solids in %																			
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in mg/kg																			
1,1,1-Trichloroethane in mg/kg																			
1,1,2 - Trichlorotrifluoroethane in mg/kg																			
1,1,2,2-Tetrachloroethane in mg/kg	700	0.0013 U	0.0013 U	0.0016 U	0.0015 U	0.0015 U	0.0015 U	0.0014 U	0.0014 U	0.0016 U	0.0016 U	0.0015 UJ	0.0016 U	0.00601 U	0.00685 U	0.00632 U	0.00835 U	0.00503 U	0.00584 U
1,1,2-Trichloroethane in mg/kg		0.0005 U	0.00051 U	0.00063 U	0.00059 U	0.00059 U	0.00058 U	0.00055 U	0.00053 U	0.00061 U	0.00062 U	0.00059 UJ	0.00063 U	0.0015 U	0.00171 U	0.00158 U	0.00209 U	0.00126 U	0.00146 U
1,1-Dichloroethane in mg/kg																			
1,1-Dichloroethene in mg/kg	175,000	0.00083 U	0.00084 U	0.001 U	0.00098 U	0.00096 U	0.00096 U	0.0009 U	0.00087 U	0.001 U	0.001 U	0.00097 UJ	0.001 U	0.00361 U	0.00411 U	0.00379 U	0.00501 U	0.00302 U	0.0035 U
1,1-Dichloropropene in mg/kg																			
1,2,3-Trichlorobenzene in mg/kg																			
1,2,3-Trichloropropane in mg/kg																			
1,2,4-Trichlorobenzene in mg/kg																			
1,2,4-Trimethylbenzene in mg/kg																			
1,2-Dibromo-3-chloropropane in mg/kg																			
1,2-Dibromoethane (EDB) in mg/kg																			
1,2-Dichlorobenzene in mg/kg																			
1,2-Dichloroethane (EDC) in mg/kg	1,000																		
1,2-Dichloropropane in mg/kg																			
1,3,5-Trimethylbenzene in mg/kg	35,000																		
1,3-Dichlorobenzene in mg/kg																			
1,3-Dichloropropane in mg/kg																			
1,4-Dichloro-2-Butene in mg/kg																			
1,4-Dichlorobenzene in mg/kg																			
2,2-Dichloropropane in mg/kg																			

Table B-11

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2/26/2016

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RI

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-19 7/27/06 (2-4 ft.)	NL-19 7/27/06 (4-6 ft.)	NL-19 7/27/06 (8-10 ft.)	NL-19 7/27/06 (12-14 ft.)	NL-19 8/1/06 (18-20 ft.)	NL-19 8/1/06 (24-26 ft.)	NL-20 7/27/06 (2-4 ft.)	NL-20 7/27/06 (4-6 ft.)	NL-20 7/27/06 (8-10 ft.)	NL-20 7/27/06 (12-14 ft.)	NL-20 7/27/06 (18-20 ft.)	NL-20 7/27/06 (24-26 ft.)	NL-21 7/25/06 (2-4 ft.)	NL-21 7/25/06 (4-6 ft.)	NL-21 7/25/06 (8-10 ft.)	NL-21 7/25/06 (12-14 ft.)	NL-21 7/25/06 (18-20 ft.)	NL-21 7/25/06 (24-26 ft.)	
2-Butanone in mg/kg																				
2-Chloroethyl Vinyl Ether in mg/kg																				
2-Chlorotoluene in mg/kg																				
2-Hexanone in mg/kg																				
4-Chlorotoluene in mg/kg																				
4-Methyl-2-pentanone in mg/kg																				
Acetone in mg/kg	3,150,000																			
Acrolein in mg/kg																				
Acrylonitrile in mg/kg	1																			
Benzene in mg/kg	0.02																			
Bromobenzene in mg/kg																				
Bromochloromethane in mg/kg																				
Bromodichloromethane in mg/kg																				
Bromoethane in mg/kg																				
Bromoform in mg/kg																				
Bromomethane in mg/kg																				
Carbon disulfide in mg/kg																				
Carbon tetrachloride in mg/kg		0.00084 U	0.00085 U	0.001 U	0.00099 U	0.00098 U	0.00097 U	0.00091 U	0.00088 U	0.001 U	0.001 U	0.00098 UJ	0.0011 U	0.00601 U	0.00685 U	0.00632 U	0.00835 U	0.00503 U	0.00584 U	
Chlorobenzene in mg/kg																				
Chloroethane in mg/kg																				
Chloroform in mg/kg	4,000	0.0015 U	0.0015 U	0.0019 U	0.0018 U	0.0017 UJ	0.0017 U	0.0016 U	0.0016 U	0.0018 U	0.0018 U	0.0018 UJ	0.0019 U	0.00301 U	0.00343 U	0.00316 U	0.00417 U	0.00251 U	0.00292 U	
Chloromethane in mg/kg																				
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.0011 U	0.0011 U	0.0014 U	0.0013 U	0.0064 J	0.0013 U	0.0012 U	0.0012 U	0.0014 U	0.0014 U	0.0013 UJ	0.0014 U	0.00361 U	0.00411 U	0.00379 U	0.00501 U	0.00302 U	0.0035 U	
cis-1,3-Dichloropropene in mg/kg																				
Dibromochloromethane in mg/kg																				
Dibromomethane in mg/kg																				
Dichlorodifluoromethane in mg/kg																				
Ethylbenzene in mg/kg	0.06																			
Hexachlorobutadiene in mg/kg	0.01													0.012 U	0.0137 U	0.0126 U	0.0167 U	0.0101 U	0.0117 U	
Isopropylbenzene in mg/kg	350,000																			
Methyl tert-butyl ether (MTBE) in mg/kg																				
Methylene chloride in mg/kg	20,000	0.0048 U	0.0049 U	0.006 U	0.0057 U	0.0056 U	0.0056 U	0.0052 U	0.005 U	0.0078	0.0059 U	0.0056 UJ	0.006 U	0.00184 J	0.00434 J	0.00259 J	0.00266 J	0.00137 J	0.00176 J	
Methyliodide in mg/kg																				
n-Butylbenzene in mg/kg	175,000																			
n-Propylbenzene in mg/kg	350,000																			
p-Isopropyltoluene in mg/kg																				
sec-Butylbenzene in mg/kg	350,000																			
Styrene in mg/kg																				
tert-Butylbenzene in mg/kg																				
Tetrachloroethene (PCE) in mg/kg	0.005	0.0034 J	0.01	0.0007 U	0.0017 J	0.023	0.00066 U	0.00062 U	0.0037 J	0.00069 U	0.0028 J	0.00066 UJ	0.00071 U	0.0024 U	0.00274 U	0.00253 U	0.00334 U	0.00201 U	0.00234 U	
Toluene in mg/kg	280,000																			
trans-1,2-Dichloroethene in mg/kg	70,000	0.0014 U	0.0014 U	0.0018 U	0.0017 U	0.0016 UJ	0.0016 U	0.0015 U	0.0015 U	0.0017 U	0.0017 U	0.0017 UJ	0.0018 U	0.00301 U	0.00343 U	0.00316 U	0.00417 U	0.00251 U	0.00292 U	
trans-1,3-Dichloropropene in mg/kg																				
Trichloroethene (TCE) in mg/kg	0.005	0.00075 UJ	0.00076 UJ	0.00092 UJ	0.0018 J	0.02 J	0.00086 U	0.00081 UJ	0.00088 J	0.0009 U	0.0013 J	0.00087 UJ	0.00093 U	0.00301 U	0.00343 U	0.00316 U	0.0017 J	0.00251 U	0.00292 U	
Trichlorofluoromethane in mg/kg																				
Vinyl acetate in mg/kg																				
Vinyl chloride in mg/kg	0.005	0.0018 U	0.0018 U	0.0022 U	0.0021 U	0.002 U	0.002 U	0.0019 U	0.0019 U	0.0021 U	0.0022 U	0.0021 UJ	0.0022 U	0.00301 U	0.00343 U	0.00316 U	0.00417 U	0.00251 U	0.00292 U	
m,p-Xylenes in mg/kg																				
o-Xylene in mg/kg																				
Total Xylenes in mg/kg																				
Xylenes (total) in mg/kg	700,000																			
Naphthalene in mg/kg	6																			

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-25 1/18/07 (5-8 ft.)	NL-25 1/18/07 (10-13 ft.)	NL-25 1/18/07 (15-18 ft.)	NL-25 1/19/07 (20-23 ft.)	NL-26 1/17/07 (5-8 ft.)	NL-26 1/17/07 (10-13 ft.)	NL-26 1/18/07 (15-18 ft.)	NL-26 1/18/07 (20-23 ft.)	NL-27 1/19/07 (6-8 ft.)	NL-28 1/17/07 (5-8 ft.)	NL-28 1/17/07 (10-13 ft.)	NL-28 1/17/07 (15-18 ft.)	NL-28 1/17/07 (20-23 ft.)	NL-29 1/18/07 (5-8 ft.)	NL-29 1/18/07 (10-13 ft.)	NL-29 1/18/07 (15-18 ft.)	NL-29 1/18/07 (20-23 ft.)	NL-30 1/19/07 (5-8 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
#2 Diesel in mg/kg																			
Gasoline Range Hydrocarbons in mg/kg	30																		
Diesel Range Hydrocarbons in mg/kg	2,000																		
Oil Range Hydrocarbons in mg/kg	2,000																		
Total TPHs D+O (ND=1/2U) in ug/L	2,000																		
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in mg/kg	2,000																		
Oil Range Hydrocarbons in mg/kg	2,000																		
Total TPHs D+O (ND=1/2U) in ug/L	2,000																		
Metals																			
Aluminum in mg/kg																			
Antimony in mg/kg																			
Arsenic in mg/kg	20	1.6	1.3	1.3	0.79	2.2	2.1	1.5	4.7		9.9	1.8	2.1	1.1	6.1	5.4	2.5	1.4	2.6
Cadmium in mg/kg																			
Chromium (Total) in mg/kg		9.2	10.7	9.2	9.2	6.1	8.3	9.6	18.4		47.7	7.3	13.9	9.2	36.6	18.1	14.5	19	12.4
Copper in mg/kg	36	10.1	13.5	11.9	9.8	10	13.2	13.7	21.7		123	13.4	18.5	13.1	34.2	22.5	16.1	17.3	11.4
Iron in mg/kg																			
Lead in mg/kg	1,000	6.6	9.1	2.8	1.3	4.8	8	6.1	67.1		6,770	378	224	42.2	488	114	4.4	3.4	2
Mercury in mg/kg		0.034 U	0.038 U	0.039 U	0.04 U	0.023 U	0.03 U	0.03 U	0.047 U		0.18 U	0.062 U	0.021 U	0.022 U	0.22	0.082 U	0.025 U	0.022 U	0.023 U
Nickel in mg/kg	48	9.4	8.5	6.9	5.8	6.1	9.7	9	23.9		132	8.7	10.8	7.7	32.4	41.7	12.5	9.9	7.8
Silicon in mg/kg																			
Silver in mg/kg																			
Sodium in mg/kg																			
Tetraethyl Lead in mg/kg	0.35																		
Thallium in mg/kg		0.03 J	0.037 J	0.029 U	0.03 U	0.077 J	0.06 J	0.058 J	0.061 J		0.049 J	0.028 U	0.031 J	0.028 U	0.067 J	0.081 J	0.089 J	0.047 J	0.029 U
Zinc in mg/kg	85	19.5	20	17.6	15.6	13.4	17.5	17.4	42.1		287	32.5	31.3	20.6	115	44.4	26	26.6	22.4
Organometals																			
Tetraethyl Lead in mg/kg	0.35																		
Conventional Chemistry Parameters																			
Chloride in mg/kg																			
pH in pH Units																			
Sodium in mg/kg																			
Sulfide in mg/kg																			
Total Organic Carbon in %										2.23									
Total Solids in %																			
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in mg/kg																			
1,1,1-Trichloroethane in mg/kg																			
1,1,2 - Trichlorotrifluoroethane in mg/kg																			
1,1,2,2-Tetrachloroethane in mg/kg	700	0.0017 U	0.0016 U	0.0017 U	0.0017 U	0.0015 U	0.0016 U	0.0016 U	0.0015 U		0.0019 U	0.0016 U	0.0016 U	0.0016 U	0.0025 U	0.0016 U	0.0015 U	0.0016 U	0.0017 U
1,1,2-Trichloroethane in mg/kg		0.00065 U	0.00064 U	0.00065 U	0.00066 U	0.00059 U	0.00062 U	0.00061 U	0.0006 U		0.00073 U	0.00062 U	0.0006 U	0.00063 U	0.00097 U	0.00062 U	0.00057 U	0.00063 U	0.00065 U
1,1-Dichloroethane in mg/kg																			
1,1-Dichloroethene in mg/kg	175,000	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.00096 U	0.001 U	0.001 U	0.00098 U		0.0012 U	0.001 U	0.00099 U	0.001 U	0.0016 U	0.001 U	0.00093 U	0.001 U	0.0011 U
1,1-Dichloropropene in mg/kg																			
1,2,3-Trichlorobenzene in mg/kg																			
1,2,3-Trichloropropane in mg/kg																			
1,2,4-Trichlorobenzene in mg/kg																			
1,2,4-Trimethylbenzene in mg/kg																			
1,2-Dibromo-3-chloropropane in mg/kg																			
1,2-Dibromoethane (EDB) in mg/kg																			
1,2-Dichlorobenzene in mg/kg																			
1,2-Dichloroethane (EDC) in mg/kg	1,000																		
1,2-Dichloropropane in mg/kg																			
1,3,5-Trimethylbenzene in mg/kg	35,000																		
1,3-Dichlorobenzene in mg/kg																			
1,3-Dichloropropane in mg/kg																			
1,4-Dichloro-2-Butene in mg/kg																			
1,4-Dichlorobenzene in mg/kg																			
2,2-Dichloropropane in mg/kg																			

Table B-11

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RI

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-25 1/18/07 (5-8 ft.)	NL-25 1/18/07 (10-13 ft.)	NL-25 1/18/07 (15-18 ft.)	NL-25 1/19/07 (20-23 ft.)	NL-26 1/17/07 (5-8 ft.)	NL-26 1/17/07 (10-13 ft.)	NL-26 1/18/07 (15-18 ft.)	NL-26 1/18/07 (20-23 ft.)	NL-27 1/19/07 (6-8 ft.)	NL-28 1/17/07 (5-8 ft.)	NL-28 1/17/07 (10-13 ft.)	NL-28 1/17/07 (15-18 ft.)	NL-28 1/17/07 (20-23 ft.)	NL-29 1/18/07 (5-8 ft.)	NL-29 1/18/07 (10-13 ft.)	NL-29 1/18/07 (15-18 ft.)	NL-29 1/18/07 (20-23 ft.)	NL-30 1/19/07 (5-8 ft.)	
2-Butanone in mg/kg																				
2-Chloroethyl Vinyl Ether in mg/kg																				
2-Chlorotoluene in mg/kg																				
2-Hexanone in mg/kg																				
4-Chlorotoluene in mg/kg																				
4-Methyl-2-pentanone in mg/kg																				
Acetone in mg/kg	3,150,000																			
Acrolein in mg/kg																				
Acrylonitrile in mg/kg	1																			
Benzene in mg/kg	0.02																			
Bromobenzene in mg/kg																				
Bromochloromethane in mg/kg																				
Bromodichloromethane in mg/kg																				
Bromoethane in mg/kg																				
Bromoform in mg/kg																				
Bromomethane in mg/kg																				
Carbon disulfide in mg/kg																				
Carbon tetrachloride in mg/kg		0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.00098 U	0.001 U	0.001 U	0.00099 U		0.0012 U	0.001 U	0.001 U	0.0011 U	0.0016 U	0.001 UJ	0.00094 U	0.0011 U	0.0011 U	
Chlorobenzene in mg/kg																				
Chloroethane in mg/kg																				
Chloroform in mg/kg	4,000	0.0019 U	0.0019 U	0.0019 U	0.002 U	0.0017 U	0.0019 U	0.0018 U	0.0018 U		0.0022 U	0.0019 U	0.0018 U	0.0019 U	0.0029 U	0.0018 UJ	0.0017 U	0.0019 U	0.002 U	
Chloromethane in mg/kg																				
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.0014 U	0.0014 U	0.0014 U	0.0015 U	0.0013 U	0.0014 U	0.0014 U	0.0013 U		0.0016 U	0.0014 U	0.0013 U	0.0014 U	0.0022 U	0.0014 UJ	0.0013 U	0.0014 U	0.0015 U	
cis-1,3-Dichloropropene in mg/kg																				
Dibromochloromethane in mg/kg																				
Dibromomethane in mg/kg																				
Dichlorodifluoromethane in mg/kg																				
Ethylbenzene in mg/kg	0.06																			
Hexachlorobutadiene in mg/kg	0.01																			
Isopropylbenzene in mg/kg	350,000																			
Methyl tert-butyl ether (MTBE) in mg/kg																				
Methylene chloride in mg/kg	20,000	0.0062 U	0.0061 U	0.0062 U	0.0063 U	0.019	0.02	0.012	0.0066		0.007 U	0.006 U	0.0091	0.0087	0.0093 U	0.0059 UJ	0.0054 U	0.0087	0.0062 U	
Methyliodide in mg/kg																				
n-Butylbenzene in mg/kg	175,000																			
n-Propylbenzene in mg/kg	350,000																			
p-Isopropyltoluene in mg/kg																				
sec-Butylbenzene in mg/kg	350,000																			
Styrene in mg/kg																				
tert-Butylbenzene in mg/kg																				
Tetrachloroethene (PCE) in mg/kg	0.005	0.00073 U	0.00072 U	0.00073 U	0.00074 U	0.00066 U	0.0007 U	0.00068 U	0.00067 U		0.00082 U	0.0007 U	0.00068 U	0.00071 U	0.0011 U		0.00064 U	0.00071 U	0.00073 U	
Toluene in mg/kg	280,000																			
trans-1,2-Dichloroethene in mg/kg	70,000	0.0018 U	0.0018 U	0.0018 U	0.0019 U	0.0016 U	0.0018 U	0.0017 U	0.0017 U		0.0021 U	0.0018 U	0.0017 U	0.0018 U	0.0027 U	0.0017 UJ	0.0016 U	0.0018 U	0.0018 U	
trans-1,3-Dichloropropene in mg/kg																				
Trichloroethene (TCE) in mg/kg	0.005	0.00096 U	0.0012 J	0.00096 U	0.00098 U	0.00087 U	0.00092 U	0.0009 U	0.00088 U		0.0016 J	0.00092 U	0.00089 U	0.00094 U	0.0025 J	0.00091 UJ	0.00084 U	0.00093 U	0.00097 U	
Trichlorofluoromethane in mg/kg																				
Vinyl acetate in mg/kg																				
Vinyl chloride in mg/kg	0.005	0.0023 U	0.0022 U	0.0023 U	0.0023 U	0.002 U	0.0022 U	0.0021 U	0.0021 U		0.0026 U	0.0022 U	0.0021 U	0.0022 U	0.0034 U	0.0022 UJ	0.002 U	0.0022 U	0.0023 U	
m,p-Xylenes in mg/kg																				
o-Xylene in mg/kg																				
Total Xylenes in mg/kg																				
Xylenes (total) in mg/kg	700,000																			
Naphthalene in mg/kg	6																			

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-30 1/19/07 (10-13 ft.)	NL-30 1/19/07 (15-18 ft.)	NL-30 1/19/07 (20-23 ft.)	WMUL-01 6/7/12 (1.5-2.5 ft.)	WMUL-01 6/7/12 (5-6 ft.)	WMUL-01 6/7/12 (10-11 ft.)	WMUL-01 6/7/12 (15-16 ft.)	WMUL-01 6/7/12 (20-21 ft.)	WMUL-01 6/7/12 (24-25 ft.)	WMUL-02 6/12/12 (2 ft.)	WMUL-02 6/12/12 (5 ft.)	WMUL-02 6/12/12 (10 ft.)	WMUL-02 6/12/12 (15 ft.)	WMUL-02 6/12/12 (20 ft.)	WMUL-02 6/12/12 (25 ft.)
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																
#2 Diesel in mg/kg																
Gasoline Range Hydrocarbons in mg/kg	30															
Diesel Range Hydrocarbons in mg/kg	2,000															
Oil Range Hydrocarbons in mg/kg	2,000															
Total TPHs D+O (ND=1/2U) in ug/L	2,000															
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																
Diesel Range Hydrocarbons in mg/kg	2,000															
Oil Range Hydrocarbons in mg/kg	2,000															
Total TPHs D+O (ND=1/2U) in ug/L	2,000															
Metals																
Aluminum in mg/kg																
Antimony in mg/kg																
Arsenic in mg/kg	20	1.6	1.1	1.2												
Cadmium in mg/kg																
Chromium (Total) in mg/kg		17.8	13.5	11.7												
Copper in mg/kg	36	19.1	13.6	11.3												
Iron in mg/kg																
Lead in mg/kg	1,000	4.9	2.8	5.7	1.52	1.1	1.11	2.65	1.63	1.18	11.5	12.2 J	2.68	2.92 J	1.41 J	0.919 J
Mercury in mg/kg		0.023 U	0.023 U	0.031 J												
Nickel in mg/kg	48	11.1 J	7.6 J	8 J												
Silicon in mg/kg																
Silver in mg/kg																
Sodium in mg/kg																
Tetraethyl Lead in mg/kg	0.35															
Thallium in mg/kg		0.038 J	0.029 U	0.03 J												
Zinc in mg/kg	85	27.5 J	19.9 J	21 J												
Organometals																
Tetraethyl Lead in mg/kg	0.35															
Conventional Chemistry Parameters																
Chloride in mg/kg																
pH in pH Units																
Sodium in mg/kg																
Sulfide in mg/kg																
Total Organic Carbon in %																
Total Solids in %																
Volatile Organic Compounds (VOC)																
1,1,1,2-Tetrachloroethane in mg/kg																
1,1,1-Trichloroethane in mg/kg																
1,1,2 - Trichlorotrifluoroethane in mg/kg																
1,1,2,2-Tetrachloroethane in mg/kg	700	0.0017 U	0.0017 UJ	0.0015 U	0.0058 U	0.0055 U	0.0057 U	0.0057 U	0.0049 U	0.006 U	0.0059 U	0.0054 U	0.0055 U	0.006 U	0.0047 U	0.0056 U
1,1,2-Trichloroethane in mg/kg		0.00065 U	0.00064 UJ	0.00059 U	0.0058 U	0.0055 U	0.0057 U	0.0057 U	0.0049 U	0.006 U	0.0059 U	0.0054 U	0.0055 U	0.006 U	0.0047 U	0.0056 U
1,1-Dichloroethane in mg/kg																
1,1-Dichloroethene in mg/kg	175,000	0.0011 U	0.0011 UJ	0.00097 U	0.0058 U	0.0055 U	0.0057 U	0.0057 U	0.0049 U	0.006 U	0.0059 U	0.0054 U	0.0055 U	0.006 U	0.0047 U	0.0056 U
1,1-Dichloropropene in mg/kg																
1,2,3-Trichlorobenzene in mg/kg																
1,2,3-Trichloropropane in mg/kg																
1,2,4-Trichlorobenzene in mg/kg																
1,2,4-Trimethylbenzene in mg/kg																
1,2-Dibromo-3-chloropropane in mg/kg																
1,2-Dibromoethane (EDB) in mg/kg																
1,2-Dichlorobenzene in mg/kg																
1,2-Dichloroethane (EDC) in mg/kg	1,000															
1,2-Dichloropropane in mg/kg																
1,3,5-Trimethylbenzene in mg/kg	35,000															
1,3-Dichlorobenzene in mg/kg																
1,3-Dichloropropane in mg/kg																
1,4-Dichloro-2-Butene in mg/kg																
1,4-Dichlorobenzene in mg/kg																
2,2-Dichloropropane in mg/kg																

Table B-11 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-30 1/19/07 (10-13 ft.)	NL-30 1/19/07 (15-18 ft.)	NL-30 1/19/07 (20-23 ft.)	WMUL-01 6/7/12 (1.5-2.5 ft.)	WMUL-01 6/7/12 (5-6 ft.)	WMUL-01 6/7/12 (10-11 ft.)	WMUL-01 6/7/12 (15-16 ft.)	WMUL-01 6/7/12 (20-21 ft.)	WMUL-01 6/7/12 (24-25 ft.)	WMUL-02 6/12/12 (2 ft.)	WMUL-02 6/12/12 (5 ft.)	WMUL-02 6/12/12 (10 ft.)	WMUL-02 6/12/12 (15 ft.)	WMUL-02 6/12/12 (20 ft.)	WMUL-02 6/12/12 (25 ft.)
2-Butanone in mg/kg																
2-Chloroethyl Vinyl Ether in mg/kg																
2-Chlorotoluene in mg/kg																
2-Hexanone in mg/kg																
4-Chlorotoluene in mg/kg																
4-Methyl-2-pentanone in mg/kg																
Acetone in mg/kg	3,150,000															
Acrolein in mg/kg																
Acrylonitrile in mg/kg	1															
Benzene in mg/kg	0.02				0.0058 U	0.0055 U	0.0057 U	0.0057 U	0.0049 U	0.006 U	0.0059 U	0.0054 U	0.00013 J	0.00043 J	0.00015 J	0.0001 J
Bromobenzene in mg/kg																
Bromochloromethane in mg/kg																
Bromodichloromethane in mg/kg																
Bromoethane in mg/kg																
Bromoform in mg/kg																
Bromomethane in mg/kg																
Carbon disulfide in mg/kg																
Carbon tetrachloride in mg/kg		0.0011 U	0.0011 UJ	0.00098 U	0.0058 U	0.0055 U	0.0057 U	0.0057 U	0.0049 U	0.006 U	0.0059 U	0.0054 U	0.0055 U	0.006 U	0.0047 U	0.0056 U
Chlorobenzene in mg/kg																
Chloroethane in mg/kg																
Chloroform in mg/kg	4,000	0.0019 U	0.0019 UJ	0.0018 U	0.0058 U	0.0055 U	0.0057 U	0.0057 U	0.0049 U	0.006 U	0.0059 U	0.0054 U	0.0055 U	0.006 U	0.0047 U	0.0056 U
Chloromethane in mg/kg																
cis-1,2-Dichloroethene (DCE) in mg/kg	7,000	0.0014 U	0.0014 UJ	0.0013 U	0.0058 U	0.00035 J	0.0057 U	0.012	0.0049 U	0.006 U	0.0059 U	0.0054 U	0.0055 U	0.0023 J	0.00061 J	0.031
cis-1,3-Dichloropropene in mg/kg																
Dibromochloromethane in mg/kg																
Dibromomethane in mg/kg																
Dichlorodifluoromethane in mg/kg																
Ethylbenzene in mg/kg	0.06				0.0058 U	0.0055 U	0.0057 U	0.0057 U	0.0049 U	0.006 U	0.0059 U	0.0054 U	0.0055 U	0.0024 J	0.0047 U	0.0056 U
Hexachlorobutadiene in mg/kg	0.01															
Isopropylbenzene in mg/kg	350,000															
Methyl tert-butyl ether (MTBE) in mg/kg																
Methylene chloride in mg/kg	20,000	0.0062 U	0.0061 UJ	0.0056 U	0.012 U	0.011 U	0.012 U	0.012 U	0.0098 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.0093 U	0.012 U
Methyliodide in mg/kg																
n-Butylbenzene in mg/kg	175,000															
n-Propylbenzene in mg/kg	350,000															
p-Isopropyltoluene in mg/kg																
sec-Butylbenzene in mg/kg	350,000															
Styrene in mg/kg																
tert-Butylbenzene in mg/kg																
Tetrachloroethene (PCE) in mg/kg	0.005	0.00073 U	0.00072 UJ	0.00066 U	0.0094	0.027	0.022	0.0016 J	0.0011 J	0.001 J	0.019	0.018	0.029	0.0019 J	0.0029 J	0.0056 U
Toluene in mg/kg	280,000				0.00029 J	0.00026 J	0.00029 J	0.00034 J	0.00022 J	0.00034 J	0.00022 J	0.00023 J	0.0006 J	0.00092 J	0.00033 J	0.00026 J
trans-1,2-Dichloroethene in mg/kg	70,000	0.0018 U	0.0018 UJ	0.0017 U	0.0058 U	0.0055 U	0.0057 U	0.0057 U	0.0049 U	0.006 U	0.0059 U	0.0054 U	0.0055 U	0.00033 J	0.0047 U	0.0056 U
trans-1,3-Dichloropropene in mg/kg																
Trichloroethene (TCE) in mg/kg	0.005	0.00096 U	0.00095 UJ	0.00087 U	0.0087	0.031	0.022	0.00061 J	0.0049 U	0.006 U	0.012	0.01	0.015	0.00071 J	0.00028 J	0.0056 U
Trichlorofluoromethane in mg/kg																
Vinyl acetate in mg/kg																
Vinyl chloride in mg/kg	0.005	0.0023 U	0.0022 U	0.0021 U	0.0058 U	0.0055 U	0.0057 U	0.00035 J	0.0049 U	0.00043 J	0.0059 U	0.0054 U	0.0055 U	0.006 U	0.0047 U	0.0013 J
m,p-Xylenes in mg/kg					0.00026 J	0.0055 U	0.0057 U	0.00035 J	0.0049 U	0.006 U	0.0059 U	0.0054 U	0.00028 J	0.0014 J	0.00031 J	0.0056 U
o-Xylene in mg/kg					0.0058 U	0.0055 U	0.0057 U	0.0057 U	0.0049 U	0.006 U	0.0059 U	0.0054 U	0.0055 U	0.0022 J	0.00014 J	0.0056 U
Total Xylenes in mg/kg					0.0032 J	ND	ND	0.0032 J	ND	ND	ND	ND	0.003 J	0.0036 J	0.00045 J	ND
Xylenes (total) in mg/kg	700,000															
Naphthalene in mg/kg	6															

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-12 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	28-15 3/23/04	29-14 3/23/04	30-15 3/17/04	48-15 3/16/04	48-15 8/10/12	49-15 3/16/04	49-15 11/30/11	49-15 8/11/12	50-15 3/16/04	50-15 12/1/11	50-15 8/11/12	51-15 3/17/04	52-15 12/1/11	52-15 8/24/12	95-15 8/25/12	709-MW-01-15 3/9/04	709-MW-02-15 3/9/04	709-MW-02-15 7/21/12
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
Gasoline Range Hydrocarbons in ug/L	800					250 U			250 U			250 U			250 U	140 J	2,700		19 J
Diesel Range Hydrocarbons in ug/L	500					260 U			63 J			21 J			260 U	260 U	1,300		260 U
Oil Range Hydrocarbons in ug/L	500					520 U			390 J			96 J			520 U	520 U			27 J
Total TPHs D+O (ND=0U) in ug/L	500					ND			450 J			120 J			ND	ND			27 J
Total TPHs D+O (ND=1/2U) in ug/L	500					ND			453 J			117 J			ND	ND			157 J
Total TPHs G+D+O (ND=0U) in ug/L	720					ND			450 J			120 J			ND	140 J			46 J
Total TPHs G+D+O (ND=1/2U) in ug/L	720					ND			580 J			240 J			ND	530 J			180 J
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in ug/L	500																		
Oil Range Hydrocarbons in ug/L	500																		
Total TPHs D+O (ND=0U) in ug/L	500																		
Total TPHs D+O (ND=1/2U) in ug/L	500																		
Total TPHs G+D+O (ND=0U) in ug/L	720																		
Total TPHs G+D+O (ND=1/2U) in ug/L	720																		
Dissolved Metals																			
Aluminum in ug/L																			
Antimony in ug/L																			
Arsenic in ug/L	5																		
Barium in ug/L																			
Beryllium in ug/L																			
Cadmium in ug/L																			
Calcium in ug/L																			
Chromium (Total) in ug/L																			
Cobalt in ug/L																			
Copper in ug/L	2.4																		
Iron in ug/L																			
Lead in ug/L	8.1																		
Magnesium in ug/L																			
Manganese in ug/L																			
Mercury in ug/L																			
Nickel in ug/L	8.2																		
Potassium in ug/L																			
Selenium in ug/L																			
Silver in ug/L																			
Sodium in ug/L																			
Tetraethyl Lead in ug/L						0.00059 UJ			0.00059 UJ			0.00058 UJ			0.00057 U	0.00057 U			0.00057 UJ
Thallium in ug/L																			
Vanadium in ug/L																			
Zinc in ug/L	81																		
Total Metals																			
Aluminum in ug/L						219			142			267			7.2	52.6			338
Antimony in ug/L						11.1			0.971			3.35			0.5 U	0.5 U			2.58
Arsenic in ug/L	5					30			32.9			15.2			2.61	0.74 J			15.8
Barium in ug/L						4 J			6.2			5			4.2 J	16.3			6.7
Beryllium in ug/L																			
Cadmium in ug/L						0.2 U			0.169 J			0.2 U			0.2 U	0.2 U			0.2 U
Calcium in ug/L						1,280			45,000			4,840			62,300	44,900			3,620
Chromium () in ug/L						5.34			672			3.17			2 U	2 U			1.3 J
Cobalt in ug/L																			
Copper in ug/L	2.4					6.41			25.5			7.42			1 U	1 U			3.89
Iron in ug/L						819			2,490			855			89	2,330			563
Lead in ug/L	8.1					0.922			1.26			5.24			0.377	0.864			1.54
Magnesium in ug/L						48.6			148,000			237			1,800	12,500			120
Manganese in ug/L																			
Mercury in ug/L						0.03 J			0.05 J			0.05 J			0.2 U	0.2 U			0.02 J
Nickel in ug/L	8.2					0.71 J			22.1			7.66			2 U	0.9 J			1.5 J
Potassium in ug/L						27,200			64,200			6,100			1,530	6,870			11,500
Selenium in ug/L																			
Silicon in ug/L						450,000			17,700			142,000			15,300	24,400			411,000

Table B-12 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	28-15 3/23/04	29-14 3/23/04	30-15 3/17/04	48-15 3/16/04	48-15 8/10/12	49-15 3/16/04	49-15 11/30/11	49-15 8/11/12	50-15 3/16/04	50-15 12/1/11	50-15 8/11/12	51-15 3/17/04	52-15 12/1/11	52-15 8/24/12	95-15 8/25/12	709-MW-01-15 3/9/04	709-MW-02-15 3/9/04	709-MW-02-15 7/21/12
Silver in ug/L						0.378			0.345			0.2 U			0.2 U	0.2 U			0.061 J
Sodium in mg/L						1,150			1,090			231			6.18	312			696
Sodium in ug/L																			
Strontium in ug/L						12.6			807			28.8			334	296			22
Thallium in ug/L						0.2 U			0.0111 J			0.2 U			0.2 U	0.2 U			0.2 U
Vanadium in ug/L																			
Zinc in ug/L	81					2.79 J			46.8			6.25			2.09 J	9.75			5 U
Organometals																			
Tetraethyl Lead in ug/L						0.00059 UJ			0.00059 UJ			0.00058 UJ			0.00057 U	0.00057 U			0.00057 UJ
Conventional Chemistry Parameters																			
Alkalinity (Total) in mg/L		128	178	158	19,800	2,670	69.8		204	176		557	124		177	596	260	49.8	1,420
Bicarbonate in mg/L						90 U			204			143			177	596 J			9 U
Bromide in mg/L						0.2 U			6.65			0.2 U			0.2 U	0.38			0.09 J
Chloride in mg/L						60.2			2,120			26.8			1.69	200			52.4
Dissolved Organic Carbon in mg/L																			
pH in pH Units																			
Sulfate in mg/L						18.3			190			15.2			10.5	3.63			21.6
Total Boron in mg/L						0.154			0.483			0.0748			0.0255 J	0.233			0.165
Total Dissolved Solids in mg/L						4,470			4,070			660			255	924			2,470
Total Sodium in mg/L						1,150			1,090			231			6.18	312			696
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in ug/L																			
1,1,1-Trichloroethane in ug/L																			
1,1,2 - Trichlorotrifluoroethane in ug/L																			
1,1,2,2-Tetrachloroethane in ug/L	3	5 U	5 U	5 U	5 UJ	0.5 U	5 U		0.5 U	5 U		0.5 U	5 U		0.5 U	0.5 U	5 U	5 U	0.5 U
1,1,2-Trichloroethane in ug/L		5 U	5 U	5 U	5 UJ	0.5 U	5 U		0.5 U	5 U		0.5 U	5 U		0.5 U	0.5 U	5 U	5 U	0.5 U
1,1-Dichloroethane in ug/L																			
1,1-Dichloroethene in ug/L	3.2	5 U	5 U	5 U	5 UJ	0.5 U	5 U		0.5 U	5 U		0.5 U	5 U		0.5 U	0.5 U	5 U	5 U	0.19 J
1,1-Dichloropropene in ug/L																			
1,2,3-Trichlorobenzene in ug/L																			
1,2,3-Trichloropropane in ug/L																			
1,2,4-Trichlorobenzene in ug/L																			
1,2,4-Trimethylbenzene in ug/L	63																		
1,2-Dibromo-3-chloropropane in ug/L																			
1,2-Dibromoethane (EDB) in ug/L																			
1,2-Dichlorobenzene in ug/L																			
1,2-Dichloroethane (EDC) in ug/L	42																		
1,2-Dichloropropane in ug/L																			
1,3,5-Trimethylbenzene in ug/L																			
1,3-Dichlorobenzene in ug/L																			
1,3-Dichloropropane in ug/L																			
1,4-Dichloro-2-Butene in ug/L																			
1,4-Dichlorobenzene in ug/L																			
2,2-Dichloropropane in ug/L																			
2-Butanone in ug/L																			
2-Chloroethyl Vinyl Ether in ug/L																			
2-Chlorotoluene in ug/L																			
2-Hexanone in ug/L																			
4-Chlorotoluene in ug/L																			
4-Methyl-2-pentanone in ug/L																			
Acetone in ug/L	31,896,900																		
Acrolein in ug/L																			
Acrylonitrile in ug/L	0.7																		
Benzene in ug/L	24	5 U	5 U	5 U	5 UJ	0.5 U	5 U		0.5 U	5 U		0.5 U	5 U		0.5 U	26	5 U	5 U	0.56
Bromobenzene in ug/L																			
Bromochloromethane in ug/L																			
Bromodichloromethane in ug/L																			
Bromoethane in ug/L																			
Bromoform in ug/L																			
Bromomethane in ug/L																			

Table B-12

Aspect Consulting

2/26/2016

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Table B-12 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	28-15 3/23/04	29-14 3/23/04	30-15 3/17/04	48-15 3/16/04	48-15 8/10/12	49-15 3/16/04	49-15 11/30/11	49-15 8/11/12	50-15 3/16/04	50-15 12/1/11	50-15 8/11/12	51-15 3/17/04	52-15 12/1/11	52-15 8/24/12	95-15 8/25/12	709-MW-01-15 3/9/04	709-MW-02-15 3/9/04	709-MW-02-15 7/21/12
Carbon disulfide in ug/L																			
Carbon tetrachloride in ug/L		5 U	5 U	5 U	5 UJ	0.5 U	5 U		0.5 U	5 U		0.5 U	5 U		0.5 U	0.5 U	5 U	5 U	0.5 U
Chlorobenzene in ug/L																			
Chloroethane in ug/L																			
Chloroform in ug/L	12	16	3.6 J	3.9 J	5 UJ	0.5 U	5 U		0.29 J	5 U		0.5 U	4.7 J		0.5 U	0.5 U	5 U	5 U	0.5 U
Chloromethane in ug/L																			
cis-1,2-Dichloroethene (DCE) in ug/L		5 U	5 U	5 U	5 UJ	0.2 J	5 U		0.77	5 U		0.33 J	5 U		1.3	0.3 J	27	12	2.6
cis-1,3-Dichloropropene in ug/L																			
Dibromochloromethane in ug/L																			
Dibromomethane in ug/L																			
Dichlorodifluoromethane in ug/L																			
Ethylbenzene in ug/L	130	5 U	5 U	5 U	5 UJ	0.5 U	5 U		0.5 U	5 U		0.5 U	5 U		0.5 U	5	25	5 U	0.1 J
Hexachlorobutadiene in ug/L	0.2																		
Isopropylbenzene in ug/L	1,614																		
Methyl tert-butyl ether (MTBE) in ug/L		5 U	5 U	5 U	5 UJ		5 U			5 U			5 U				5 U	5 U	
Methylene chloride in ug/L	1,000	5 U	5 U	5 U	5 UJ	2 U	5 U		2 U	5 U		2 U	5 U		2 U	2 U	53 U	42 U	2 U
Methyliodide in ug/L																			
n-Butylbenzene in ug/L																			
n-Propylbenzene in ug/L	5,200																		
p-Isopropyltoluene in ug/L																			
sec-Butylbenzene in ug/L																			
Styrene in ug/L																			
tert-Butylbenzene in ug/L																			
Tetrachloroethene (PCE) in ug/L	8.9	5 U	2.7 J	5	8.3 J	16	5 U		2.2	22		12	12		11	0.5 U	120	13	15
Toluene in ug/L	520	5 U	5 U	5 U	5 UJ	0.09 J	5 U		0.5 U	5 U		0.5 U	5 U		11	10	5 U	5 U	0.5 U
trans-1,2-Dichloroethene in ug/L	4,000	5 U	5 U	5 U	5 UJ	0.08 J	5 U		0.5 U	5 U		0.11 J	5 U		0.09 J	0.59	4.7 J	9	2.4
trans-1,3-Dichloropropene in ug/L																			
Trichloroethene (TCE) in ug/L	7	5 U	5 U	5 U	5 UJ	3.7	5 U		0.96	3.9 J		4.7	3.6 J		12	0.5 U	35	19	11
Trichlorofluoromethane in ug/L																			
Vinyl acetate in ug/L																			
Vinyl chloride in ug/L	1.6	5 U	5 U	5 U	5 UJ	0.5 U	5 U		0.18 J	5 U		0.5 U	5 U		0.5 U	0.54	5 U	5.6	0.5 U
m,p-Xylenes in ug/L						0.5 U			0.5 U			0.5 U			0.5 U	9.8			0.5 U
o-Xylene in ug/L						0.16 J			0.5 U			0.5 U			0.5 U	3.3			0.5 U
Total Xylenes in ug/L						0.41 J			ND			ND			ND	13			ND
Xylenes (total) in ug/L	970	5 U	5 U	5 U	5 UJ		5 U			5 U			5 U				120	5 U	
Naphthalene in ug/L	90	5 U	5 U	5 U	5 UJ		5 U			5 U			5 U				17	5 U	
Field Parameters																			
Conductivity in umhos/cm						6.24		49.4	5.38		0.515	1.15		0.459	0.33				3.05
Dissolved Oxygen in mg/L						3.89		0	0		6.18	4.2		1.05	1.23				0
Dissolved Total Dissolved Solids in ug/L								30,000			330			300					
ORP in mVolts						-154		175	33		233	-56		146	-165				-13
pH in pH Units		9.32	8.62	9.57	13.72	12.83	5.97	6.56	6.39	9.34	8.72	10.69	9.26	7.06	7.2	7.55	9.62	9.46	11.67
Salinity in %						0.3		3.1	0.3		0	0.1		0	0				0.1
Temperature in Deg C						17.16		7.1	18.47		10.97	16.96		13.31	18.44				15.7
Turbidity in NTU						0		351	-5		28	4.1		19.5	0				0

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-12 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	709-MW-03-15 3/9/04	709-MW-04-15 3/9/04	709-MW-04-15 7/22/12	709-MW-05-15 3/9/04	709-MW-05-15 12/1/11	709-MW-05-15 7/22/12	709-MW-06-15 3/10/04	709-MW-06-15 12/1/11	709-MW-06-15 8/9/12	709-MW-07-15 3/10/04	709-MW-07-15 7/28/12	709-MW-08-15 8/9/12	709-MW-09-15 3/10/04	709-MW-09-15 8/14/12	709-MW-11-15 3/10/04	709-MW-11-15 7/29/12	709-MW-13-15 3/10/04	709-MW-14-15 3/10/04
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
Gasoline Range Hydrocarbons in ug/L	800			20 J			31 J		27		250 U	720	70 J	300	7,100	5,000	480	600	2,100
Diesel Range Hydrocarbons in ug/L	500			13 J			13 J			18 J	920		37 J		840				
Oil Range Hydrocarbons in ug/L	500			26 J			47 J			510 U			540 U		110 J				
Total TPHs D+O (ND=0U) in ug/L	500			39 J			60 J			18 J			37 J		950				
Total TPHs D+O (ND=1/2U) in ug/L	500			39 J			60 J			273 J			307 J		950				
Total TPHs G+D+O (ND=0U) in ug/L	720			59 J			91 J			18 J			340		8,000				
Total TPHs G+D+O (ND=1/2U) in ug/L	720			59 J			91 J			400 J			610		8,000				
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in ug/L	500												260 U						1,700
Oil Range Hydrocarbons in ug/L	500												520 U						520 U
Total TPHs D+O (ND=0U) in ug/L	500												ND						1,700
Total TPHs D+O (ND=1/2U) in ug/L	500												ND						1,960
Total TPHs G+D+O (ND=0U) in ug/L	720												70 J						2,200
Total TPHs G+D+O (ND=1/2U) in ug/L	720												460 J						2,400
Dissolved Metals																			
Aluminum in ug/L																			
Antimony in ug/L																			
Arsenic in ug/L	5																		
Barium in ug/L																			
Beryllium in ug/L																			
Cadmium in ug/L																			
Calcium in ug/L																			
Chromium (Total) in ug/L																			
Cobalt in ug/L																			
Copper in ug/L	2.4																		
Iron in ug/L																			
Lead in ug/L	8.1																		
Magnesium in ug/L																			
Manganese in ug/L																			
Mercury in ug/L																			
Nickel in ug/L	8.2																		
Potassium in ug/L																			
Selenium in ug/L																			
Silver in ug/L																			
Sodium in ug/L																			
Tetraethyl Lead in ug/L				0.00058 UJ			0.00059 UJ			0.0006 U		0.00057 U	0.00058 U				0.00283		
Thallium in ug/L																			
Vanadium in ug/L																			
Zinc in ug/L	81																		
Total Metals																			
Aluminum in ug/L				16.5			5 U			50 U		14.1	112		114			48.3	
Antimony in ug/L				0.5 U			5.39			1.01 J		0.166 J	8.86 J		0.215 J			0.576	
Arsenic in ug/L	5			4.54			3.61			7.87		2.26	51.7		4.09			1.75	
Barium in ug/L				2.1 J			16.3			1.4 J		2.9 J	1.4 J		9			15.7	
Beryllium in ug/L																			
Cadmium in ug/L				0.2 U			0.117 J			0.2 U		0.2 U	0.2 U		0.2 U			0.079 J	
Calcium in ug/L				184			214,000			30,700		25,100	6,750		97,700			42,400	
Chromium (I) in ug/L				2 U			13.8			2 U		2 U	2.34		1.95 J			1.52 J	
Cobalt in ug/L																			
Copper in ug/L	2.4			1.32			6.8			1.18		0.5 J	4.68		1.27			3.96	
Iron in ug/L				22.8			107			49.2		150	170		16,000			18,300	
Lead in ug/L	8.1			0.2 U			868			0.345		0.2 U	0.63		1.68			3.96	
Magnesium in ug/L				309			737,000			854		4,380	1,140		27,600			10,100	
Manganese in ug/L																			
Mercury in ug/L				0.2 U			0.2 U			0.2 U		0.02 J	0.2 U		0.2 U			0.04 J	
Nickel in ug/L	8.2			0.2 J			26.1			2 U		2 U	2 U		0.8 J			1.32 J	
Potassium in ug/L				2,220			188,000			6,210		2,680	4,090		1,510			2,190	
Selenium in ug/L																			
Silicon in ug/L				28,800			7,140			117,000		17,600	231,000		25,700			20,000	

Table B-12

Aspect Consulting

2/26/2016

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Table B-12 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	709-MW-03-15 3/9/04	709-MW-04-15 3/9/04	709-MW-04-15 7/22/12	709-MW-05-15 3/9/04	709-MW-05-15 12/1/11	709-MW-05-15 7/22/12	709-MW-06-15 3/10/04	709-MW-06-15 12/1/11	709-MW-06-15 8/9/12	709-MW-07-15 3/10/04	709-MW-07-15 7/28/12	709-MW-08-15 8/9/12	709-MW-09-15 3/10/04	709-MW-09-15 8/14/12	709-MW-11-15 3/10/04	709-MW-11-15 7/29/12	709-MW-13-15 3/10/04	709-MW-14-15 3/10/04
Silver in ug/L				0.2 U			0.173 J			0.2 U		0.2 U	0.086 J		0.2 U		0.2 U		
Sodium in mg/L				64.4			5,510			184		9.21	323		9.62		10.3		
Sodium in ug/L																			
Strontium in ug/L				10 U			4,100			102		118	51.9		454		201		
Thallium in ug/L				0.2 U			0.2 U			0.2 U		0.2 U	0.2 U		0.2 U		0.2 U		
Vanadium in ug/L																			
Zinc in ug/L	81			5 U			22.5			5 U		1.76 J	5 U		1.84 J		46.2		
Organometals																			
Tetraethyl Lead in ug/L				0.00058 UJ			0.00059 UJ			0.0006 U		0.00057 U	0.00058 U				0.00283		
Conventional Chemistry Parameters																			
Alkalinity (Total) in mg/L		2,140	2 U	50.5	170		157	131		311	281	101	837	324	424	304	212	790	385
Bicarbonate in mg/L				50.5			157			124		101	90 U		424		212		
Bromide in mg/L				0.11 J			39			0.19 J		0.2 U	0.03 J		0.2 U		0.02 J		
Chloride in mg/L				36.8			10,600			75.1		1.08	26.5		2.25		1.7		
Dissolved Organic Carbon in mg/L																			
pH in pH Units																			
Sulfate in mg/L				32.3			1,490			27.1 J		5.36	16.9 J		2.48		1.88		
Total Boron in mg/L				0.0566			1.82			0.144		0.0211 J	0.114		0.12		0.0618		
Total Dissolved Solids in mg/L				211			19,800			637		136	1,360		471		301		
Total Sodium in mg/L				64.4			5,510			184		9.21	323		9.62		10.3		
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in ug/L																			
1,1,1-Trichloroethane in ug/L																			
1,1,2 - Trichlorotrifluoroethane in ug/L																			
1,1,2,2-Tetrachloroethane in ug/L	3	5 U	5 U	0.5 U	5 U		0.77	5 U		0.5 U	5 U	0.5 U	0.5 U	5 U	13 U	5 U	0.5 U	5 U	5 U
1,1,2-Trichloroethane in ug/L		5 U	5 U	0.5 U	5 U		0.5 U	5 U		0.5 U	5 U	0.5 U	0.5 U	5 U	13 U	5 U	0.5 U	5 U	5 U
1,1-Dichloroethane in ug/L																			
1,1-Dichloroethene in ug/L	3.2	5 U	5 U	0.5 U	5 U		0.5 U	5 U		0.5 U	5 U	0.5 U	0.27 J	5 U	13 U	5 U	0.5 U	5 U	5 U
1,1-Dichloropropene in ug/L																			
1,2,3-Trichlorobenzene in ug/L																			
1,2,3-Trichloropropane in ug/L																			
1,2,4-Trichlorobenzene in ug/L																			
1,2,4-Trimethylbenzene in ug/L	63																		
1,2-Dibromo-3-chloropropane in ug/L																			
1,2-Dibromoethane (EDB) in ug/L																			
1,2-Dichlorobenzene in ug/L																			
1,2-Dichloroethane (EDC) in ug/L	42																		
1,2-Dichloropropane in ug/L																			
1,3,5-Trimethylbenzene in ug/L																			
1,3-Dichlorobenzene in ug/L																			
1,3-Dichloropropane in ug/L																			
1,4-Dichloro-2-Butene in ug/L																			
1,4-Dichlorobenzene in ug/L																			
2,2-Dichloropropane in ug/L																			
2-Butanone in ug/L																			
2-Chloroethyl Vinyl Ether in ug/L																			
2-Chlorotoluene in ug/L																			
2-Hexanone in ug/L																			
4-Chlorotoluene in ug/L																			
4-Methyl-2-pentanone in ug/L																			
Acetone in ug/L	31,896,900																		
Acrolein in ug/L																			
Acrylonitrile in ug/L	0.7																		
Benzene in ug/L	24	5 U	5 U	0.5 U	5 U		0.5 U	5 U		0.5 U	5 U	0.29 J	1.3	280	42	55	7.1	11	5 U
Bromobenzene in ug/L																			
Bromochloromethane in ug/L																			
Bromodichloromethane in ug/L																			
Bromoethane in ug/L																			
Bromoform in ug/L																			
Bromomethane in ug/L																			

Table B-12

Table B-12 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	709-MW-03-15 3/9/04	709-MW-04-15 3/9/04	709-MW-04-15 7/22/12	709-MW-05-15 3/9/04	709-MW-05-15 12/1/11	709-MW-05-15 7/22/12	709-MW-06-15 3/10/04	709-MW-06-15 12/1/11	709-MW-06-15 8/9/12	709-MW-07-15 3/10/04	709-MW-07-15 7/28/12	709-MW-08-15 8/9/12	709-MW-09-15 3/10/04	709-MW-09-15 8/14/12	709-MW-11-15 3/10/04	709-MW-11-15 7/29/12	709-MW-13-15 3/10/04	709-MW-14-15 3/10/04	
Carbon disulfide in ug/L																				
Carbon tetrachloride in ug/L		5 U	5 U	0.5 U	5 U		0.3 J	5 U		0.5 U	5 U	0.5 U	0.5 U	5 U	13 U	5 U	0.5 U	5 U	5 U	
Chlorobenzene in ug/L																				
Chloroethane in ug/L																				
Chloroform in ug/L	12	5 U	3.6 J	0.46 J	4.9 J		10	5 U		0.5 U	5 U	0.5 U	0.5 U	5 U	13 U	5 U	0.5 U	5 U	5 U	
Chloromethane in ug/L																				
cis-1,2-Dichloroethene (DCE) in ug/L		5 U	5 U	0.16 J	5.5		0.38 J	16		7.1	19	3	5.4	5 U	3 J	5 U	0.07 J	7.5	71	
cis-1,3-Dichloropropene in ug/L																				
Dibromochloromethane in ug/L																				
Dibromomethane in ug/L																				
Dichlorodifluoromethane in ug/L																				
Ethylbenzene in ug/L	130	5 U	5 U	0.5 U	5 U		0.5 U	5 U		0.5 U	5	0.29 J	1.3	310	440	14	37	9.4	31	
Hexachlorobutadiene in ug/L	0.2																			
Isopropylbenzene in ug/L	1,614																			
Methyl tert-butyl ether (MTBE) in ug/L		5 U	5 U		5 U			5 U			5 U			5 U		5 U		5 U	5 U	
Methylene chloride in ug/L	1,000	43 U	32 U	2 U	27 U		2 U	93 U		2 U	120 U	2 U	2 U	130 U	50 U	9.5 U	2 U	15 U	15 U	
Methyliodide in ug/L																				
n-Butylbenzene in ug/L																				
n-Propylbenzene in ug/L	5,200																			
p-Isopropyltoluene in ug/L																				
sec-Butylbenzene in ug/L																				
Styrene in ug/L																				
tert-Butylbenzene in ug/L																				
Tetrachloroethene (PCE) in ug/L	8.9	9.6	9.3	19	53		42	51		46	43	0.17 J	45	5 U	13 U	5 U	0.11 J	5 U	9.9	
Toluene in ug/L	520	5 U	5 U	0.5 U	5 U		0.5 U	5 U		0.5 U	5 U	0.5 U	0.5 U	300	170	23	3.5	5 J	5 U	
trans-1,2-Dichloroethene in ug/L	4,000	5 U	5 U	0.5 U	5 U		0.5 U	7.9		6.1	6.4	4.6	6.6	5 U	13 U	5 U	0.5 U	5 U	4 J	
trans-1,3-Dichloropropene in ug/L																				
Trichloroethene (TCE) in ug/L	7	4.2 J	5 U	2.1	7.4		2.4	7.8		4	10	0.51	24	5 U	13 U	5 U	0.34 J	2.9 J	41	
Trichlorofluoromethane in ug/L																				
Vinyl acetate in ug/L																				
Vinyl chloride in ug/L	1.6	5 U	5 U	0.5 U	5 U		0.5 U	4.5 J		0.87	5 U	1.6	0.87	5 U	13 U	5 U	0.5 U	5 U	5 U	
m,p-Xylenes in ug/L				0.5 U			0.5 U			0.5 U		0.5 U	0.62		660		39			
o-Xylene in ug/L				0.5 U			0.5 U			0.5 U		0.5 U	0.5 U		56		5.5			
Total Xylenes in ug/L				ND			ND			ND		ND	0.87		720		44			
Xylenes (total) in ug/L	970	5 U	5 U		5 U			5 U			3.4 J			720		1,000		5 U	8.9	
Naphthalene in ug/L	90	5 U	5 U		5 U			5 U			5 U			58		74		5 U	5 U	
Field Parameters																				
Conductivity in umhos/cm				0.347		36.5	31.5		0.459	0.526		0.208	2.18		0.643		0.314			
Dissolved Oxygen in mg/L				0		9	6.69		7.69	0.78		0	0		1.38		0			
Dissolved Total Dissolved Solids in ug/L						22,000			290											
ORP in mVolts				162		71	131		24	-122		-209	12		-186		-0260			
pH in pH Units		12.15	4.12	5.91	7.19	7.17	7.12	8.27	8.75	9.46	9.79	8.19	11.25	6.36	5.9	6.08	6.17	6.6	6.74	
Salinity in %				0		2.3	2		0	0		0	0.1		0		0			
Temperature in Deg C				15.2		9.55	16.8		13.04	16.2		16.74	18.9		17		14.87			
Turbidity in NTU				0		9.8	0		1.2	0		0	0		122		34.8			

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

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Table B-12 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	709-MW-15-15 3/10/04	709-MW-15-15 8/15/12	709-MW-16-15 3/11/04	709-MW-16-15 7/27/12	709-MW-17-15 3/11/04	709-MW-17-15 7/21/12	709-MW-18-15 3/11/04	709-MW-18-15 7/26/12	709-MW-19-15 3/11/04	709-MW-19-15 7/28/12	709-MW20-15 7/21/04	709-MW20-15 8/21/12	709-MW21-15 7/27/12	721-MW2 2/16/08	721-MW3 2/17/08	721-MW5-15 7/19/04	721-MW5-15 8/25/12	721-MW6-15 7/19/04
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
Gasoline Range Hydrocarbons in ug/L	800	22	250 U	550	160 J	1,500	960		250 U	27	18 J		250 U	2,300	3,820	920		950	
Diesel Range Hydrocarbons in ug/L	500		250 U		1,100		870		12 J				260 U		1,700	250 U		270 U	
Oil Range Hydrocarbons in ug/L	500		500 U		850		150 J		31 J				520 U		500 U	500 U		530 U	
Total TPHs D+O (ND=0U) in ug/L	500		ND		2,000		1,000		43 J				ND		1,700	ND		ND	
Total TPHs D+O (ND=1/2U) in ug/L	500		ND		1,950		1,020 J		43 J				ND		1,950	ND		ND	
Total TPHs G+D+O (ND=0U) in ug/L	720		ND		2,100		2,000		43 J				ND		5,500	920		950	
Total TPHs G+D+O (ND=1/2U) in ug/L	720		ND		2,100		2,000		170 J				ND		5,800	1,300		1,400	
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in ug/L	500												260 U		560				
Oil Range Hydrocarbons in ug/L	500												520 U		520 U				
Total TPHs D+O (ND=0U) in ug/L	500												ND		560				
Total TPHs D+O (ND=1/2U) in ug/L	500												ND		820				
Total TPHs G+D+O (ND=0U) in ug/L	720												18 J		2,900				
Total TPHs G+D+O (ND=1/2U) in ug/L	720												410 J		3,100				
Dissolved Metals																			
Aluminum in ug/L																			
Antimony in ug/L																			
Arsenic in ug/L	5																		
Barium in ug/L																			
Beryllium in ug/L																			
Cadmium in ug/L																			
Calcium in ug/L																			
Chromium (Total) in ug/L																			
Cobalt in ug/L																			
Copper in ug/L	2.4																		
Iron in ug/L																			
Lead in ug/L	8.1														1 U	1 U			
Magnesium in ug/L																			
Manganese in ug/L																			
Mercury in ug/L																			
Nickel in ug/L	8.2																		
Potassium in ug/L																			
Selenium in ug/L																			
Silver in ug/L																			
Sodium in ug/L																			
Tetraethyl Lead in ug/L			0.00059 U						0.00057 U		0.00057 U		0.00057 U					0.00057 U	
Thallium in ug/L																			
Vanadium in ug/L																			
Zinc in ug/L	81																		
Total Metals																			
Aluminum in ug/L			86.5		22.3		7.6		16.3		29		7	55.8					39
Antimony in ug/L			1.15		0.197 J		0.5 U		0.445 J		2.61		1.43	0.636					0.5 U
Arsenic in ug/L	5		24		5.99		3.77		12.6		9.27		3.29	1.34					0.9 J
Barium in ug/L			5		9		18.8		7		6.4		11.1	47.9					6
Beryllium in ug/L																			
Cadmium in ug/L			0.2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.121 J	0.2 U					0.2 U
Calcium in ug/L			64,500		56,000		111,000		80,200		26,600		84,900	78,900					22,200
Chromium (I) in ug/L			4.01		0.71 J		0.63 J		2 U		1.31 J		0.73 J	0.56 J					2.14
Cobalt in ug/L																			
Copper in ug/L	2.4		1.38		0.83 J		1.02		0.72 J		5.21		2.04	0.24 J					4.24
Iron in ug/L			866		5,610		26,700		129		59.8		100 U	13,000					2,350
Lead in ug/L	8.1		0.46		1.31		0.165 J		0.435		0.051 J		5.96	0.599	1 U	1 U			0.424
Magnesium in ug/L			1,400		4,280		6,050		2,110		8,430		140,000	7,650					2,620
Manganese in ug/L																			
Mercury in ug/L			0.2 U		0.02 J		0.2 U		0.2 U		0.05 J		0.2 U	0.2 U					0.2 U
Nickel in ug/L	8.2		4.98		0.83 J		0.56 J		0.51 J		0.62 J		3.94	0.76 J					0.58 J
Potassium in ug/L			903		858		4,010		2,660		7,350		50,000	5,170					1,430
Selenium in ug/L																			
Silicon in ug/L			31,400		17,600		21,600		14,000		19,600		22,600	20,900					34,700

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Table B-12

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Table B-12 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	709-MW-15-15 3/10/04	709-MW-15-15 8/15/12	709-MW-16-15 3/11/04	709-MW-16-15 7/27/12	709-MW-17-15 3/11/04	709-MW-17-15 7/21/12	709-MW-18-15 3/11/04	709-MW-18-15 7/26/12	709-MW-19-15 3/11/04	709-MW-19-15 7/28/12	709-MW20-15 7/21/04	709-MW20-15 8/21/12	709-MW21-15 7/27/12	721-MW2 2/16/08	721-MW3 2/17/08	721-MW5-15 7/19/04	721-MW5-15 8/25/12	721-MW6-15 7/19/04
Silver in ug/L			0.2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U	0.2 U				0.2 U	
Sodium in mg/L			36.8		12.2		11.2		7.63		106		1,140	14.6				298	
Sodium in ug/L																			
Strontium in ug/L			169		257		666		468		162		1,030	430				159	
Thallium in ug/L			0.2 U		0.2 U		0.2 U		0.2 U		0.2 U		0.2 U	0.2 U				0.2 U	
Vanadium in ug/L																			
Zinc in ug/L	81		5 U		5 U		5 U		5 U		2.29 J		17.7	33.9				5 U	
Organometals																			
Tetraethyl Lead in ug/L			0.00059 U						0.00057 U		0.00057 U		0.00057 U					0.00057 U	
Conventional Chemistry Parameters																			
Alkalinity (Total) in mg/L		65.1	218	210	217	374	375	240	203	239	346		250	308				658	
Bicarbonate in mg/L			218		217		375		203		346		250	308				658 J	
Bromide in mg/L			0.01 J		0.2 U		0.01 J		0.2 U		0.01 J		7.64	0.02 J				0.09 J	
Chloride in mg/L			14.7		1.92		1.6		2.12		5.82		2,310	1.6				54.2	
Dissolved Organic Carbon in mg/L																			
pH in pH Units																	7.64		6.29
Sulfate in mg/L			6.11		11.5		1.28		19.6		17		310	0.54				4.04	
Total Boron in mg/L			0.05 U		0.0369 J		0.0572		0.0411 J		0.0856		0.418	0.063				0.209	
Total Dissolved Solids in mg/L			342		246		451		268		374		4,670	335				811	
Total Sodium in mg/L			36.8		12.2		11.2		7.63		106		1,140	14.6				298	
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in ug/L																		1 U	1 U
1,1,1-Trichloroethane in ug/L												0.7 U						1 U	1 U
1,1,2-Trichlorotrifluoroethane in ug/L																		2 U	2 U
1,1,2,2-Tetrachloroethane in ug/L	3	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	1.4 U	2.5 U	2.5 U				1 U	0.5 U
1,1,2-Trichloroethane in ug/L		5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	1 U	2.5 U	2.5 U				1 U	0.5 U
1,1-Dichloroethane in ug/L												0.95 U						1 U	1 U
1,1-Dichloroethene in ug/L	3.2	5 U	0.15 J	5 U	0.5 U	5 U	0.5 U	5 U	0.17 J	5 U	0.5 U	1.5 U	0.7 J	2.5 U				1 U	0.5 U
1,1-Dichloropropene in ug/L																		1 U	1 U
1,2,3-Trichlorobenzene in ug/L																		5 U	5 U
1,2,3-Trichloropropane in ug/L																		3 U	3 U
1,2,4-Trichlorobenzene in ug/L																			
1,2,4-Trimethylbenzene in ug/L	63																		
1,2-Dibromo-3-chloropropane in ug/L													3.8 U					5 U	5 U
1,2-Dibromoethane (EDB) in ug/L													1 U					1 U	1 U
1,2-Dichlorobenzene in ug/L													0.85 U					0.85 U	0.17 U
1,2-Dichloroethane (EDC) in ug/L	42												0.7 U					1 U	1 U
1,2-Dichloropropane in ug/L													0.85 U					1 U	1 U
1,3,5-Trimethylbenzene in ug/L																			
1,3-Dichlorobenzene in ug/L													0.55 U					0.55 U	0.11 U
1,3-Dichloropropane in ug/L																		1 U	1 U
1,4-Dichloro-2-Butene in ug/L																		5 U	5 U
1,4-Dichlorobenzene in ug/L													0.95 U					0.95 U	0.19 U
2,2-Dichloropropane in ug/L																		1 U	1 U
2-Butanone in ug/L													3 U					5 U	5 U
2-Chloroethyl Vinyl Ether in ug/L																		5 U	5 U
2-Chlorotoluene in ug/L																		1 U	1 U
2-Hexanone in ug/L													4.6 U					5 U	5 U
4-Chlorotoluene in ug/L																		1 U	1 U
4-Methyl-2-pentanone in ug/L													9.5 U					5 U	5 U
Acetone in ug/L	31,896,900												34 U					5.5	29 M
Acrolein in ug/L																		50 U	50 U
Acrylonitrile in ug/L	0.7																	1.5 Y	31 Y
Benzene in ug/L	24	5 U	0.5 U	5 U	0.09 J	25	2.4	5 U	0.5 U	5 U	0.5 U	0.8 U	2.5 U	21	2,100	16	6.3	22	2,300
Bromobenzene in ug/L																		1 U	1 U
Bromochloromethane in ug/L																		1 U	1 U
Bromodichloromethane in ug/L													0.7 U					1 U	1 U
Bromoethane in ug/L																		2 U	2 U
Bromoform in ug/L													0.7 U					1 U	1 U
Bromomethane in ug/L													1.2 U					1 U	1 U

Table B-12

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Table B-12 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	709-MW-15-15 3/10/04	709-MW-15-15 8/15/12	709-MW-16-15 3/11/04	709-MW-16-15 7/27/12	709-MW-17-15 3/11/04	709-MW-17-15 7/21/12	709-MW-18-15 3/11/04	709-MW-18-15 7/26/12	709-MW-19-15 3/11/04	709-MW-19-15 7/28/12	709-MW20-15 7/21/04	709-MW20-15 8/21/12	709-MW21-15 7/27/12	721-MW2 2/16/08	721-MW3 2/17/08	721-MW5-15 7/19/04	721-MW5-15 8/25/12	721-MW6-15 7/19/04
Carbon disulfide in ug/L												1 U					1 U		1 U
Carbon tetrachloride in ug/L		5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.5 U	2.5 U	2.5 U			1 U	0.5 U	1 U
Chlorobenzene in ug/L												1 U					1 U		1 U
Chloroethane in ug/L												1 U					1 U		1 U
Chloroform in ug/L	12	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	5 U	0.5 U	0.8 U	3.3	2.5 U			1 U	0.5 U	1 U
Chloromethane in ug/L												1.6 U					1 U		1 U
cis-1,2-Dichloroethene (DCE) in ug/L		5 U	16	5 U	0.43 J	3.6 J	0.55	31	63	18	0.22 J	12	26	2.5 U			190	1.6	1 U
cis-1,3-Dichloropropene in ug/L												0.75 U					1 U		1 U
Dibromochloromethane in ug/L												0.95 U					1 U		1 U
Dibromomethane in ug/L																	1 U		1 U
Dichlorodifluoromethane in ug/L												0.95 U					0.95 U		0.19 U
Ethylbenzene in ug/L	130	5 U	0.5 U	5 U	1.8	24	11	5 U	0.5 U	5 U	0.5 U	1.2 U	2.5 U	140	65	1 U	35	15	130
Hexachlorobutadiene in ug/L	0.2																		
Isopropylbenzene in ug/L	1,614																1.3		24
Methyl tert-butyl ether (MTBE) in ug/L		5 U		5 U		5 U		5 U		5 U									
Methylene chloride in ug/L	1,000	6.7 U	2 U	5 U	2 U	5.8 U	2 U	8.4 U	2 U	6 U	2 U	1.8 U	10 U	10 U			2 U	2 U	2 U
Methyliodide in ug/L																	1 U		1 U
n-Butylbenzene in ug/L																	1 U		5.8
n-Propylbenzene in ug/L	5,200																1.5		28
p-Isopropyltoluene in ug/L																	1 U		3
sec-Butylbenzene in ug/L																	1 U		4.2
Styrene in ug/L												1.2 U					1 U		1 U
tert-Butylbenzene in ug/L																	1 U		1 U
Tetrachloroethene (PCE) in ug/L	8.9	24	1.5	5 U	0.45 J	5 U	0.17 J	6.4	1.8	15	28	130	150	2.5 U			38	0.17 J	1 U
Toluene in ug/L	520	5 U	0.53	5 U	0.06 J	12	1.3 U	5 U	0.5 U	5 U	0.5 U	0.85 U	0.5 J	17	52	1	1.6	6.6	63
trans-1,2-Dichloroethene in ug/L	4,000	5 U	0.38 J	5 U	0.33 J	5 U	0.5 U	5 U	1.2	5 U	0.5 U	0.95 U	0.7 J	2.5 U			5.4	5.9	1 U
trans-1,3-Dichloropropene in ug/L												0.9 U					1 U		1 U
Trichloroethene (TCE) in ug/L	7	3.8 J	4.4	3.4 J	2	5 U	1.7 U	16	7.1	50	6.6	31	27	2.5 U			34	0.5 U	1 U
Trichlorofluoromethane in ug/L												1.2 U					1 U		1 U
Vinyl acetate in ug/L																	5 U		5 U
Vinyl chloride in ug/L	1.6	5 U	0.5 U	5 U	0.5 U	5.5	2	5 U	0.11 J	5 U	0.5 U	1.2 U	1.6 J	2.5 U			67	2.3	1 U
m,p-Xylenes in ug/L			0.5 U		0.93		4.3		0.5 U		0.5 U	2 U	2.5 U	41			2 U	76	72
o-Xylene in ug/L			0.5 U		0.65		0.23 J		0.5 U		0.5 U	0.95 U	2.5 U	7.9			1.9	5.1	7
Total Xylenes in ug/L			ND		1.6		4.5		ND		ND	ND	ND	49			ND	81	80
Xylenes (total) in ug/L	970	5 U		5 U		21		5 U		5 U					15	2.2			
Naphthalene in ug/L	90	5 U		5 U		5 U		5 U		5 U									
Field Parameters																			
Conductivity in umhos/cm			0.515		0.355		0.796		0.475		0.617		7.77	0.637				1.93	
Dissolved Oxygen in mg/L			0		0		0		0.24		1.27		1.3	0				0.8	
Dissolved Total Dissolved Solids in ug/L																			
ORP in mVolts			-0270		-139		-85		98		25		87	-155				-189	
pH in pH Units		7.36	8.98	6.81	6.55	6.4	6.07	7.12	7.36	8.76	8.94	7.54	7.52	6.2			8.07	7.52	6.39
Salinity in %			0		0.01		0		0		0		0.4	0				0.1	
Temperature in Deg C			15.8		15.09		17.3		13.8		18.2		18.3	17.31				18.32	
Turbidity in NTU			54.3		14		0		0.2		0		-010	0.8				4.2	

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-12 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	721-MW6-15 7/25/12	721-MW7-15 7/19/04	721-MW7-15 8/9/12	721-MW8-15 7/20/04	721-MW9-15 7/20/04	721-MW9-15 7/22/12	721-MW9-15 7/21/04	721-MW10-15 8/8/12	721-MW10-15 7/31/12	721-MW11-15 7/30/12	721-MW12-15 7/31/12	721-MW13-15 8/8/12	721-MW14-15 7/30/12	721-MW15-15 6/4/04	721-PZ-01 6/4/04	721-PZ-02 6/4/04	721-PZ-03 6/4/04	721-PZ-03 6/4/04 FD	721-PZ-04 8/28/04
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																				
Gasoline Range Hydrocarbons in ug/L	800	2,600		720			1,100		990	2,000	3,100	18 J	3,300	2,600 J						
Diesel Range Hydrocarbons in ug/L	500						260 U		160 J		1,600		1,300							
Oil Range Hydrocarbons in ug/L	500						520 U		530 U		530 U		550 U							
Total TPHs D+O (ND=0U) in ug/L	500						ND		160 J		1,600		1,300							
Total TPHs D+O (ND=1/2U) in ug/L	500						ND		425 J		1,865		1,575							
Total TPHs G+D+O (ND=0U) in ug/L	720						1,100		1,200		4,700		4,600							
Total TPHs G+D+O (ND=1/2U) in ug/L	720						1,500		1,400		5,000		4,900							
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																				
Diesel Range Hydrocarbons in ug/L	500	560		110 J					360		270 U		590							
Oil Range Hydrocarbons in ug/L	500	510 U		530 U					580 U		540 U		520 U							
Total TPHs D+O (ND=0U) in ug/L	500	560		110 J					360		ND		590							
Total TPHs D+O (ND=1/2U) in ug/L	500	815		375 J					650		ND		850							
Total TPHs G+D+O (ND=0U) in ug/L	720	3,200		830					2,400		18 J		3,200							
Total TPHs G+D+O (ND=1/2U) in ug/L	720	3,400		1,100					2,600		420 J		3,400							
Dissolved Metals																				
Aluminum in ug/L																				
Antimony in ug/L																				
Arsenic in ug/L	5																			
Barium in ug/L																				
Beryllium in ug/L																				
Cadmium in ug/L																				
Calcium in ug/L																				
Chromium (Total) in ug/L																				
Cobalt in ug/L																				
Copper in ug/L	2.4																			
Iron in ug/L																				
Lead in ug/L	8.1																			
Magnesium in ug/L																				
Manganese in ug/L																				
Mercury in ug/L																				
Nickel in ug/L	8.2																			
Potassium in ug/L																				
Selenium in ug/L																				
Silver in ug/L																				
Sodium in ug/L																				
Tetraethyl Lead in ug/L				0.0006 U			0.00599 J		0.00264	0.0054	0.00318	0.00058 U	0.00344	0.00087						
Thallium in ug/L																				
Vanadium in ug/L																				
Zinc in ug/L	81																			
Total Metals																				
Aluminum in ug/L		5 U		75.1			5 U		5 U	169	14	13.3	5 U	73.2						
Antimony in ug/L		0.226 J		2.33 J			0.5 U		0.081 J	0.5 U	0.5 U	0.5 U	0.111 J	0.216 J						
Arsenic in ug/L	5	1 U		26			0.41 J		1.52	2.05	1.68	1.6	2.48	5.31						
Barium in ug/L		33.7		1.4 J			10.3		17.3	34.8	30.8	9.4	29.4	32.8						
Beryllium in ug/L																				
Cadmium in ug/L		0.2 U		0.2 U			0.2 U		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U						
Calcium in ug/L		92,500		5,270			63,800		129,000	106,000	90,900	39,700	110,000	158,000						
Chromium (I) in ug/L		0.69 J		2.74			0.31 J		0.99 J	2.26	2.07	0.48 J	0.63 J	2 U						
Cobalt in ug/L																				
Copper in ug/L	2.4	1 U		9.14			1 U		0.3 J	0.68 J	1 U	0.48 J	0.29 J	0.34 J						
Iron in ug/L		64,800		125			2,750		10,300	48,800	36,000	9,610	40,700	70,700						
Lead in ug/L	8.1	0.2 U		0.756			0.514		3.63	0.816	0.113 J	0.2 U	0.34	0.2 U						
Magnesium in ug/L		11,300		957			7,740		330,000	10,200	8,380	6,370	5,550	13,100						
Manganese in ug/L																				
Mercury in ug/L		0.02 J		0.2 U			0.2 U		0.2 U	0.02 J	0.2 U	0.02 J	0.02 J	0.2 U						
Nickel in ug/L	8.2	0.36 J		2 U			0.21 J		0.25 J	1.08 J	2 U	0.95 J	0.33 J	2 U						
Potassium in ug/L		11,100		850			2,470		103,000	9,800	5,730	4,400	5,390	8,820						
Selenium in ug/L																				
Silicon in ug/L		27,700		82,100			26,800		14,700	22,600	25,500	29,600	20,300	28,000						

Table B-12

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RI

Table B-12 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	721-MW6-15 7/25/12	721-MW7-15 7/19/04	721-MW7-15 8/9/12	721-MW8-15 7/20/04	721-MW9-15 7/20/04	721-MW9-15 7/22/12	721-MW10-15 7/21/04	721-MW10-15 8/8/12	721-MW11-15 7/31/12	721-MW12-15 7/30/12	721-MW13-15 7/31/12	721-MW14-15 8/8/12	721-MW15-15 7/30/12	721-PZ-01 6/4/04	721-PZ-02 6/4/04	721-PZ-03 6/4/04	721-PZ-03 6/4/04 FD	721-PZ-04 8/28/04
Silver in ug/L		0.2 U		0.2 U			0.2 U		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U					
Sodium in mg/L		28.2		198			27.3		2,700	187	21.9	11.6	6.84	32.7					
Sodium in ug/L																			
Strontium in ug/L		527		35.8			361		2,300	335	582	73	681	1,010					
Thallium in ug/L		0.2 U		0.2 U			0.2 U		0.0064 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U					
Vanadium in ug/L																			
Zinc in ug/L	81	5 U		5 U			5 U		0.84 J	5 U	5 U	5 U	2.59 J	5 U					
Organometals																			
Tetraethyl Lead in ug/L				0.0006 U			0.00599 J		0.00264	0.0054	0.00318	0.00058 U	0.00344	0.00087					
Conventional Chemistry Parameters																			
Alkalinity (Total) in mg/L		408		414			225		393	575	344	157	375	538					
Bicarbonate in mg/L		408		252			225		393	575	344	157	375	538					
Bromide in mg/L		0.08 J		0.03 J			0.02 J		17.3	0.43	0.03 J	0.2 U	0.01 J	0.3					
Chloride in mg/L		20.8		23.8			2.41		4,960	182	4.41	5.39	5.12	41.7					
Dissolved Organic Carbon in mg/L																			
pH in pH Units			8.57		7.44		7.78											8.4	8.2
Sulfate in mg/L		0.81		17.3 J			5.83		681	1.36	0.59	18.3	0.76	0.9					
Total Boron in mg/L		0.193		0.16			0.0585		1.11	0.872	0.0803	0.056	0.0342 J	0.136					
Total Dissolved Solids in mg/L		504		579			286		10,100 J	929	380	274	437 J	763					
Total Sodium in mg/L		28.2		198			27.3		2,700	187	21.9	11.6	6.84	32.7					
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in ug/L			1 U		1 U		1 U												
1,1,1-Trichloroethane in ug/L			1 U		1 U		1 U		0.7 U						1.4 U	1.4 U	1.4 U		
1,1,2 - Trichlorotrifluoroethane in ug/L			2 U		2 U		2 U												
1,1,2,2-Tetrachloroethane in ug/L	3	50 U	1 U	0.5 UJ	1 U	1.1 Y	0.5 U	1.4 U	0.5 U	25 U	10 U	0.5 U	5 U	50 U	2.7 U	2.7 U	2.7 U		
1,1,2-Trichloroethane in ug/L		50 U	1 U	0.5 UJ	1 U	1 U	0.5 U	1 U	0.5 U	25 U	10 U	0.5 U	5 U	50 U	2 U	2 U	2 U		
1,1-Dichloroethane in ug/L			1 U		1 U		1 U		0.95 U						1.9 U	1.9 U	1.9 U		
1,1-Dichloroethene in ug/L	3.2	50 U	1 U	0.28 J	1 U	1 U	0.5 U	1.5 U	0.5 U	25 U	10 U	0.5 U	5 U	50 U	3 U	3 U	3 U		
1,1-Dichloropropene in ug/L			1 U		1 U		1 U												
1,2,3-Trichlorobenzene in ug/L			5 U		5 U		5 U												
1,2,3-Trichloropropane in ug/L			3 U		3 U		3 U												
1,2,4-Trichlorobenzene in ug/L																			
1,2,4-Trimethylbenzene in ug/L	63																		
1,2-Dibromo-3-chloropropane in ug/L			5 U		5 U		5 U		3.8 U						7.6 U	7.6 U	7.6 U		
1,2-Dibromoethane (EDB) in ug/L			1 U		1 U		1 U		1 U						2 U	2 U	2 U		
1,2-Dichlorobenzene in ug/L			0.85 U		0.85 U		1.7 U		0.85 U						1.7 U	1.7 U	1.7 U		
1,2-Dichloroethane (EDC) in ug/L	42		1 U		1 U		1 U		0.7 U						1.4 U	1.4 U	1.4 U		
1,2-Dichloropropane in ug/L			1 U		1 U		1 U		0.85 U						1.7 U	1.7 U	1.7 U		
1,3,5-Trimethylbenzene in ug/L																			
1,3-Dichlorobenzene in ug/L			0.55 U		0.55 U		1.1 U		0.55 U						1.1 U	1.1 U	1.1 U		
1,3-Dichloropropane in ug/L			1 U		1 U		1 U												
1,4-Dichloro-2-Butene in ug/L			5 U		5 U		5 U												
1,4-Dichlorobenzene in ug/L			0.95 U		0.95 U		1.9 U		0.95 U						1.9 U	1.9 U	1.9 U		
2,2-Dichloropropane in ug/L			1 U		1 U		1 U												
2-Butanone in ug/L			5 U		5 U		26		3 U						6 U	6 U	6 U		
2-Chloroethyl Vinyl Ether in ug/L			5 U		5 U		5 U												
2-Chlorotoluene in ug/L			1 U		1 U		1 U												
2-Hexanone in ug/L			5 U		5 U		5 U		4.6 U						9.2 U	9.2 U	9.2 U		
4-Chlorotoluene in ug/L			1 U		1 U		1 U												
4-Methyl-2-pentanone in ug/L			5 U		5 U		5 U		9.5 U						19 U	19 U	19 U		
Acetone in ug/L	31,896,900		5 U		5 U		17		14 U						15 J	20 J	18 J		
Acrolein in ug/L			50 U		50 U		50 U												
Acrylonitrile in ug/L	0.7		1 U		1 U		1 U												
Benzene in ug/L	24	2,400	5.7	5.2 J	5.5	1.7	2.3	0.8 U	7.8	1,100	450	0.29 J	150	2,300	15	4.7 J	1.6 U		
Bromobenzene in ug/L			1 U		1 U		1 U												
Bromochloromethane in ug/L			1 U		1 U		1 U												
Bromodichloromethane in ug/L			1 U		1 U		1 U		0.7 U						1.4 U	1.4 U	1.4 U		
Bromoethane in ug/L			2 U		2 U		2 U												
Bromoform in ug/L			1 U		1 U		1 U		0.7 U						1.4 U	1.4 U	1.4 U		
Bromomethane in ug/L			1 U		1 U		1 U		1.2 U						2.4 UJ	2.4 UJ	2.4 U		

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RI

Table B-12 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	721-MW6-15 7/25/12	721-MW7-15 7/19/04	721-MW7-15 8/9/12	721-MW8-15 7/20/04	721-MW9-15 7/20/04	721-MW9-15 7/22/12	721-MW10-15 7/21/04	721-MW10-15 8/8/12	721-MW11-15 7/31/12	721-MW12-15 7/30/12	721-MW13-15 7/31/12	721-MW14-15 8/8/12	721-MW15-15 7/30/12	721-PZ-01 6/4/04	721-PZ-02 6/4/04	721-PZ-03 6/4/04	721-PZ-03 6/4/04 FD	721-PZ-04 8/28/04
Carbon disulfide in ug/L			1 U		1 U	1 U		1 U							2 U	2 U	2 U		
Carbon tetrachloride in ug/L		50 U	1 U	0.5 UJ	1 U	1 U	0.5 U	0.5 U	0.5 U	25 U	10 U	0.5 U	5 U	50 U	1 U	1 U	1 U		
Chlorobenzene in ug/L			1 U		1 U	1 U		1 U							2.1 U	2.1 U	5.6 J		
Chloroethane in ug/L			1 U		1 U	1 U		1 U							2.1 U	2.1 U	2.1 U		
Chloroform in ug/L	12	50 U	1 U	0.5 UJ	1 U	1 U	0.5 U	0.8 U	0.5 U	25 U	10 U	0.5 U	5 U	50 U	1.6 U	1.6 U	1.6 U		
Chloromethane in ug/L			1 U		1 U	1 U		1.6 U							3.1 U	3.1 U	3.1 U		
cis-1,2-Dichloroethene (DCE) in ug/L		50 U	240	11 J	13	1 U	0.09 J	0.8 U	0.5 U	25 U	10 U	0.5 U	5 U	50 U	1.6 U	3.1 J	1.6 U		
cis-1,3-Dichloropropene in ug/L			1 U		1 U	1 U		0.75 U							1.5 U	1.5 U	1.5 U		
Dibromochloromethane in ug/L			1 U		1 U	1 U		0.95 U							1.9 U	1.9 U	1.9 U		
Dibromomethane in ug/L			1 U		1 U	1 U													
Dichlorodifluoromethane in ug/L			0.95 U		0.95 U	1.9 U		0.95 U							1.9 U	1.9 U	1.9 U		
Ethylbenzene in ug/L	130	66	21	3.4 J	120	4.7	0.5 U	1.2 U	2	44	160	0.06 J	130	62	2.3 U	2.3 U	2.3 U		
Hexachlorobutadiene in ug/L	0.2																		
Isopropylbenzene in ug/L	1,614		3.5		33	21													
Methyl tert-butyl ether (MTBE) in ug/L																			
Methylene chloride in ug/L	1,000	200 U	2 U	2.2 UJ	2 U	2 U	2 U	5.9 U	2 U	100 U	40 U	2 U	20 U	200 U	5.7 J	6 J	3.5 U		
Methyliodide in ug/L			1 U		1 U	1 U													
n-Butylbenzene in ug/L			4.1 Y		8	3.8													
n-Propylbenzene in ug/L	5,200		6.2		58	22													
p-Isopropyltoluene in ug/L			1.4		3.8	1.2													
sec-Butylbenzene in ug/L			1.3		5.3	3.2													
Styrene in ug/L			1 U		1 U	1 U		1.2 U							2.5 U	2.5 U	2.5 U		
tert-Butylbenzene in ug/L			1 U		1 U	1 U													
Tetrachloroethene (PCE) in ug/L	8.9	50 U	35	3.8 J	1.8	1 U	0.5 U	0.75 U	0.5 U	25 U	10 U	0.5 U	5 U	50 U	1.5 U	1.5 U	1.5 U		
Toluene in ug/L	520	57	1.6	1.1 J	3	1 U	0.3 J	0.85 U	2.3	18 J	69	0.5 U	50	47 J	1.7 U	1.7 U	1.7 U		
trans-1,2-Dichloroethene in ug/L	4,000	50 U	1.6 M	11 J	1 U	1 U	0.5 U	0.95 U	0.17 J	25 U	10 U	0.5 U	5 U	50 U	1.9 U	3.4 J	1.9 U		
trans-1,3-Dichloropropene in ug/L			1 U		1 U	1 U		0.9 U							1.8 U	1.8 U	1.8 U		
Trichloroethene (TCE) in ug/L	7	50 U	27	11 J	8.2	2.1	0.71 U	0.8 U	0.5 U	25 U	10 U	0.5 U	5 U	50 U	1.6 U	1.6 U	1.6 U		
Trichlorofluoromethane in ug/L			1 U		1 U	1 U		1.2 U							2.4 U	2.4 U	2.4 U		
Vinyl acetate in ug/L			5 U		5 U	5 U													
Vinyl chloride in ug/L	1.6	50 U	93	2.9 J	20	1 U	0.14 J	1.2 U	0.5 U	25 U	10 U	0.5 U	5 U	50 U	2.3 U	2.3 U	5.5 J		
m,p-Xylenes in ug/L		130	2 U	1.6 J	5 J	4 U	0.37 J	2 U	2.4	17 J	250	0.5 U	140	84	4 U	4 U	4 U		
o-Xylene in ug/L		17 J	2.5	0.73 J	1.6	1 U	0.09 J	0.95 U	0.54	25 U	13	0.5 U	4.6 J	50 U	1.9 U	1.9 U	1.9 U		
Total Xylenes in ug/L		150	ND	2.3 J	5.5 J	ND	0.46 J	ND	2.9	30 J	260	ND	140	110	ND	ND	ND		
Xylenes (total) in ug/L	970																		
Naphthalene in ug/L	90																		
Field Parameters																			
Conductivity in umhos/cm		0.98		0.763			0.514		17.4	1.83	0.539	0.253	0.7	1.09	19.4	17.9	13.6		
Dissolved Oxygen in mg/L		0.69		0			0.15		0	0.46	0	0	0	3.82					
Dissolved Total Dissolved Solids in ug/L																			
ORP in mVolts		-156		-188			-96		-187	-164	-123	-060	-118	-113					
pH in pH Units		6.74	8.82	9.44	7.47	7.61	7.21	6.52	6.73	6.65	6.76	6.39	6.65	5.97	8.26	8.92	8.4		
Salinity in %		0		0.03			0		1.03	0.1	0	0	0.03	0					
Temperature in Deg C		19.4		17.89			16.3		18.33	19.53	17.7	17.66	18.63	18.91	14	12.5	14.4		
Turbidity in NTU		0		31.5			0		0	252	17.1	19	0	0					

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-12 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	721-PZ-05 8/28/04	DOCK2-005 8/1/05	DOCK2-010 9/12/05	DOCK2-014 10/28/05	HC-N11-1 9/30/10	HC-N11-2 9/30/10	HC-N11-3 10/1/10	HC-N11-4 9/30/10	HC-N11-5 11/9/11	HC-N11-6 11/9/11	HC-N11-6 8/16/12	HC-P24-1 9/24/10	HC-P24-2 9/24/10	HC-P24-3 9/24/10	HC-P24-4 9/24/10	HW-4 1/23/07	HYD-008 9/13/05	HYD-009 9/14/05
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
Gasoline Range Hydrocarbons in ug/L	800					2,800	1,900	2,400	2,500	2,000	2,200	1,100	100 U	100 U	100 U	100 U			
Diesel Range Hydrocarbons in ug/L	500					1,500 U	1,200 U	1,100 U	1,200 U	900 U	1,100 U	500	260 U	260 U	260 U	260 U			
Oil Range Hydrocarbons in ug/L	500					420 U	420 U	420 U	420 U	410 U	410 U	530 U	410 U	420 U	410 U	410 U			
Total TPHs D+O (ND=0U) in ug/L	500					ND	ND	ND	ND	ND	ND	500	ND	ND	ND	ND			
Total TPHs D+O (ND=1/2U) in ug/L	500					ND	ND	ND	ND	ND	ND	765	ND	ND	ND	ND			
Total TPHs G+D+O (ND=0U) in ug/L	720					2,800	1,900	2,400	2,500	2,000	2,200	1,600	ND	ND	ND	ND			
Total TPHs G+D+O (ND=1/2U) in ug/L	720					3,800	2,700	3,200	3,300	2,700	3,000	1,900	ND	ND	ND	ND			
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in ug/L	500																		
Oil Range Hydrocarbons in ug/L	500																		
Total TPHs D+O (ND=0U) in ug/L	500																		
Total TPHs D+O (ND=1/2U) in ug/L	500																		
Total TPHs G+D+O (ND=0U) in ug/L	720																		
Total TPHs G+D+O (ND=1/2U) in ug/L	720																		
Dissolved Metals																			
Aluminum in ug/L																			
Antimony in ug/L																			
Arsenic in ug/L	5		1.53 U	0.995 U	55.6 U					3 U	3 U						471	0.334 U	0.334 U
Barium in ug/L																			
Beryllium in ug/L																			
Cadmium in ug/L										4 U	4 U								
Calcium in ug/L																			
Chromium (Total) in ug/L			38.8	40.2 U	2.4 U					10 U	10 U						4	1.07 U	2.68 U
Cobalt in ug/L																			
Copper in ug/L	2.4		15.1 J	5.15 U	107												75.7	12.6 U	8.86 U
Iron in ug/L																			
Lead in ug/L	8.1		0.08 J	0.02 U	2.2 U					1 U	1 U						0.11 U	0.065 U	0.0167 U
Magnesium in ug/L																			
Manganese in ug/L																			
Mercury in ug/L			0.044 U	0.044 U	0.066 U					0.5 U	0.5 U						0.8 U	0.044 U	0.044 U
Nickel in ug/L	8.2		36.1	20.1 U	6.9 U												30.9	31.4 J	30.1 J
Potassium in ug/L																			
Selenium in ug/L																			
Silver in ug/L																			
Sodium in ug/L																			
Tetraethyl Lead in ug/L													0.00058 U						
Thallium in ug/L			0.1 U	0.0184 U	3 U												0.01 U	0.03 U	0.02 U
Vanadium in ug/L																			
Zinc in ug/L	81		2.89 U	9.46 U	46 U												115	0.302 U	11.7 U
Total Metals																			
Aluminum in ug/L												21.5							
Antimony in ug/L												0.5 U							
Arsenic in ug/L	5									3.3 U	3.3 U	3.52							
Barium in ug/L												13.2							
Beryllium in ug/L																			
Cadmium in ug/L										4.4 U	4.4 U	0.326							
Calcium in ug/L												124,000							
Chromium () in ug/L										11 U	11 U	2 U							
Cobalt in ug/L																			
Copper in ug/L	2.4																1 U		
Iron in ug/L																			15,900
Lead in ug/L	8.1									1.1 U	1.1 U	0.62							
Magnesium in ug/L																			3,770
Manganese in ug/L																			
Mercury in ug/L										0.5 U	0.5 U	0.2 U							
Nickel in ug/L	8.2																		2 U
Potassium in ug/L																			5,090
Selenium in ug/L																			
Silicon in ug/L												20,700							

Table B-12

Table B-12 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	721-PZ-05 8/28/04	DOCK2-005 8/1/05	DOCK2-010 9/12/05	DOCK2-014 10/28/05	HC-N11-1 9/30/10	HC-N11-2 9/30/10	HC-N11-3 10/1/10	HC-N11-4 9/30/10	HC-N11-5 11/9/11	HC-N11-6 11/9/11	HC-N11-6 8/16/12	HC-P24-1 9/24/10	HC-P24-2 9/24/10	HC-P24-3 9/24/10	HC-P24-4 9/24/10	HW-4 1/23/07	HYD-008 9/13/05	HYD-009 9/14/05
Silver in ug/L												0.2 U							
Sodium in mg/L												5.78							
Sodium in ug/L																			
Strontium in ug/L												725							
Thallium in ug/L												0.517							
Vanadium in ug/L																			
Zinc in ug/L	81											5 U							
Organometals																			
Tetraethyl Lead in ug/L												0.00058 U							
Conventional Chemistry Parameters																			
Alkalinity (Total) in mg/L												390							
Bicarbonate in mg/L												390							
Bromide in mg/L												0.2 U							
Chloride in mg/L												2.41							
Dissolved Organic Carbon in mg/L			21.8	16 U	14.3 J													0.585 U	9.27 U
pH in pH Units		7.98																	
Sulfate in mg/L												0.9							
Total Boron in mg/L												0.0338 J							
Total Dissolved Solids in mg/L												432							
Total Sodium in mg/L												5.78							
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in ug/L										1 U	2 U								
1,1,1-Trichloroethane in ug/L										1 U	2 U								
1,1,2 - Trichlorotrifluoroethane in ug/L																			
1,1,2,2-Tetrachloroethane in ug/L	3		0.068 U	0.068 U						1 U	2 U	5 U						0.01 U	0.01 U
1,1,2-Trichloroethane in ug/L			0.0627 U	0.0627 U						1 U	2 U	5 U						0.045 U	0.045 U
1,1-Dichloroethane in ug/L										1 U	2 U								
1,1-Dichloroethene in ug/L	3.2		0.0595 U	0.0595 U						1 U	2 U	5 U						0.025 U	0.025 U
1,1-Dichloropropene in ug/L										1 U	2 U								
1,2,3-Trichlorobenzene in ug/L										1 U	2 U								
1,2,3-Trichloropropane in ug/L										1 U	2 U								
1,2,4-Trichlorobenzene in ug/L										1 U	2 U								
1,2,4-Trimethylbenzene in ug/L	63									1	2 U								
1,2-Dibromo-3-chloropropane in ug/L										5 U	10 U								
1,2-Dibromoethane (EDB) in ug/L										0.0096 U	0.0096 U								
1,2-Dichlorobenzene in ug/L										1 U	2 U								
1,2-Dichloroethane (EDC) in ug/L	42									1 U	2 U								
1,2-Dichloropropane in ug/L										1 U	2 U								
1,3,5-Trimethylbenzene in ug/L										8.6	2.1								
1,3-Dichlorobenzene in ug/L										1 U	2 U								
1,3-Dichloropropane in ug/L										1 U	2 U								
1,4-Dichloro-2-Butene in ug/L																			
1,4-Dichlorobenzene in ug/L										1 U	2 U								
2,2-Dichloropropane in ug/L										1 U	2 U								
2-Butanone in ug/L										25 U	50 U								
2-Chloroethyl Vinyl Ether in ug/L										5 U	10 U								
2-Chlorotoluene in ug/L										1 U	2 U								
2-Hexanone in ug/L										10 U	20 U								
4-Chlorotoluene in ug/L										1 U	2 U								
4-Methyl-2-pentanone in ug/L										10 U	20 U								
Acetone in ug/L	31,896,900									25 U	50 U								
Acrolein in ug/L																			
Acrylonitrile in ug/L	0.7																		
Benzene in ug/L	24									87	190	220							
Bromobenzene in ug/L										1 U	2 U								
Bromochloromethane in ug/L										1 U	2 U								
Bromodichloromethane in ug/L										1 U	2 U								
Bromoethane in ug/L																			
Bromoform in ug/L										5 U	10 U								
Bromomethane in ug/L										1 U	2 U								

Table B-12

Aspect Consulting

2/26/2016

\\seastore2.aspect.local\projects\Port of Tacoma\Alexander Avenue Petroleum Tank Facilities\Draft Reports\RIFS\Appendices\Appendix B - Data Tables\B-11 to B-15 Pre-RI Data 2000-2013.xlsx

RI

Table B-12 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	721-PZ-05 8/28/04	DOCK2-005 8/1/05	DOCK2-010 9/12/05	DOCK2-014 10/28/05	HC-N11-1 9/30/10	HC-N11-2 9/30/10	HC-N11-3 10/1/10	HC-N11-4 9/30/10	HC-N11-5 11/9/11	HC-N11-6 11/9/11	HC-N11-6 8/16/12	HC-P24-1 9/24/10	HC-P24-2 9/24/10	HC-P24-3 9/24/10	HC-P24-4 9/24/10	HW-4 1/23/07	HYD-008 9/13/05	HYD-009 9/14/05	
Carbon disulfide in ug/L										1 U	2 U									
Carbon tetrachloride in ug/L			0.097 U	0.137 U						1 U	2 U	5 U						0.075 U	0.075 U	
Chlorobenzene in ug/L										1 U	2 U									
Chloroethane in ug/L										5 U	10 U									
Chloroform in ug/L	12		0.0717 U	0.0717 U						1 U	2 U	5 U						0.02 U	0.02 U	
Chloromethane in ug/L										5 U	10 U									
cis-1,2-Dichloroethene (DCE) in ug/L			1	0.523 J						1 U	2 U	5 U						0.185 J	0.015 U	
cis-1,3-Dichloropropene in ug/L										1 U	2 U									
Dibromochloromethane in ug/L										1 U	2 U									
Dibromomethane in ug/L										1 U	2 U									
Dichlorodifluoromethane in ug/L										1 U	2 U									
Ethylbenzene in ug/L	130									5.8	9.4	14								
Hexachlorobutadiene in ug/L	0.2									1 U	2 U									
Isopropylbenzene in ug/L	1,614									18	20									
Methyl tert-butyl ether (MTBE) in ug/L										1 U	2 U									
Methylene chloride in ug/L	1,000		0.0752 U	0.0752 U						5 U	10 U	20 U						0.045 UJ	0.045 U	
Methyliodide in ug/L										5 U	10 U									
n-Butylbenzene in ug/L										1 U	2 U									
n-Propylbenzene in ug/L	5,200									1 U	34									
p-Isopropyltoluene in ug/L										1 U	2.5									
sec-Butylbenzene in ug/L										3.1	2.7									
Styrene in ug/L										1 U	2 U									
tert-Butylbenzene in ug/L										1 U	2 U									
Tetrachloroethene (PCE) in ug/L	8.9		0.0578 U	0.0578 U						1 U	2 U	5 U						0.015 U	0.015 U	
Toluene in ug/L	520									6.6	10 U	8.5								
trans-1,2-Dichloroethene in ug/L	4,000		0.0584 U	0.0584 U						1 U	2 U	5 U						0.02 U	0.02 U	
trans-1,3-Dichloropropene in ug/L										1 U	2 U									
Trichloroethene (TCE) in ug/L	7		0.0641 U	2.16						1 U	2 U	5 U						0.266 J	0.02 U	
Trichlorofluoromethane in ug/L										1 U	2 U									
Vinyl acetate in ug/L										10 U	20 U									
Vinyl chloride in ug/L	1.6		12	0.0604 U						1 U	2 U	5 U						0.066 J	0.025 U	
m,p-Xylenes in ug/L										12	19	28								
o-Xylene in ug/L										1 U	2 U	1 J								
Total Xylenes in ug/L										12	20	29								
Xylenes (total) in ug/L	970																			
Naphthalene in ug/L	90									5 U	10 U									
Field Parameters																				
Conductivity in umhos/cm			48.4	40.7	17.6							0.673						40.2	54.1	54.2
Dissolved Oxygen in mg/L			2.68	0	0.66							0						1.88	0.21	1.12
Dissolved Total Dissolved Solids in ug/L																				
ORP in mVolts			-157	-306	-0200							-156						102	-128	-141
pH in pH Units			9.65	8.36	8.07							7.06						8.44	8.63	7.48
Salinity in %			3.2	2.6	3							0							3.2	3.6
Temperature in Deg C			14.2	13.6	12							18.27						10.02	14.8	14.6
Turbidity in NTU			314	279	999							0							176	391

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-12 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	HYD-010 9/16/05	NL-13 12/20/05	NL-16 5/18/06	NL-16 5/19/06	NL-25 1/18/07	NL-26 1/17/07	NL-28 1/16/07	NL-28 1/17/07	NL-29 1/18/07	NL-30 1/19/07	PZ-5 7/1/04	PZ-6 7/1/04	WMUL-01 6/7/12	WMUL-02 6/12/12
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup															
Gasoline Range Hydrocarbons in ug/L	800														
Diesel Range Hydrocarbons in ug/L	500														
Oil Range Hydrocarbons in ug/L	500														
Total TPHs D+O (ND=0U) in ug/L	500														
Total TPHs D+O (ND=1/2U) in ug/L	500														
Total TPHs G+D+O (ND=0U) in ug/L	720														
Total TPHs G+D+O (ND=1/2U) in ug/L	720														
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup															
Diesel Range Hydrocarbons in ug/L	500														
Oil Range Hydrocarbons in ug/L	500														
Total TPHs D+O (ND=0U) in ug/L	500														
Total TPHs D+O (ND=1/2U) in ug/L	500														
Total TPHs G+D+O (ND=0U) in ug/L	720														
Total TPHs G+D+O (ND=1/2U) in ug/L	720														
Dissolved Metals															
Aluminum in ug/L												250 U	250 U		
Antimony in ug/L												5 U	5 U		
Arsenic in ug/L	5	26.6	34.4	5.3 U	130	146	168	163	15	544 J	175	24	6.2		
Barium in ug/L												97	100		
Beryllium in ug/L												2 U	2 U		
Cadmium in ug/L												2 U	2 U		
Calcium in ug/L												170,000	120,000		
Chromium (Total) in ug/L		4.78 U	369	1.9 U	22 J	14 U	11.3 U	15.5 U	40.8	22.4 J	19 U	2 U	2 U		
Cobalt in ug/L												5 U	5 U		
Copper in ug/L	2.4	21.8 U	11	22	8.6	52.8	30.4	63.6	49.6	54.1 U	42.4 J	5 U	5 U		
Iron in ug/L												400 U	400 U		
Lead in ug/L	8.1	0.09 U	17 J	8.2	0.37 U	1.1 U	1.1 U	2.8 U	1.8 U	0.51 U	1.1 U	3 U	3 U		
Magnesium in ug/L												810,000	660,000		
Manganese in ug/L												7.8	13		
Mercury in ug/L		0.044 U	0.044 U	0.055 U	0.055 U	0.41 U	11.1 U	0.17 U	1.4 U	0.41 U	1.2 U				
Nickel in ug/L	8.2	36.4 U	57.9	53	59	45.4	22 U	37	33.2	24.5 J	26.4	5 U	5 U		
Potassium in ug/L												280,000	230,000		
Selenium in ug/L												5 U	5 U		
Silver in ug/L												2 U	2 U		
Sodium in ug/L												7,200,000	5,700,000		
Tetraethyl Lead in ug/L															
Thallium in ug/L		0.025 U	0.184 U	0.019 U	0.019 U	0.18 U	0.1 U	1.4 U	0.1 U	0.5 U	0.1 U	5 U	5 U		
Vanadium in ug/L												6.6	6.7		
Zinc in ug/L	81	2.73 U	30 J	7.1 U	2.3 U	44.9 J	23 U	58 U	88.9 U	31 U	38.7 U	31	30		
Total Metals															
Aluminum in ug/L												23,000	9,900		
Antimony in ug/L												5 U	5 U		
Arsenic in ug/L	5											34	14		
Barium in ug/L												180	160		
Beryllium in ug/L												2 U	2 U		
Cadmium in ug/L												2 U	2 U		
Calcium in ug/L												180,000	130,000		
Chromium () in ug/L												19	16		
Cobalt in ug/L												8.2	5.1		
Copper in ug/L	2.4											54	36		
Iron in ug/L												18,000	8,600		
Lead in ug/L	8.1											49	68	12.5	0.158
Magnesium in ug/L												830,000	660,000		
Manganese in ug/L												150	90		
Mercury in ug/L															
Nickel in ug/L	8.2											30	27		
Potassium in ug/L												290,000	230,000		
Selenium in ug/L												5 U	5 U		
Silicon in ug/L															

Table B-12 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	HYD-010 9/16/05	NL-13 12/20/05	NL-16 5/18/06	NL-16 5/19/06	NL-25 1/18/07	NL-26 1/17/07	NL-28 1/16/07	NL-28 1/17/07	NL-29 1/18/07	NL-30 1/19/07	PZ-5 7/1/04	PZ-6 7/1/04	WMUL-01 6/7/12	WMUL-02 6/12/12
Silver in ug/L												2 U	2 U		
Sodium in mg/L															
Sodium in ug/L												7,500,000	5,400,000		
Strontium in ug/L															
Thallium in ug/L												5 U	5 U		
Vanadium in ug/L												55	29		
Zinc in ug/L	81											110	110		
Organometals															
Tetraethyl Lead in ug/L															
Conventional Chemistry Parameters															
Alkalinity (Total) in mg/L															
Bicarbonate in mg/L															
Bromide in mg/L															
Chloride in mg/L															
Dissolved Organic Carbon in mg/L		13.7 U													
pH in pH Units															
Sulfate in mg/L															
Total Boron in mg/L															
Total Dissolved Solids in mg/L															
Total Sodium in mg/L															
Volatile Organic Compounds (VOC)															
1,1,1,2-Tetrachloroethane in ug/L															
1,1,1-Trichloroethane in ug/L															
1,1,2 - Trichlorotrifluoroethane in ug/L															
1,1,2,2-Tetrachloroethane in ug/L	3	0.068 U	0.01 U	0.081 U	0.081 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.5 UJ	0.5 UJ
1,1,2-Trichloroethane in ug/L		0.0939 U	0.497 J	0.082 U	0.082 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 UJ	0.5 UJ
1,1-Dichloroethane in ug/L															
1,1-Dichloroethene in ug/L	3.2	0.177 U	0.135 J	0.086 U	0.086 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.2 J	0.16 J
1,1-Dichloropropene in ug/L															
1,2,3-Trichlorobenzene in ug/L															
1,2,3-Trichloropropane in ug/L															
1,2,4-Trichlorobenzene in ug/L															
1,2,4-Trimethylbenzene in ug/L	63														
1,2-Dibromo-3-chloropropane in ug/L															
1,2-Dibromoethane (EDB) in ug/L															
1,2-Dichlorobenzene in ug/L															
1,2-Dichloroethane (EDC) in ug/L	42														
1,2-Dichloropropane in ug/L															
1,3,5-Trimethylbenzene in ug/L															
1,3-Dichlorobenzene in ug/L															
1,3-Dichloropropane in ug/L															
1,4-Dichloro-2-Butene in ug/L															
1,4-Dichlorobenzene in ug/L															
2,2-Dichloropropane in ug/L															
2-Butanone in ug/L															
2-Chloroethyl Vinyl Ether in ug/L															
2-Chlorotoluene in ug/L															
2-Hexanone in ug/L															
4-Chlorotoluene in ug/L															
4-Methyl-2-pentanone in ug/L															
Acetone in ug/L	31,896,900														
Acrolein in ug/L															
Acrylonitrile in ug/L	0.7														
Benzene in ug/L	24													0.08 J	0.89 J
Bromobenzene in ug/L															
Bromochloromethane in ug/L															
Bromodichloromethane in ug/L															
Bromoethane in ug/L															
Bromoform in ug/L															
Bromomethane in ug/L															

Table B-12 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	HYD-010 9/16/05	NL-13 12/20/05	NL-16 5/18/06	NL-16 5/19/06	NL-25 1/18/07	NL-26 1/17/07	NL-28 1/16/07	NL-28 1/17/07	NL-29 1/18/07	NL-30 1/19/07	PZ-5 7/1/04	PZ-6 7/1/04	WMUL-01 6/7/12	WMUL-02 6/12/12
Carbon disulfide in ug/L															
Carbon tetrachloride in ug/L		0.137 U	0.066 U	0.082 U	0.082 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U			0.5 UJ	0.5 UJ
Chlorobenzene in ug/L															
Chloroethane in ug/L															
Chloroform in ug/L	12	0.181 U	0.0845 U	0.07 U	0.26 J	0.16 U	0.16 U	0.25 J	0.16 U	0.16 U	0.16 U			0.08 J	0.5 UJ
Chloromethane in ug/L															
cis-1,2-Dichloroethene (DCE) in ug/L		1.15	12.1	0.33 J	0.26 J	0.16 U	0.16 U	0.36 J	0.16 U	0.32 J	0.16 U			24 J	5 J
cis-1,3-Dichloropropene in ug/L															
Dibromochloromethane in ug/L															
Dibromomethane in ug/L															
Dichlorodifluoromethane in ug/L															
Ethylbenzene in ug/L	130													0.25 J	2.6 J
Hexachlorobutadiene in ug/L	0.2														
Isopropylbenzene in ug/L	1,614														
Methyl tert-butyl ether (MTBE) in ug/L															
Methylene chloride in ug/L	1,000	0.155 U	0.045 U	0.31 U	0.31 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U			2 UJ	2 UJ
Methyliodide in ug/L															
n-Butylbenzene in ug/L															
n-Propylbenzene in ug/L	5,200														
p-Isopropyltoluene in ug/L															
sec-Butylbenzene in ug/L															
Styrene in ug/L															
tert-Butylbenzene in ug/L															
Tetrachloroethene (PCE) in ug/L	8.9	0.144 U	30.1	0.26 J	0.48 J	0.15 U	0.43 J	0.3 J	0.26 J	0.78 J	0.15 U			1.5 J	2.6 J
Toluene in ug/L	520													0.45 J	0.66 J
trans-1,2-Dichloroethene in ug/L	4,000	0.205 J	0.532	0.31 J	0.098 J	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U			3.9 J	0.13 J
trans-1,3-Dichloropropene in ug/L															
Trichloroethene (TCE) in ug/L	7	0.226 J	16.4	0.15 J	0.16 J	0.16 U	0.16 U	0.16 U	0.18 J	0.29 J	0.16 U			25 J	5 J
Trichlorofluoromethane in ug/L															
Vinyl acetate in ug/L															
Vinyl chloride in ug/L	1.6	0.378 J	2.12	0.26 J	0.95 J	0.23 U	0.23 U	0.23 U	3.2	0.23 U	0.23 U			0.21 J	0.5 UJ
m,p-Xylenes in ug/L														0.24 J	1.8 J
o-Xylene in ug/L														0.24 J	2.1 J
Total Xylenes in ug/L														0.48 J	3.9 J
Xylenes (total) in ug/L	970														
Naphthalene in ug/L	90														
Field Parameters															
Conductivity in umhos/cm		56.7	27.8	39.3	35.2	42.8	17.2	40.8	24	29.6	21.5				
Dissolved Oxygen in mg/L		0.01	0.57	0.41	8.03	1.68	1.93	2.19	1.94	1.88	2.56				
Dissolved Total Dissolved Solids in ug/L															
ORP in mVolts		-249	-459	-225	-0380	-218	-107	-194	-153	-228	-258				
pH in pH Units		8.4	9.53	8.11	7.5	8.63	7.9	8.44	8.86	8.49	8.34	8.53	8.26	9.2	7.6
Salinity in %		3.7													
Temperature in Deg C		13.2	9.9	12.88	12.54	9.2	8.6	7.57	8.6	8.78	9.29				
Turbidity in NTU		160	293			502	657	165	193	999	999				

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-13 - 2000-2013 Pre-RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	9-25 3/16/04	9-25 4/14/06	9-25 7/15/06	9-25 12/1/11	9-25 8/8/12	93C-25 7/17/12	95C-25 7/19/12	709-MW6-25 8/9/12	709-MW9-25 8/14/12	709-MW11-25 7/29/12	709-MW16-25 7/27/12	709-MW18-25 7/26/12	709-MW20-25 7/21/04	709-MW20-25 7/21/06	709-MW20-25 12/1/11	709-MW20-25 8/23/12	709-MW21-25 7/27/12	721-MW5-25 7/19/04
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
Gasoline Range Hydrocarbons in ug/L	800						250 U	35 J	250 U	700	510	250 U	13 J					18 J	560
Diesel Range Hydrocarbons in ug/L	500						260 U	270 U	20 J	84 J		22 J	170 J					270 U	
Oil Range Hydrocarbons in ug/L	500						520 U	750	21 J	160 J		35 J	480 J					530 U	
Total TPHs D+O (ND=0U) in ug/L	500						ND	750	41 J	240 J		57 J	650 J					ND	
Total TPHs D+O (ND=1/2U) in ug/L	500						ND	885	41 J	244 J		57 J	650 J					ND	
Total TPHs G+D+O (ND=0U) in ug/L	720						ND	780	41 J	940		57 J	660 J					18 J	
Total TPHs G+D+O (ND=1/2U) in ug/L	720						ND	920	170 J	940		180 J	660 J					420 J	
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in ug/L	500										330								430
Oil Range Hydrocarbons in ug/L	500										520 U								520 U
Total TPHs D+O (ND=0U) in ug/L	500										330								430
Total TPHs D+O (ND=1/2U) in ug/L	500										590								690
Total TPHs G+D+O (ND=0U) in ug/L	720										840								990
Total TPHs G+D+O (ND=1/2U) in ug/L	720										1,100								1,200
Dissolved Metals																			
Arsenic in ug/L	5																		
Chromium (Total) in ug/L																			
Copper in ug/L	2.4																		
Lead in ug/L	8.1																		
Mercury in ug/L																			
Nickel in ug/L	8.2																		
Sodium in mg/L			510	483 J													1,340 J		
Thallium in ug/L																			
Zinc in ug/L	81																		
Total Metals																			
Aluminum in ug/L						3,040 J	21.2	131	14,600	138	102	7,440	9,730					5 U	753
Antimony in ug/L						0.216 J	0.5 U	0.5 U	1.51 J	0.501	0.51	0.261 J	0.552					0.271 J	1.03
Arsenic in ug/L	5					2.01 J	0.62 J	2.53	73.6	1.68	0.6 J	1.35	3.16					1.51	5.06
Barium in ug/L						19.3	5 U	184	29.4	50.7	60.5	52.2	53.2					50.4	24.6
Cadmium in ug/L						0.473	0.2 U	0.2 U	0.22	0.2 U	0.2 U	0.148 J	0.081 J					0.22	0.2 U
Calcium in ug/L						5,180	34,200	123,000	10,800	46,000	33,800	8,890	37,500					179,000	17,300
Chromium (I) in ug/L						19.4	0.31 J	2.63	81.8	1.65 J	1.08 J	8	15.3					4	1.68 J
Copper in ug/L	2.4					159	1 U	0.34 J	49.9	0.53 J	0.51 J	31.8	26.7					0.85 J	4.49
Iron in ug/L						5,230	389	8,940	1,070	1,320	892	5,000	6,740					732	421
Lead in ug/L	8.1					5.45	0.2 U	0.52	6.11	0.157 J	0.102 J	4.27	3.77					0.393	0.886
Magnesium in ug/L						1,620	9,460	371,000	22 J	18,300	8,880	2,500	10,800					14,500	1,360
Mercury in ug/L						0.2 U	0.2 U	0.2 U	0.8 U	0.2 U	0.03 J	0.03 J	0.03 J					0.2 U	0.02 J
Nickel in ug/L	8.2					7.23	2 U	1.11 J	14.2	0.42 J	0.45 J	5.9	8.33					2 U	1.31 J
Potassium in ug/L						4,830	5,850	122,000	172,000	28,100	13,800	5,140	16,000					19,900	7,240
Silicon in ug/L						183,000	21,800	15,800	5,790,000	18,700	18,000	30,000	29,600					34,300	21,300
Silver in ug/L						0.174 J	0.2 U	0.2 U	0.073 J	0.2 U	0.2 U	0.2 U	0.052 J					0.2 U	0.055 J
Sodium in mg/L						355	14.4	3,460	6,090	237	170	160	96.9					451	161
Strontium in ug/L						39.6	198	2,860	209	362	256	75.4	241					643	129
Thallium in ug/L						0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.0229 J					0.2 U	0.2 U
Zinc in ug/L	81					52.2	5 U	5 U	8.48	1.75 J	5 U	15.3	24.7					40	5.95
Organometals																			
Tetraethyl Lead in ug/L							0.0006 UJ	0.00057 UJ	0.0006 U	0.00059 U		0.00057 UJ	0.00058 U					0.00057 U	
Conventional Chemistry Parameters																			
Alkalinity (Total) in mg/L		1,120				925	1,200	1,460	11,700	720	536	372	329					183	312
Bicarbonate in mg/L						90 U	1,200	1,460	900 U	720	536	353	329					183	312
Bromide in mg/L						0.11 J	0.2 U	28	1.9 J	0.14 J	0.03 J	0.06 J	0.04 J					0.9	1 U
Carbon, Dissolved Organic (DOC) in mg/L			20																
Chloride in mg/L						19.3	19.4	7,340	2,680	99.5	3.8	30.1	13.7					1,000	1.42
Dissolved Chloride in mg/L			130 J	148															
Dissolved Organic Carbon in mg/L																			
Dissolved Sodium in mg/L			510	483 J														1,340 J	
pH in pH Units																			7.68
Sulfate in mg/L						1.71	6.64	37	181 J	6.87	4.64	0.79	1.11					9.34	8.41
Total Boron in mg/L						0.101	0.152	1.65	1.47	0.362	0.206	0.145	0.286					0.14	0.13

Table B-13 - 2000-2013 Pre-RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	9-25 3/16/04	9-25 4/14/06	9-25 7/15/06	9-25 12/1/11	9-25 8/8/12	93C-25 7/17/12	95C-25 7/19/12	709-MW6-25 8/9/12	709-MW9-25 8/14/12	709-MW11-25 7/29/12	709-MW16-25 7/27/12	709-MW18-25 7/26/12	709-MW20-25 7/21/04	709-MW20-25 7/21/06	709-MW20-25 12/1/11	709-MW20-25 8/23/12	709-MW21-25 7/27/12	721-MW5-25 7/19/04
Total Dissolved Solids in mg/L			2,200	2,000		1,550	149	14,600	32,900	927	600	404	388		8,400		2,250	482	
Total Sodium in mg/L						355	14.4	3,460	6,090	237	170	160	96.9				451	161	
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in ug/L																			1 U
1,1,1-Trichloroethane in ug/L														0.7 U					1 U
1,1,2 - Trichlorotrifluoroethane in ug/L																			2 U
1,1,2,2-Tetrachloroethane in ug/L	3	5 U				0.5 U	0.5 U	0.5 U	2.5 U	13 U	1 U	0.5 U	13 U	1.4 U			0.5 U	5 U	1 U
1,1,2-Trichloroethane in ug/L		5 U				0.5 U	0.5 U	0.5 U	2.5 U	13 U	1 U	0.5 U	13 U	1 U			0.5 U	5 U	1 U
1,1-Dichloroethane in ug/L														0.95 U					1 U
1,1-Dichloroethene in ug/L	3.2	5 U				0.5 U	0.5 U	0.5 U	2.5 U	13 U	1 U	0.5 U	3 J	1.5 U			0.65	5 U	1 U
1,1-Dichloropropene in ug/L																			1 U
1,2,3-Trichlorobenzene in ug/L																			5 U
1,2,3-Trichloropropane in ug/L																			3 U
1,2-Dibromo-3-chloropropane in ug/L														3.8 U					5 U
1,2-Dibromoethane (EDB) in ug/L														1 U					1 U
1,2-Dichlorobenzene in ug/L														0.85 U					0.85 U
1,2-Dichloroethane (EDC) in ug/L	99													0.7 U					1 U
1,2-Dichloropropane in ug/L														0.85 U					1 U
1,3-Dichlorobenzene in ug/L														0.55 U					0.55 U
1,3-Dichloropropane in ug/L																			1 U
1,4-Dichloro-2-Butene in ug/L																			5 U
1,4-Dichlorobenzene in ug/L														0.95 U					0.95 U
2,2-Dichloropropane in ug/L																			1 U
2-Butanone in ug/L														3 U					5 U
2-Chloroethyl Vinyl Ether in ug/L																			5 U
2-Chlorotoluene in ug/L																			1 U
2-Hexanone in ug/L														4.6 U					5 U
4-Chlorotoluene in ug/L																			1 U
4-Methyl-2-pentanone in ug/L														9.5 U					5 U
Acetone in ug/L														11 U					18
Acrolein in ug/L																			50 U
Acrylonitrile in ug/L	0.7																		1 U
Benzene in ug/L	58	5 U				0.08 J	0.1 J	21	2.1 J	510	520	0.23 J	9.5 J	0.8 U			0.18 J	230	370
Bromobenzene in ug/L																			1 U
Bromochloromethane in ug/L																			1 U
Bromodichloromethane in ug/L														0.7 U					1 U
Bromoethane in ug/L																			2 U
Bromoform in ug/L														0.7 U					1 U
Bromomethane in ug/L														1.2 U					1 U
Carbon disulfide in ug/L														1 U					1 U
Carbon tetrachloride in ug/L		5 U				0.5 U	0.5 U	0.5 U	2.5 U	13 U	1 U	0.5 U	13 U	0.5 U			0.5 U	5 U	1 U
Chlorobenzene in ug/L														1 U					1 U
Chloroethane in ug/L														1 U					1 U
Chloroform in ug/L	470	5 U				0.5 U	0.5 U	0.18 J	2.5 U	13 U	1.9	0.16 J	2.3 J	0.8 U			0.5 U	5 U	1 U
Chloromethane in ug/L														1.6 U					1 U
cis-1,2-Dichloroethene (DCE) in ug/L		53				0.35 J	0.5 U	0.5 U	2.8	5.8 J	0.14 J	10	810	16			55	5 U	3.6
cis-1,3-Dichloropropene in ug/L														0.75 U					1 U
Dibromochloromethane in ug/L														0.95 U					1 U
Dibromomethane in ug/L																			1 U
Dichlorodifluoromethane in ug/L														0.95 U					0.95 U
Ethylbenzene in ug/L	130	5 U				0.5 U	0.5 U	0.24 J	2.5 U	11 J	11	0.5 U	13 U	1.2 U			0.5 U	15	6.8
Isopropylbenzene in ug/L																			1.6
Methyl tert-butyl ether (MTBE) in ug/L		5 U																	
Methylene chloride in ug/L	1,000	5 U				2 U	2 U	2 U	10 U	9 J	4 U	2 U	3.3 J	1.8 U			2 U	3.3 J	2 U
Methyliodide in ug/L																			1 U
n-Butylbenzene in ug/L																			1 U
n-Propylbenzene in ug/L																			1 U
p-Isopropyltoluene in ug/L																			1 U
sec-Butylbenzene in ug/L																			1 U
Styrene in ug/L														1.2 U					1 U

Table B-13

Aspect Consulting

2/26/2016

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RI

Table B-13 - 2000-2013 Pre-RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	9-25 3/16/04	9-25 4/14/06	9-25 7/15/06	9-25 12/1/11	9-25 8/8/12	93C-25 7/17/12	95C-25 7/19/12	709-MW6-25 8/9/12	709-MW9-25 8/14/12	709-MW11-25 7/29/12	709-MW16-25 7/27/12	709-MW18-25 7/26/12	709-MW20-25 7/21/04	709-MW20-25 7/21/06	709-MW20-25 12/1/11	709-MW20-25 8/23/12	709-MW21-25 7/27/12	721-MW5-25 7/19/04	
tert-Butylbenzene in ug/L																				1 U
Tetrachloroethene (PCE) in ug/L	8.9	5 U				0.5 U	0.5 U	0.5 U	2.5 U	13 U	1 U	0.5 U	13 U	34			15	5 U		1 U
Toluene in ug/L	520	5 U				0.5 U	0.12 J	0.29 J	2.5 U	8.5 J	2	0.08 J	13 U	0.85 U			0.5 U	7.5		4.7
trans-1,2-Dichloroethene in ug/L	4,000	5 U				0.5 U	0.5 U	0.5 U	0.75 J	13 U	1 U	0.29 J	39	9.5 J			2.6	5 U		1 U
trans-1,3-Dichloropropene in ug/L														0.9 U						1 U
Trichloroethene (TCE) in ug/L	7	5 U				0.5 U	0.5 U	0.5 U	2.5 U	13 U	1 U	0.5 U	4.8 J	15			6.2	5 U		1.2
Trichlorofluoromethane in ug/L														1.2 U						1 U
Vinyl acetate in ug/L																				5 U
Vinyl chloride in ug/L	1.6	31				1.2	0.5 U	0.5 U	0.75 J	27	2.4	0.52	66	11			4.8	5 U		2.3
m,p-Xylenes in ug/L						0.5 U	0.5 U	0.3 J	2.5 U	25	5.1	0.5 U	13 U	2 U			0.5 U	5.7		6 J
o-Xylene in ug/L						0.5 U	0.5 U	0.11 J	2.5 U	10 J	0.86 J	0.5 U	13 U	0.95 U			0.5 U	2.6 J		3.9
Total Xylenes in ug/L						ND	ND	0.41 J	ND	35	6.0	ND	ND	ND			ND	8.3		6.5 J
Xylenes (total) in ug/L		5 U																		
Naphthalene in ug/L	4,710	5 U																		
Field Parameters																				
Conductivity in umhos/cm			2.22	4.69	1.71	1.93	100 >	25.6	30.9	1.65	0.73	0.608				16.3	18.1	3.1	0.772	
Dissolved Oxygen in mg/L			0	0	1	0	0.12	0.12	0	0.17	0	0				0.27	1.22	0.56	0	
Dissolved Total Dissolved Solids in ug/L					1,100												11,000			
ORP in mVolts			-364	-292	-0180	-299	-197	-192	-439	-0160	-168	-206				-63	-49	-81	-62	
pH in pH Units		11.03	11.48	11.36	11.03	11.07	8.14	7.34	12.42	7.93	7.45	8.53	9.25	7.08	6.72	7.5	7.77	7.93	7.81	
Salinity in %					0.1	0.1	4	1.6	2	0.1	0	0.03				1.1	0.2	0		
Temperature in Deg C			11.41	18.4	12.81	17.4	14.94	20.2	19.02	17.9	14.91	15.88			20.37	11.85	14.4	17.23		
Turbidity in NTU			488	340	3.3	16.9	17.5	64	4.5	129	68.3	161			35.5	0	34.4	54.3		

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-13 - 2000-2013 Pre-RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW5-25 4/20/06	721-MW5-25 7/24/06	721-MW5-25 8/25/12	721-MW6-25 7/19/04	721-MW6-25 4/20/06	721-MW6-25 7/24/06	721-MW6-25 7/25/12	721-MW9-25 7/20/04	721-MW9-25 4/20/06	721-MW9-25 7/24/06	721-MW9-25 7/22/12	721-MW10-25 7/21/04	721-MW10-25 4/19/06	721-MW10-25 7/25/06	721-MW10-25 8/7/12	721-MW11-25 7/31/12	721-MW12-25 7/30/12	721-MW13-25 7/31/12
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
Gasoline Range Hydrocarbons in ug/L	800			170 J				72 J								46 J	220 J	400	160 J
Diesel Range Hydrocarbons in ug/L	500			260 U								260 UJ				25 J		260 U	
Oil Range Hydrocarbons in ug/L	500			520 U								520 UJ				530 U		520 U	
Total TPHs D+O (ND=0U) in ug/L	500			ND								ND				25 J		ND	
Total TPHs D+O (ND=1/2U) in ug/L	500			ND								ND				290 J		ND	
Total TPHs G+D+O (ND=0U) in ug/L	720			170 J								190 J				71 J		400	
Total TPHs G+D+O (ND=1/2U) in ug/L	720			560 J								580 J				340 J		790	
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in ug/L	500							100 J									97 J		14 J
Oil Range Hydrocarbons in ug/L	500							520 U									520 U		510 U
Total TPHs D+O (ND=0U) in ug/L	500							100 J									97 J		14 J
Total TPHs D+O (ND=1/2U) in ug/L	500							360 J									357 J		269 J
Total TPHs G+D+O (ND=0U) in ug/L	720							170 J									320 J		170 J
Total TPHs G+D+O (ND=1/2U) in ug/L	720							430 J									580 J		430 J
Dissolved Metals																			
Arsenic in ug/L	5																		
Chromium (Total) in ug/L																			
Copper in ug/L	2.4																		
Lead in ug/L	8.1																		
Mercury in ug/L																			
Nickel in ug/L	8.2																		
Sodium in mg/L		860	605 J			87	78.3 J			890	1,120 J			340	577 J				
Thallium in ug/L																			
Zinc in ug/L	81																		
Total Metals																			
Aluminum in ug/L				55.5				7.8 U				862				26.1	145	8.9 U	5 U
Antimony in ug/L				0.536				0.091 J				0.883				0.111 J	0.5 U	0.156 J	0.5 U
Arsenic in ug/L	5			9.32				1 U				24.6				0.26 J	1.67	0.82 J	0.27 J
Barium in ug/L				12.4				35.1				57.7				9.5	79.8	11.5	6.3
Cadmium in ug/L				0.2 U				0.2 U				0.58				0.2 U	0.2 U	0.2 U	0.2 U
Calcium in ug/L				49,700				141,000				34,600				10,400	122,000	39,400	73,700
Chromium (I) in ug/L				17.8				2 U				83.2				3.05	5.07	2 U	2 U
Copper in ug/L	2.4			6.96				1 U				117				0.85 J	0.79 J	1 U	1 U
Iron in ug/L				269				2,810				1,640				57.2	2,870	4,650	9,570
Lead in ug/L	8.1			0.454				0.2 U				9.04				0.036 J	0.098 J	0.2 U	0.2 U
Magnesium in ug/L				8,780				76,500				12,400				34,100	58,200	2,720	7,230
Mercury in ug/L				0.2 U				0.03 J				0.8 U				0.2 U	0.04 J	0.2 U	0.03 J
Nickel in ug/L	8.2			3.42				2 U				19.3				1.18 J	1.21 J	2 U	0.33 J
Potassium in ug/L				47,400				43,200				36,500				35,700	42,000	11,300	6,520
Silicon in ug/L				274,000				21,300				27,600				12,300	19,400	23,800	24,100
Silver in ug/L				0.2 U				0.2 U				0.145 J				0.2 U	0.2 U	0.2 U	0.2 U
Sodium in mg/L				1,630				131				1,760				243	254	182	11.6
Strontium in ug/L				577				884				442				165	887	224	344
Thallium in ug/L				0.2 U				0.2 U				0.2 U				0.2 U	0.2 U	0.2 U	0.2 U
Zinc in ug/L	81			5 U				5 U				16				0.89 J	5 U	5 U	5 U
Organometals																			
Tetraethyl Lead in ug/L				0.00057 U				0.00057 UJ				0.00057 UJ				0.0006 U	0.00057 U	0.00057 U	0.00057 U
Conventional Chemistry Parameters																			
Alkalinity (Total) in mg/L				1,300				974				1,420				632	728	593	238
Bicarbonate in mg/L				298 J				974				1,080				632	728	593	238
Bromide in mg/L				1.32				0.8				3.7 J				0.65	0.71	0.03 J	0.02 J
Carbon, Dissolved Organic (DOC) in mg/L						29								27					
Chloride in mg/L				1,710				224				2,220				180	392	2.41	26.7
Dissolved Chloride in mg/L		1,500	1,300			79 J	129			2,100	2,330			290 J	1,260				
Dissolved Organic Carbon in mg/L		16								49									
Dissolved Sodium in mg/L		860	605 J			87	78.3 J			890	1,120 J			340	577 J				
pH in pH Units					7.57				8.76										
Sulfate in mg/L				8.28				0.81				5 U				0.76	2.94	1.11	4.09
Total Boron in mg/L				0.35				0.439				1.06				0.781	0.318	0.514	0.0745

Table B-13 - 2000-2013 Pre-RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW5-25 4/20/06	721-MW5-25 7/24/06	721-MW5-25 8/25/12	721-MW6-25 7/19/04	721-MW6-25 4/20/06	721-MW6-25 7/24/06	721-MW6-25 7/25/12	721-MW9-25 7/20/04	721-MW9-25 4/20/06	721-MW9-25 7/24/06	721-MW9-25 7/22/12	721-MW10-25 7/21/04	721-MW10-25 4/19/06	721-MW10-25 7/25/06	721-MW10-25 8/7/12	721-MW11-25 7/31/12	721-MW12-25 7/30/12	721-MW13-25 7/31/12
Total Dissolved Solids in mg/L		11,000	2,300	4,680		950	680	1,170		4,900	4,100	4,750		1,500	2,600	931	1,390	682	338
Total Sodium in mg/L				1,630				131				1,760				243	254	182	11.6
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in ug/L					1 U				1 U										
1,1,1-Trichloroethane in ug/L					1 U				1.4 U				0.7 U						
1,1,2 - Trichlorotrifluoroethane in ug/L					2 U				2 U										
1,1,2,2-Tetrachloroethane in ug/L	3			2.5 U	1 U			5 U	1 U			5 U	1.4 U			0.5 U	1.3 U	5 U	0.5 U
1,1,2-Trichloroethane in ug/L				2.5 U	1 U			5 U	1 U			5 U	1 U			0.5 U	1.3 U	5 U	0.5 U
1,1-Dichloroethane in ug/L					1 U				1.9 U				0.95 U						
1,1-Dichloroethene in ug/L	3.2			2.5 U	1 U			5 U	1			5.8	1.5 U			0.5 U	1.3 U	5 U	0.5 U
1,1-Dichloropropene in ug/L					1 U				1 U										
1,2,3-Trichlorobenzene in ug/L					5 U				5 U										
1,2,3-Trichloropropane in ug/L					3 U				3 U										
1,2-Dibromo-3-chloropropane in ug/L					7.6 U				5 U				3.8 U						
1,2-Dibromoethane (EDB) in ug/L					1 U				1 U				1 U						
1,2-Dichlorobenzene in ug/L					1.7 U				1.7 U				0.85 U						
1,2-Dichloroethane (EDC) in ug/L	99				1 U				1 U				0.7 U						
1,2-Dichloropropane in ug/L					1 U				1 U				0.85 U						
1,3-Dichlorobenzene in ug/L					1.1 U				1.1 U				0.55 U						
1,3-Dichloropropane in ug/L					1 U				1 U										
1,4-Dichloro-2-Butene in ug/L					5 U				5 U										
1,4-Dichlorobenzene in ug/L					1.9 U				1.9 U				0.95 U						
2,2-Dichloropropane in ug/L					1 U				1 U										
2-Butanone in ug/L					5 U				5 U				3 U						
2-Chloroethyl Vinyl Ether in ug/L					5 U				5 U										
2-Chlorotoluene in ug/L					1 U				1 U										
2-Hexanone in ug/L					9.2 U				5 U				4.6 U						
4-Chlorotoluene in ug/L					1 U				1 U										
4-Methyl-2-pentanone in ug/L					5 U				5 U				9.5 U						
Acetone in ug/L					28 U				33				14 U						
Acrolein in ug/L					50 U				50 U										
Acrylonitrile in ug/L	0.7				1 U				1 U										
Benzene in ug/L	58			120	680			210 J	330			260	130			170	94	300	75
Bromobenzene in ug/L					1 U				1 U										
Bromochloromethane in ug/L					1 U				1 U										
Bromodichloromethane in ug/L					1 U				1.4 U				0.7 U						
Bromoethane in ug/L					2 U				2 U										
Bromoform in ug/L					1 U				1.4 U				0.7 U						
Bromomethane in ug/L					1 U				2.4 U				1.2 U						
Carbon disulfide in ug/L					1 U				2 U				1 U						
Carbon tetrachloride in ug/L				2.5 U	1 U			5 U	1 U			5 U	0.5 U			0.5 U	1.3 U	5 U	0.5 U
Chlorobenzene in ug/L					1 U				1 U				1 U						
Chloroethane in ug/L					1 U				2.1 U				1 U						
Chloroform in ug/L	470			2.5 U	1.6 U			5 U	1 U			5 U	0.8 U			0.5 U	0.28 J	0.8 J	0.5 U
Chloromethane in ug/L					1 U				3.1 U				1.6 U						
cis-1,2-Dichloroethene (DCE) in ug/L				8	1 U			5 U	30			61	0.8 U			0.1 J	1.3 U	5 U	0.5 U
cis-1,3-Dichloropropene in ug/L					1 U				1 U				0.75 U						
Dibromochloromethane in ug/L					1 U				1 U				0.95 U						
Dibromomethane in ug/L					1 U				1 U										
Dichlorodifluoromethane in ug/L					1.9 U				1.9 U				0.95 U						
Ethylbenzene in ug/L	130			6.1	2.2			5 U	2.3 U			3.7 J	1.2 U			0.5 U	6.5	0.9 J	13
Isopropylbenzene in ug/L					1 U				1 U										
Methyl tert-butyl ether (MTBE) in ug/L																			
Methylene chloride in ug/L	1,000			10 U	2 U			2.2 J	8.4 U			1.9 J	7.3 U			2 U	5 U	20 U	2 U
Methyliodide in ug/L					1 U				1 U										
n-Butylbenzene in ug/L					1 U				1 U										
n-Propylbenzene in ug/L					1 U				1 U										
p-Isopropyltoluene in ug/L					1 U				1 U										
sec-Butylbenzene in ug/L					1 U				1 U										
Styrene in ug/L					1 U				1 U				1.2 U						

Table B-13

Aspect Consulting

2/26/2016

\\seastore2.aspect.local\projects\Port of Tacoma\Alexander Avenue Petroleum Tank Facilities\Draft Reports\RI\Appendices\Appendix B - Data Tables\B-11 to B-15 Pre-RI Data 2000-2013.xlsx

RI

Table B-13 - 2000-2013 Pre-RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW5-25 4/20/06	721-MW5-25 7/24/06	721-MW5-25 8/25/12	721-MW6-25 7/19/04	721-MW6-25 4/20/06	721-MW6-25 7/24/06	721-MW6-25 7/25/12	721-MW9-25 7/20/04	721-MW9-25 4/20/06	721-MW9-25 7/24/06	721-MW9-25 7/22/12	721-MW10-25 7/21/04	721-MW10-25 4/19/06	721-MW10-25 7/25/06	721-MW10-25 8/7/12	721-MW11-25 7/31/12	721-MW12-25 7/30/12	721-MW13-25 7/31/12
tert-Butylbenzene in ug/L					1 U				1 U										
Tetrachloroethene (PCE) in ug/L	8.9			2.5 U	1 U			5 U	1 U			5 U	0.75 U			0.5 U	1.3 U	5 U	0.5 U
Toluene in ug/L	520			1.7 J	1.8			5 U	4.3			3.3 J	0.85 U			3.5	0.55 J	5.3	1.4
trans-1,2-Dichloroethene in ug/L	4,000			0.85 J	1 U			5 U	1 U			0.8 J	0.95 U			0.5 U	1.3 U	5 U	0.5 U
trans-1,3-Dichloropropene in ug/L					1 U				1 U				0.9 U						
Trichloroethene (TCE) in ug/L	7			1.5 J	1 U			5 U	2			1.3 J	0.8 U			0.5 U	1.3 U	5 U	0.5 U
Trichlorofluoromethane in ug/L					1 U				2.4 U				1.2 U						
Vinyl acetate in ug/L					5 U				5 U										
Vinyl chloride in ug/L	1.6			2.8	1 U			5 U	1 U			3.5 J	1.2 U			0.29 J	1.3 U	5 U	0.5 U
m,p-Xylenes in ug/L				3.5	4 U			5 U	4 U			2.4 J	2 U			0.5 U	0.58 J	16	8.7
o-Xylene in ug/L				1.9 J	1 U			5 U	1.7			2.7 J	0.95 U			0.5 U	0.3 J	4 J	0.65
Total Xylenes in ug/L				5.4	ND			ND	ND			5.1 J	ND			ND	0.88 J	20	9.4
Xylenes (total) in ug/L																			
Naphthalene in ug/L	4,710																		
Field Parameters																			
Conductivity in umhos/cm		5.57	4.59	14		1.12	1.17	1.94		8.79	7.88	8.15		2.48	5.37	1.68	2.75	0.76	0.383
Dissolved Oxygen in mg/L		0	3.73	1.36		7.24	0.83	0		0	5.37	0		0	3.33	1.18	0.45	0	0
Dissolved Total Dissolved Solids in ug/L																			
ORP in mVolts		-335	-279	-384		-192	-165	-185		-307	-0190	-229		-148	-231	-159	-166	-138	-141
pH in pH Units		9	8.14	10.77	7.53	7.5	7.27	7.79	8.94	9.35	9.35	10.01	8.4	7.98	8.12	8.38	7.33	7.18	7.1
Salinity in %				0.8				0.09				0.4				0.08	0.1	0	0
Temperature in Deg C		15.18	19.49	16.49		15.1	18.18	16.14		14.8	25.46	15.3		12.8	17.31	16.62	19.99	16.4	17.08
Turbidity in NTU		37	162	158		399	92.1	30.4		999	999	53.8		217	12.4	173	204	17.7	0

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-13 - 2000-2013 Pre-RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW14-25 8/9/12	721-MW15-25 7/30/12	DOCK2-005 8/2/05	DOCK2-010 9/13/05	DOCK2-014 10/28/05	HW-4 1/23/07	HYD-008 9/13/05	HYD-009 9/15/05	HYD-010 9/16/05	NL-13 12/21/05	NL-16 5/19/06	NL-25 1/18/07	NL-25 1/19/07	NL-26 1/18/07	NL-28 1/17/07	NL-29 1/18/07	NL-30 1/19/07	
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																			
Gasoline Range Hydrocarbons in ug/L	800	250 U	1,500																
Diesel Range Hydrocarbons in ug/L	500																		
Oil Range Hydrocarbons in ug/L	500																		
Total TPHs D+O (ND=0U) in ug/L	500																		
Total TPHs D+O (ND=1/2U) in ug/L	500																		
Total TPHs G+D+O (ND=0U) in ug/L	720																		
Total TPHs G+D+O (ND=1/2U) in ug/L	720																		
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																			
Diesel Range Hydrocarbons in ug/L	500	82 J	270 U																
Oil Range Hydrocarbons in ug/L	500	520 U	530 U																
Total TPHs D+O (ND=0U) in ug/L	500	82 J	ND																
Total TPHs D+O (ND=1/2U) in ug/L	500	342 J	ND																
Total TPHs G+D+O (ND=0U) in ug/L	720	82 J	1,500																
Total TPHs G+D+O (ND=1/2U) in ug/L	720	470 J	1,900																
Dissolved Metals																			
Arsenic in ug/L	5			1.11 U	0.334 U	71.6	202	0.334 U	1.89 U	0.334 U	1.2 J	16	129	99.2	87.8	5 U	233 J	188	
Chromium (Total) in ug/L				2.16 U	1.64 U	5.3 U	25.7	1.35 U	3.18 U	2.94 U	6.83 U	30 J	16 U	13.7 U	8.7 U	49.9	10.8 U	11.2 U	
Copper in ug/L	2.4			7.02 U	7.21 U	82.2	10.2	17.7	12 U	16.6 U	8.95	5.9	43.1	47.1	31.4	67.4	42.7 J	51.3 J	
Lead in ug/L	8.1			0.045 U	0.0167 U	2.2 U	1.1 U	0.0167 U	0.0167 U	0.455 U	0.18 U	0.5 U	1.1 U	1.1 U	2 U	1.1 U	1.1 U	1.1 U	
Mercury in ug/L				0.044 U	0.044 U	0.041 U	0.97 U	0.044 U	0.044 U	0.044 U	0.232 U	0.055 U	0.41 U	0.41 U	2.8 U	1.7 U	0.41 U	0.41 U	
Nickel in ug/L	8.2			20.5 J	17.3 U	12.9 U	17.7 U	35.3 J	33.6 J	31.8 U	19.3 J	41	29.5	44.2	23.4 U	44.7	32.5 J	40.7	
Sodium in mg/L																			
Thallium in ug/L				0.0184 U	0.0184 U	2.7 U	0.1 U	0.025 U	0.025 U	0.0184 U	0.02 U	0.019 U	0.1 U	0.1 U	0.1 U	0.1 U	4.4	0.1 U	
Zinc in ug/L	81			0.302 U	16.3 U	46 U	81.9 U	0.302 U	11.6 U	4.56 U	0.302 U	4.2 U	28.3 J	55.5 J	65.4 U	23 U	44.7 U	24.3 U	
Total Metals																			
Aluminum in ug/L		61.3	5 U																
Antimony in ug/L		0.5 UJ	0.201 J																
Arsenic in ug/L	5	0.49 J	0.76 J																
Barium in ug/L		41.6	54.8																
Cadmium in ug/L		0.2 U	0.2 U																
Calcium in ug/L		35,500	143,000																
Chromium (I) in ug/L		2 U	2 U																
Copper in ug/L	2.4	1 U	1 U																
Iron in ug/L		1,040	34,200																
Lead in ug/L	8.1	0.2 U	0.2 U																
Magnesium in ug/L		2,930	10,200																
Mercury in ug/L		0.2 U	0.2 U																
Nickel in ug/L	8.2	0.21 J	2 U																
Potassium in ug/L		11,900	12,500																
Silicon in ug/L		21,900	27,400																
Silver in ug/L		0.2 U	0.2 U																
Sodium in mg/L		179	43.2																
Strontium in ug/L		285	917																
Thallium in ug/L		0.2 U	0.2 U																
Zinc in ug/L	81	1.3 J	5 U																
Organometals																			
Tetraethyl Lead in ug/L			0.00057 U																
Conventional Chemistry Parameters																			
Alkalinity (Total) in mg/L		556	525																
Bicarbonate in mg/L		556	525																
Bromide in mg/L		0.04 J	0.17 J																
Carbon, Dissolved Organic (DOC) in mg/L																			
Chloride in mg/L		2.07	19.7																
Dissolved Chloride in mg/L																			
Dissolved Organic Carbon in mg/L				4.01	17.8 U	11.2		12.1 U	8.19 U	5.87 U									
Dissolved Sodium in mg/L																			
pH in pH Units																			
Sulfate in mg/L		0.72 J	1.65																
Total Boron in mg/L		0.163	0.105																

Table B-13 - 2000-2013 Pre-RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW14-25 8/9/12	721-MW15-25 7/30/12	DOCK2-005 8/2/05	DOCK2-010 9/13/05	DOCK2-014 10/28/05	HW-4 1/23/07	HYD-008 9/13/05	HYD-009 9/15/05	HYD-010 9/16/05	NL-13 12/21/05	NL-16 5/19/06	NL-25 1/18/07	NL-25 1/19/07	NL-26 1/18/07	NL-28 1/17/07	NL-29 1/18/07	NL-30 1/19/07	
Total Dissolved Solids in mg/L		631 J	633																
Total Sodium in mg/L		179	43.2																
Volatile Organic Compounds (VOC)																			
1,1,1,2-Tetrachloroethane in ug/L																			
1,1,1-Trichloroethane in ug/L																			
1,1,2 - Trichlorotrifluoroethane in ug/L																			
1,1,2,2-Tetrachloroethane in ug/L	3	2.5 U	25 U	0.068 U	0.068 U			0.01 U	0.01 U	0.068 U	0.0912 J	0.081 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	
1,1,2-Trichloroethane in ug/L		2.5 U	25 U	0.0939 U	0.0627 U			0.045 U	0.045 U	0.0939 U	0.318 J	0.082 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	
1,1-Dichloroethane in ug/L																			
1,1-Dichloroethene in ug/L	3.2	2.5 U	25 U	0.177 U	0.0595 U			0.025 U	0.025 U	0.177 U	0.165 J	0.086 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	
1,1-Dichloropropene in ug/L																			
1,2,3-Trichlorobenzene in ug/L																			
1,2,3-Trichloropropane in ug/L																			
1,2-Dibromo-3-chloropropane in ug/L																			
1,2-Dibromoethane (EDB) in ug/L																			
1,2-Dichlorobenzene in ug/L																			
1,2-Dichloroethane (EDC) in ug/L	99																		
1,2-Dichloropropane in ug/L																			
1,3-Dichlorobenzene in ug/L																			
1,3-Dichloropropane in ug/L																			
1,4-Dichloro-2-Butene in ug/L																			
1,4-Dichlorobenzene in ug/L																			
2,2-Dichloropropane in ug/L																			
2-Butanone in ug/L																			
2-Chloroethyl Vinyl Ether in ug/L																			
2-Chlorotoluene in ug/L																			
2-Hexanone in ug/L																			
4-Chlorotoluene in ug/L																			
4-Methyl-2-pentanone in ug/L																			
Acetone in ug/L																			
Acrolein in ug/L																			
Acrylonitrile in ug/L	0.7																		
Benzene in ug/L	58	160	1,800																
Bromobenzene in ug/L																			
Bromochloromethane in ug/L																			
Bromodichloromethane in ug/L																			
Bromoethane in ug/L																			
Bromoform in ug/L																			
Bromomethane in ug/L																			
Carbon disulfide in ug/L																			
Carbon tetrachloride in ug/L		2.5 U	25 U	0.137 U	0.137 U			0.075 U	0.075 U	0.137 U	0.097 UJ	0.082 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	
Chlorobenzene in ug/L																			
Chloroethane in ug/L																			
Chloroform in ug/L	470	2.5 U	25 U	0.181 U	0.0717 U			0.02 U	0.02 U	0.181 U	0.0717 UJ	0.07 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	
Chloromethane in ug/L																			
cis-1,2-Dichloroethene (DCE) in ug/L		2.5 U	25 U	0.154 U	0.714 J			0.176 J	0.112 J	0.154 U	0.516 J	0.27 J	0.16 U	0.16 U	0.16 U	0.97 J	0.16 U	0.16 U	
cis-1,3-Dichloropropene in ug/L																			
Dibromochloromethane in ug/L																			
Dibromomethane in ug/L																			
Dichlorodifluoromethane in ug/L																			
Ethylbenzene in ug/L	130	0.8 J	14 J																
Isopropylbenzene in ug/L																			
Methyl tert-butyl ether (MTBE) in ug/L																			
Methylene chloride in ug/L	1,000	10 U	100 U	0.155 U	0.0752 U			0.045 U	0.045 U	0.155 U	0.0752 UJ	0.31 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	
Methyliodide in ug/L																			
n-Butylbenzene in ug/L																			
n-Propylbenzene in ug/L																			
p-Isopropyltoluene in ug/L																			
sec-Butylbenzene in ug/L																			
Styrene in ug/L																			

Table B-13 - 2000-2013 Pre-RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW14-25 8/9/12	721-MW15-25 7/30/12	DOCK2-005 8/2/05	DOCK2-010 9/13/05	DOCK2-014 10/28/05	HW-4 1/23/07	HYD-008 9/13/05	HYD-009 9/15/05	HYD-010 9/16/05	NL-13 12/21/05	NL-16 5/19/06	NL-25 1/18/07	NL-25 1/19/07	NL-26 1/18/07	NL-28 1/17/07	NL-29 1/18/07	NL-30 1/19/07	
tert-Butylbenzene in ug/L																			
Tetrachloroethene (PCE) in ug/L	8.9	2.5 U	25 U	0.144 U	0.0578 U			0.015 U	0.015 U	0.144 U	2.3 J	0.066 U	0.15 U	0.15 U	0.15 U	0.21 J	0.3 J	0.15 U	
Toluene in ug/L	520	16	39																
trans-1,2-Dichloroethene in ug/L	4,000	2.5 U	25 U	0.145 U	0.0584 U			0.02 U	0.02 U	0.145 U	0.552 J	0.091 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	
trans-1,3-Dichloropropene in ug/L																			
Trichloroethene (TCE) in ug/L	7	2.5 U	25 U	0.126 U	2.63			0.141 J	0.109 J	0.126 U	4.23 J	0.055 U	0.16 U	0.16 U	0.26 J	0.16 U	0.16 U	0.16 U	
Trichlorofluoromethane in ug/L																			
Vinyl acetate in ug/L																			
Vinyl chloride in ug/L	1.6	8.1	25 U	0.162 U	0.0604 U			0.025 U	0.025 U	0.162 U	0.241 J	0.35 J	0.23 U	0.23 U	0.23 U	5.6	0.23 U	0.23 U	
m,p-Xylenes in ug/L		1.6 J	100																
o-Xylene in ug/L		2.5 U	12 J																
Total Xylenes in ug/L		2.8 J	110																
Xylenes (total) in ug/L																			
Naphthalene in ug/L	4,710																		
Field Parameters																			
Conductivity in umhos/cm		1.04	0.789	13.7	52.4	36.2	18.4	53	47.3	35.8	44.7	37.7	31.2	35.4	14.6	32.2	21.4	34.8	
Dissolved Oxygen in mg/L		0	0.84	3.35	0.25	0.62	2.03	3.24	0.61	0.52	2.38	10.4	2.05	1.9	2.01	1.96	2.04	2.17	
Dissolved Total Dissolved Solids in ug/L																			
ORP in mVolts		-108	-118	-159	-224	-258	18	-030	-118	-139	3	-408	-256	-259	-137	-204	-169	-212	
pH in pH Units		7.05	5.94	7.52	8.41	7.95	9.23	8.28	7.5	8.52	8.55	8.52	8.52	8.48	7.83	8.99	8.34	8.02	
Salinity in %		0.05	0	0.8	3.4	2.3		3.5	3	2.2									
Temperature in Deg C		17.68	17.33	13.6	13.3	11.8	11.6	15.1	13.8	13	10.4	12.69	9.18	9.61	9.9	9.78	9.44	8.79	
Turbidity in NTU		31.8	80.7	263	999	140		999	325	860	150		95.8	83.7		903	366	999	

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-14 - 2000-2013 Pre-RI Groundwater Data - 50 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	9-50 3/16/04	9-50 4/14/06	9-50 7/15/06	9-50 8/7/12	93C-50 7/17/12	95C-50 7/19/12	709-MW6-50 8/9/12	709-MW15A-50 8/14/12	709-MW16-50 7/28/12	709-MW18-50 7/26/12	709-MW20-50 7/21/04	709-MW20-50 7/21/06	709-MW20-50 8/21/12	709-MW21-50 7/27/12	721-MW5-50 7/19/04	721-MW5-50 4/20/06	721-MW5-50 7/24/06
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																		
Gasoline Range Hydrocarbons in ug/L	800					14 J	18 J	250 U	250 U	250 U	250 U			250 U	250 U			
Diesel Range Hydrocarbons in ug/L	500					260 U	260 U	17 J	17 J		44 J			270 U				
Oil Range Hydrocarbons in ug/L	500					510 U	510 U	540 U	67 J		97 J			530 U				
Total TPHs D+O (ND=0U) in ug/L	500					ND	ND	17 J	84 J		140 J			ND				
Total TPHs D+O (ND=1/2U) in ug/L	500					ND	ND	287 J	84 J		141 J			ND				
Total TPHs G+D+O (ND=0U) in ug/L	720					14 J	18 J	17 J	84 J		140 J			ND				
Total TPHs G+D+O (ND=1/2U) in ug/L	720					400 J	400 J	410 J	210 J		270 J			ND				
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																		
Diesel Range Hydrocarbons in ug/L	500									270 U					260 U			
Oil Range Hydrocarbons in ug/L	500									530 U					520 U			
Total TPHs D+O (ND=0U) in ug/L	500									ND					ND			
Total TPHs D+O (ND=1/2U) in ug/L	500									ND					ND			
Total TPHs G+D+O (ND=0U) in ug/L	720									ND					ND			
Total TPHs G+D+O (ND=1/2U) in ug/L	720									ND					ND			
Dissolved Metals																		
Arsenic in ug/L	5																	
Chromium (Total) in ug/L																		
Copper in ug/L	2.4																	
Iron in ug/L																	76.6	
Lead in ug/L	8.1																	
Manganese in ug/L																	13.8	
Mercury in ug/L																		
Nickel in ug/L	8.2																	
Sodium in mg/L			1,300	822 J									707 J				1,500	1,900 J
Thallium in ug/L																		
Zinc in ug/L	81																	
Total Metals																		
Aluminum in ug/L					294 J	127	19.6	341	296 J	195	11,100			1,830	18,500			
Antimony in ug/L					0.501	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.36 J	0.444 J			0.032 J	0.618			
Arsenic in ug/L	5				1.94 J	0.47 J	0.67 J	0.32 J	1.73	1.55	2.37			0.61 J	3.93			
Barium in ug/L					15.9	85.3	299	57.7	321	68.7	73.3			14.8	92			
Cadmium in ug/L					0.184 J	0.171 J	0.2 U	0.2 U	0.2 U	0.2 U	0.528			0.2 U	0.117 J			
Calcium in ug/L					22,100	48,500	151,000	95,600	142,000	41,600	16,900			10,300	27,100			
Chromium (Total) in ug/L					47.5	7.7	1.32 J	2 U	2 U	13.5	37.3			6.18	43.2			
Copper in ug/L	2.4				31	4.16	1 U	1 U	0.58 J	10.8	127			3.52	58.7			
Iron in ug/L					11,000	220	4,400	342	1,140	227	7,910			1,650	14,300		329	
Lead in ug/L	8.1				1.47	0.109 J	0.024 J	0.2 U	0.293	0.795	8.22			0.589	7.74			
Magnesium in ug/L					41,800	102,000	432,000	140,000	244,000	58,300	24,100			27,300	39,500			
Manganese in ug/L																	17.6	
Mercury in ug/L					0.07 J	0.02 J	0.2 U	0.2 U	0.2 U	0.04 J	0.04 J			0.2 U	0.06 J			
Nickel in ug/L	8.2				4.99	2 U	0.48 J	2 U	2 U	1.57 J	11.3			1.58 J	19.4			
Potassium in ug/L					36,600	59,900	128,000	43,100	88,500	31,400	21,900			41,200	25,900			
Silicon in ug/L					7,910	10,700	13,200	17,300	13,700	17,600	35,700			16,300	44,700			
Silver in ug/L					0.155 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.105 J			0.2 U	0.2 U			
Sodium in mg/L					803	1,160	3,480	875	3,260	701	415			906	395			
Strontium in ug/L					390	820	3,310	1,230	2,410	473	208			169	343			
Thallium in ug/L					0.2 U	0.2 U	0.2 U	0.2 U	0.0187 J	0.2 U	0.0177 J			0.2 U	0.0547 J			
Zinc in ug/L	81				4.32 J	5 U	5 U	5 U	5 U	5 U	32.4			5 U	156			
Metals																		
Tetraethyl Lead in ug/L						0.0006 UJ		0.0006 U	0.00058 U	0.00057 U	0.00057 U			0.00057 UJ	0.00057 U			
Conventional Chemistry Parameters																		
Alkalinity (Total) in mg/L		572			659	545	1,550	231	390	499	590			500	545			
Bicarbonate in mg/L					485	545	1,550	231	311	470	565			500	537			
Bromide in mg/L					2.17	5.92	28.5	5.23	6.5	2.06	0.94			4.76	1.23			
Carbon, Dissolved Organic (DOC) in mg/L			10															
Chloride in mg/L					1,040	1,840	8,130	1,940	6,250	883	288			1,350	372			

Table B-14

Aspect Consulting

3/1/2016

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RI

Table B-14 - 2000-2013 Pre-RI Groundwater Data - 50 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	9-50 3/16/04	9-50 4/14/06	9-50 7/15/06	9-50 8/7/12	93C-50 7/17/12	95C-50 7/19/12	709-MW6-50 8/9/12	709-MW15A-50 8/14/12	709-MW16-50 7/28/12	709-MW18-50 7/26/12	709-MW20-50 7/21/04	709-MW20-50 7/21/06	709-MW20-50 8/21/12	709-MW21-50 7/27/12	721-MW5-50 7/19/04	721-MW5-50 4/20/06	721-MW5-50 7/24/06					
Dissolved Alkalinity (Total) in mg/L																		370					
Dissolved Biochemical Oxygen Demand in mg/L																		2.8					
Dissolved Chemical Oxygen Demand in mg/L																		5	U				
Dissolved Chloride in mg/L			1,800	1,160									1,140					3,400	4,170				
Dissolved Ethane in mg/L																		0.00051	U				
Dissolved Ethene in mg/L																		0.005					
Dissolved Methane in mg/L																		0.69					
Dissolved Nitrate as Nitrogen in mg/L																		0.008	U				
Dissolved Nitrite as Nitrogen in mg/L																		0.02	UJ				
Dissolved Organic Carbon in mg/L																		2.5					
Dissolved Sodium in mg/L			1,300	822	J								707	J				1,500	1,900	J			
Dissolved Sulfate in mg/L																		152					
Dissolved Sulfide in mg/L																		0.6	U				
pH in pH Units																8.03							
Sulfate in mg/L					0.85	57.2	42.7	110	J	176	12.3	0.51		0.96	15.9								
Total Boron in mg/L					1.4	1.11	1.95	0.26	0.631	1.01	1.35			1.41	0.65								
Total Dissolved Solids in mg/L			4,600	2,600	2,630	3,310	13,700	3,700	11,800	2,280	1,320		2,200	2,740	204			6,200	6,700				
Total Organic Carbon in mg/L																		2.3					
Total Sodium in mg/L					803	1,160	3,480	875	3,260	701	415			906	395								
Dissolved Ammonia as Nitrogen in mg/L																		3.4					
Volatile Organic Compounds (VOC)																							
1,1,1,2-Tetrachloroethane in ug/L																		1	U				
1,1,1-Trichloroethane in ug/L													0.7	U				1	U				
1,1,2 - Trichlorotrifluoroethane in ug/L																		2	U				
1,1,2,2-Tetrachloroethane in ug/L	3	5	U		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1.4	U		0.5	U	0.5	U	1	U
1,1,2-Trichloroethane in ug/L		5	U		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1	U		0.5	U	0.5	U	1	U
1,1-Dichloroethane in ug/L															0.95	U						1	U
1,1-Dichloroethene in ug/L	3.2	5	U		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	1.5	U		0.5	U	0.5	U	1	U
1,1-Dichloropropene in ug/L																						1	U
1,2,3-Trichlorobenzene in ug/L																						5	U
1,2,3-Trichloropropane in ug/L																						3	U
1,2-Dibromo-3-chloropropane in ug/L														3.8	U							5	U
1,2-Dibromoethane (EDB) in ug/L														1	U							1	U
1,2-Dichlorobenzene in ug/L														0.85	U							0.85	U
1,2-Dichloroethane (EDC) in ug/L	99													0.7	U							1	U
1,2-Dichloropropane in ug/L														0.85	U							1	U
1,3-Dichlorobenzene in ug/L														0.55	U							0.55	U
1,3-Dichloropropane in ug/L																						1	U
1,4-Dichloro-2-Butene in ug/L																						5	U
1,4-Dichlorobenzene in ug/L														0.95	U							0.95	U
2,2-Dichloropropane in ug/L																						1	U
2-Butanone in ug/L														3	U							5	U
2-Chloroethyl Vinyl Ether in ug/L																						5	U
2-Chlorotoluene in ug/L																						1	U
2-Hexanone in ug/L														4.6	U							5	U
4-Chlorotoluene in ug/L																						1	U
4-Methyl-2-pentanone in ug/L														9.5	U							5	U
Acetone in ug/L														130	U							5.5	
Acrolein in ug/L																						50	U
Acrylonitrile in ug/L	0.7																					1	U
Benzene in ug/L	58	5	U		0.5	U	5.5	0.56	0.5	U	0.5	U	0.5	U	0.8	U		0.5	U	0.43	J	1	U
Bromobenzene in ug/L																						1	U
Bromochloromethane in ug/L																						1	U
Bromodichloromethane in ug/L														0.7	U							1	U
Bromoethane in ug/L																						2	U
Bromoform in ug/L														0.7	U							1	U
Bromomethane in ug/L														1.2	U							1	U

Table B-14 - 2000-2013 Pre-RI Groundwater Data - 50 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	9-50 3/16/04	9-50 4/14/06	9-50 7/15/06	9-50 8/7/12	93C-50 7/17/12	95C-50 7/19/12	709-MW6-50 8/9/12	709-MW15A-50 8/14/12	709-MW16-50 7/28/12	709-MW18-50 7/26/12	709-MW20-50 7/21/04	709-MW20-50 7/21/06	709-MW20-50 8/21/12	709-MW21-50 7/27/12	721-MW5-50 7/19/04	721-MW5-50 4/20/06	721-MW5-50 7/24/06	
Carbon disulfide in ug/L													1 U			1 U			
Carbon tetrachloride in ug/L		5 U			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U	1 U			
Chlorobenzene in ug/L													1 U			1 U			
Chloroethane in ug/L													1 U			1 U			
Chloroform in ug/L	470	5 U			0.5 U	0.16 J	0.16 J	0.5 U	0.5 U	27	0.8	0.8 U		0.5 U	1.8	2.6			
Chloromethane in ug/L													1.6 U			1 U			
cis-1,2-Dichloroethene (DCE) in ug/L		5 U			0.5 U	0.5 U	0.5 U	0.5 U	0.42 J	0.5 U	2.6	0.8 U		0.5 U	0.07 J	15			
cis-1,3-Dichloropropene in ug/L													0.75 U			1 U			
Dibromochloromethane in ug/L													0.95 U			1 U			
Dibromomethane in ug/L																1 U			
Dichlorodifluoromethane in ug/L													0.95 U			0.95 U			
Ethylbenzene in ug/L	130	5 U			0.5 U	0.5 U	0.08 J	0.5 U	0.5 U	0.07 J	0.5 U	1.2 U		0.5 U	0.16 J	1 U			
Isopropylbenzene in ug/L																1 U			
Methyl tert-butyl ether (MTBE) in ug/L		5 U																	
Methylene chloride in ug/L	1,000	5 U			2 U	0.17 J	2 U	2 U	2 U	2 U	2 U	1.8 U		2 U	2 U	2 U			
Methyl iodide in ug/L																1 U			
n-Butylbenzene in ug/L																1 U			
n-Propylbenzene in ug/L																1 U			
p-Isopropyltoluene in ug/L																1 U			
sec-Butylbenzene in ug/L																1 U			
Styrene in ug/L													1.2 U			1 U			
tert-Butylbenzene in ug/L																1 U			
Tetrachloroethene (PCE) in ug/L	8.9	5 U			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.75 U		0.5 U	0.5 U	1 U			
Toluene in ug/L	520	5 U			0.09 J	0.3 J	0.14 J	0.5 U	0.85	0.14 J	0.5 U	0.85 U		0.74	0.06 J	1 U			
trans-1,2-Dichloroethene in ug/L	4,000	5 U			0.5 U	0.5 U	0.5 U	0.5 U	0.11 J	0.5 U	0.5 U	0.95 U		0.5 U	0.5 U	1 U			
trans-1,3-Dichloropropene in ug/L													0.9 U			1 U			
Trichloroethene (TCE) in ug/L	7	5 U			0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.8 U		0.5 U	0.5 U	1 U			
Trichlorofluoromethane in ug/L													1.2 U			1 U			
Vinyl acetate in ug/L																5 U			
Vinyl chloride in ug/L	1.6	5 U			1.2	0.5 U	0.5 U	0.5 U	0.33 J	0.5 U	3.6	1.2 U		0.5 U	3.9	17			
m,p-Xylenes in ug/L					0.5 U	0.5 U	0.12 J	0.5 U	0.5 U	0.5 U	0.5 U	2 U		0.5 U	0.5 U	2 U			
o-Xylene in ug/L					0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.95 U		0.5 U	0.5 U	1 U			
Total Xylenes in ug/L					ND	ND	0.37 J	ND	ND	ND	ND	ND		ND	ND	ND			
Xylenes (total) in ug/L		5 U																	
Naphthalene in ug/L	4,710	5 U																	
Field Parameters																			
Conductivity in umhos/cm			5.92	14.8	4.59	6.78	26.1	6.84	24.8	1.33	0.637			4.23	5.19	2.09		11.4	17.3
Dissolved Oxygen in mg/L			0	0	0	0	0	0	0	9.05	0.18			0	0.19	0		0	0
ORP in mVolts			-349	-185	-317	-247	-199	-258	-239	16	-132			-109	-128	-164		-0200	-141
pH in pH Units		9.04	9.71	9.41	9.73	8.64	7.44	8.84	8.44	11.54	9.25	8.49		8.03	7.97	8.34	8.17	8.16	7.98
Salinity in %					0.2	0.4	1.6	0.4	1.52	0.1	0			0.3	0.1				
Temperature in Deg C			12.96	19.5	17.19	16.3	18.1	19.85	19.6	15.43	16.3			19.2	19.9	17.72		14.45	20.76
Turbidity in NTU				471	598	47.5	311	241	19.8	4.5	74.1			74	608	707		138	44.9

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-14 - 2000-2013 Pre-RI Groundwater Data - 50 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW5-50 8/25/12	721-MW6-50 7/19/04	721-MW6-50 4/20/06	721-MW6-50 7/24/06	721-MW6-50 7/25/12	721-MW9-50 7/20/04	721-MW9-50 4/20/06	721-MW9-50 7/24/06	721-MW9-50 7/22/12	721-MW10-50 7/21/04	721-MW10-50 4/19/06	721-MW10-50 7/25/06	721-MW10-50 8/6/12	721-MW11-50 8/1/12	721-MW12-50 7/30/12	721-MW13-50 7/31/12	721-MW14-50 8/9/12
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup																		
Gasoline Range Hydrocarbons in ug/L	800	250 U				13 J				250 U				250 U	250 U	13 J	41 J	250 U
Diesel Range Hydrocarbons in ug/L	500	260 U								270 U						270 U		
Oil Range Hydrocarbons in ug/L	500	520 U								530 U						530 U		
Total TPHs D+O (ND=0U) in ug/L	500	ND								ND						ND		
Total TPHs D+O (ND=1/2U) in ug/L	500	ND								ND						ND		
Total TPHs G+D+O (ND=0U) in ug/L	720	ND								ND						13 J		
Total TPHs G+D+O (ND=1/2U) in ug/L	720	ND								ND						410 J		
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup																		
Diesel Range Hydrocarbons in ug/L	500					260 U								260 U	25 J		42 J	64 J
Oil Range Hydrocarbons in ug/L	500					520 U								520 U	530 U		530 U	540 U
Total TPHs D+O (ND=0U) in ug/L	500					ND								ND	25 J		42 J	64 J
Total TPHs D+O (ND=1/2U) in ug/L	500					ND								ND	290 J		307 J	334 J
Total TPHs G+D+O (ND=0U) in ug/L	720					13 J								ND	25 J		83 J	64 J
Total TPHs G+D+O (ND=1/2U) in ug/L	720					400 J								ND	420 J		350 J	460 J
Dissolved Metals																		
Arsenic in ug/L	5																	
Chromium (Total) in ug/L																		
Copper in ug/L	2.4																	
Iron in ug/L								201										
Lead in ug/L	8.1																	
Manganese in ug/L								72.6										
Mercury in ug/L																		
Nickel in ug/L	8.2																	
Sodium in mg/L				1,500	1,810 J			3,000	3,240 J				3,700	4,960 J				
Thallium in ug/L																		
Zinc in ug/L	81																	
Total Metals																		
Aluminum in ug/L		63				10.9 U				17.3				278 J	97.3 J	2,070	230	3,030
Antimony in ug/L		0.595				0.5 U				0.5 U				0.089 J	0.436 J	0.586	1.53	0.5 UJ
Arsenic in ug/L	5	0.61 J				0.53 J				0.93 J				0.78 J	1.04	2.42	0.82 J	1.01
Barium in ug/L		531				360				281				977	209	53.1	74.6	39.5
Cadmium in ug/L		0.2 U				0.2 U				0.2 U				0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Calcium in ug/L		142,000				137,000				99,600				127,000	114,000	23,200	39,000	14,600
Chromium (Total) in ug/L		0.48 J				0.78 J				2.04				1.45 J	0.49 J	11.4	1.9 J	30.7
Copper in ug/L	2.4	1 U				6.67				1 U				0.22 J	0.28 J	23.8	1.71	26.6
Iron in ug/L		145				94.9		632		279				109	188	1,280	224	2,190
Lead in ug/L	8.1	0.2 U				0.18 J				0.2 U				0.224 J	0.05 J	2.32	0.167 J	2.22
Magnesium in ug/L		284,000				388,000				394,000				420,000	185,000	15,800	63,100	23,600
Manganese in ug/L								80.4										
Mercury in ug/L		0.2 U				0.04 J				0.2 U				0.07 J	0.2 U	0.2 U	0.03 J	0.2 U
Nickel in ug/L	8.2	2 U				2 U				0.21 J				0.43 J	0.26 J	2.51	0.57 J	3.75
Potassium in ug/L		83,400				102,000				128,000				109,000	51,700	20,700	37,900	21,200
Silicon in ug/L		16,000				11,100				16,200				9,960	9,110	18,400	9,900	17,100
Silver in ug/L		0.2 U				0.2 U				0.2 U				0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Sodium in mg/L		2,250				1,690				2,930				3,660	1,350	208	364	405
Strontium in ug/L		2,390				2,280				2,170				2,780	1,560	168	435	188
Thallium in ug/L		0.0226 J				0.2 U				0.2 U				0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Zinc in ug/L	81	5 U				5 U				5 U				5 U	5 U	16.3	5 U	16.6
Metals																		
Tetraethyl Lead in ug/L		0.00057 U				0.00058 UJ				0.0006 UJ				0.00062 U	0.00057 U	0.00057 U	0.00057 U	0.00058 U
Conventional Chemistry Parameters																		
Alkalinity (Total) in mg/L		310				483				1,440				985	242	545	622	600
Bicarbonate in mg/L		310 J				483				1,440				985	238	521	598	592
Bromide in mg/L		6.9				8.1				21.9				14.3	5.72	0.34	1.97	1.16
Carbon, Dissolved Organic (DOC) in mg/L				5.9								13						
Chloride in mg/L		4,260				3,760				5,700				6,230	2,420	97	560	325

Table B-14 - 2000-2013 Pre-RI Groundwater Data - 50 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW5-50 8/25/12	721-MW6-50 7/19/04	721-MW6-50 4/20/06	721-MW6-50 7/24/06	721-MW6-50 7/25/12	721-MW9-50 7/20/04	721-MW9-50 4/20/06	721-MW9-50 7/24/06	721-MW9-50 7/22/12	721-MW10-50 7/21/04	721-MW10-50 4/19/06	721-MW10-50 7/25/06	721-MW10-50 8/6/12	721-MW11-50 8/1/12	721-MW12-50 7/30/12	721-MW13-50 7/31/12	721-MW14-50 8/9/12
Dissolved Alkalinity (Total) in mg/L								1,550										
Dissolved Biochemical Oxygen Demand in mg/L								48										
Dissolved Chemical Oxygen Demand in mg/L								190										
Dissolved Chloride in mg/L				3,500 J	4,510			5,200	6,530			6,700 J	8,940					
Dissolved Ethane in mg/L								0.00051 U										
Dissolved Ethene in mg/L								0.00047 U										
Dissolved Methane in mg/L								25										
Dissolved Nitrate as Nitrogen in mg/L								0.02 U										
Dissolved Nitrite as Nitrogen in mg/L								0.05 UJ										
Dissolved Organic Carbon in mg/L								12										
Dissolved Sodium in mg/L				1,500	1,810 J			3,000	3,240 J			3,700	4,960 J					
Dissolved Sulfate in mg/L								0.45 U										
Dissolved Sulfide in mg/L								0.6 U										
pH in pH Units			8.09				7.43											
Sulfate in mg/L		350				79.8			1.01				33.8 J	132	1.49	4.24	0.6 J	
Total Boron in mg/L		0.526				0.576			2.24				1.73	0.357	0.82	0.632	0.801	
Total Dissolved Solids in mg/L		7,510		6,500	7,400	6,880		11,000	9,800	10,300		12,000	14,000	11,000	4,420	819	1,550	1,330 J
Total Organic Carbon in mg/L								12.1										
Total Sodium in mg/L		2,250				1,690			2,930					3,660	1,350	208	364	405
Dissolved Ammonia as Nitrogen in mg/L								23.6										
Volatile Organic Compounds (VOC)																		
1,1,1,2-Tetrachloroethane in ug/L			1 U					1 U										
1,1,1-Trichloroethane in ug/L			0.7 U					0.7 U			0.7 U							
1,1,2 - Trichlorotrifluoroethane in ug/L			2 U					2 U										
1,1,2,2-Tetrachloroethane in ug/L	3	0.5 U	1.4 U			0.5 U	1.4 U		0.5 U	1.4 U			0.5 U	0.5 U	0.5 U	2.5 U	0.5 U	
1,1,2-Trichloroethane in ug/L		0.5 U	1 U			0.5 U	1 U		0.5 U	1 U			0.5 U	0.5 U	0.5 U	2.5 U	0.5 U	
1,1-Dichloroethane in ug/L			0.95 U				0.95 U			0.95 U								
1,1-Dichloroethene in ug/L	3.2	0.5 U	1.5 U			0.5 U	1.5 U		0.5 U	1.5 U			0.5 U	0.5 U	0.5 U	2.5 U	0.5 U	
1,1-Dichloropropene in ug/L			1 U				1 U											
1,2,3-Trichlorobenzene in ug/L			5 U				5 U											
1,2,3-Trichloropropane in ug/L			3 U				3 U											
1,2-Dibromo-3-chloropropane in ug/L			3.8 U				3.8 U					3.8 U						
1,2-Dibromoethane (EDB) in ug/L			1 U				1 U					1 U						
1,2-Dichlorobenzene in ug/L			0.85 U				0.85 U					0.85 U						
1,2-Dichloroethane (EDC) in ug/L	99		0.7 U				0.7 U					0.7 U						
1,2-Dichloropropane in ug/L			0.85 U				0.85 U					0.85 U						
1,3-Dichlorobenzene in ug/L			0.55 U				0.55 U					0.55 U						
1,3-Dichloropropane in ug/L			1 U				1 U											
1,4-Dichloro-2-Butene in ug/L			5 U				5 U											
1,4-Dichlorobenzene in ug/L			0.95 U				0.95 U					0.95 U						
2,2-Dichloropropane in ug/L			1 U				1 U											
2-Butanone in ug/L			3 U				3 U					3 U						
2-Chloroethyl Vinyl Ether in ug/L			5 U				5 U											
2-Chlorotoluene in ug/L			1 U				1 U											
2-Hexanone in ug/L			4.6 U				4.6 U					4.6 U						
4-Chlorotoluene in ug/L			1 U				1 U											
4-Methyl-2-pentanone in ug/L			9.5 U				9.5 U					9.5 U						
Acetone in ug/L			14 U				14 U					22 U						
Acrolein in ug/L			50 U				50 U											
Acrylonitrile in ug/L	0.7		1 U				1 U											
Benzene in ug/L	58	0.5 U	0.8 U			11	0.8 U			0.5 U	0.8 U		0.5 U	0.13 J	1.9	170	0.14 J	
Bromobenzene in ug/L			1 U				1 U											
Bromochloromethane in ug/L			1 U				1 U											
Bromodichloromethane in ug/L			0.7 U				0.7 U					0.7 U						
Bromoethane in ug/L			2 U				2 U											
Bromoform in ug/L			0.7 U				0.7 U					0.7 U						
Bromomethane in ug/L			1.2 U				1.2 U					1.2 U						

Table B-14 - 2000-2013 Pre-RI Groundwater Data - 50 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW5-50 8/25/12	721-MW6-50 7/19/04	721-MW6-50 4/20/06	721-MW6-50 7/24/06	721-MW6-50 7/25/12	721-MW9-50 7/20/04	721-MW9-50 4/20/06	721-MW9-50 7/24/06	721-MW9-50 7/22/12	721-MW10-50 7/21/04	721-MW10-50 4/19/06	721-MW10-50 7/25/06	721-MW10-50 8/6/12	721-MW11-50 8/1/12	721-MW12-50 7/30/12	721-MW13-50 7/31/12	721-MW14-50 8/9/12
Carbon disulfide in ug/L			1 U				1 U				1 U							
Carbon tetrachloride in ug/L		0.5 U	0.5 U			0.5 U	0.5 U			0.5 U	0.5 U			0.5 U	0.5 U	0.5 U	2.5 U	0.5 U
Chlorobenzene in ug/L			1 U				1 U				1 U							
Chloroethane in ug/L			1 U				1 U				1 U							
Chloroform in ug/L	470	0.5 U	0.8 U			0.5 U	0.8 U			0.5 U	0.8 U			0.5 U	0.43 J	39	0.75 J	0.5 U
Chloromethane in ug/L			1.6 U				1.6 U				1.6 U							
cis-1,2-Dichloroethene (DCE) in ug/L		8.5	0.8 U			0.5 U	0.8 U			0.5 U	0.8 U			0.19 J	0.68	0.5 U	2.5 U	0.5 U
cis-1,3-Dichloropropene in ug/L			0.75 U				0.75 U				0.75 U							
Dibromochloromethane in ug/L			0.95 U				0.95 U				0.95 U							
Dibromomethane in ug/L			1 U				1 U											
Dichlorodifluoromethane in ug/L			0.95 U				0.95 U				0.95 U							
Ethylbenzene in ug/L	130	0.5 U	1.2 U			0.11 J	1.2 U			0.5 U	1.2 U			0.5 U	0.5 U	0.1 J	2.5 U	0.5 U
Isopropylbenzene in ug/L			1 U				1 U											
Methyl tert-butyl ether (MTBE) in ug/L																		
Methylene chloride in ug/L	1,000	2 U	1.8 U			2 U	1.8 U			2 U	1.8 U			2 U	2 U	2 U	10 U	2 U
Methyliodide in ug/L			1 U				1 U											
n-Butylbenzene in ug/L			1 U				1 U											
n-Propylbenzene in ug/L			1 U				1 U											
p-Isopropyltoluene in ug/L			1 U				1 U											
sec-Butylbenzene in ug/L			1 U				1 U											
Styrene in ug/L			1.2 U				1.2 U				1.2 U							
tert-Butylbenzene in ug/L			1 U				1 U											
Tetrachloroethene (PCE) in ug/L	8.9	0.5 U	0.75 U			0.5 U	0.75 U			0.5 U	0.75 U			0.5 U	0.5 U	0.5 U	2.5 U	0.5 U
Toluene in ug/L	520	0.6 U	0.85 U			0.6 U	1 U			0.1 J	0.85 U			0.06 J	0.5 U	0.25 J	3.9	0.5 U
trans-1,2-Dichloroethene in ug/L	4,000	0.26 J	0.95 U			0.5 U	0.95 U			0.5 U	5.5 J			4	0.5 U	0.5 U	2.5 U	0.5 U
trans-1,3-Dichloropropene in ug/L			0.9 U				0.9 U				0.9 U							
Trichloroethene (TCE) in ug/L	7	0.5 U	0.8 U			0.5 U	0.8 U			0.5 U	0.8 U			0.5 U	0.5 U	0.5 U	2.5 U	0.5 U
Trichlorofluoromethane in ug/L			1.2 U				1.2 U				1.2 U							
Vinyl acetate in ug/L			5 U				5 U											
Vinyl chloride in ug/L	1.6	9.9	1.2 U			0.5 U	1.2 U			0.5 U	48			1.4	5.4	0.12 J	0.5 J	0.62
m,p-Xylenes in ug/L		0.11 J	2 U			1	2 U			0.13 J	2 U			0.5 U	0.5 U	0.24 J	2.5 U	0.5 U
o-Xylene in ug/L		0.5 U	0.95 U			0.12 J	0.95 U			0.5 U	0.95 U			0.5 U	0.5 U	0.12 J	2.5 U	0.5 U
Total Xylenes in ug/L		0.36 J	ND			1.1	ND			0.38 J	ND			ND	ND	0.36 J	ND	ND
Xylenes (total) in ug/L																		
Naphthalene in ug/L	4,710																	
Field Parameters																		
Conductivity in umhos/cm		14.9		9.2	17.3	12.6		22.7	23.7	15.5		24.3	33.8	24.9	10.2	0.383	1.28	2.39
Dissolved Oxygen in mg/L		0.66		0.3	3.02	0.08		0	3.97	0		0	0	3.48	1.99	6.77	0	0
ORP in mVolts		-137		-215	-305	-303		-164	-129	-139		-174	-0140	-155	-257	-49	-235	-157
pH in pH Units		8.15	8.2	8.33	8.16	8.55	7.52	7.72	7.5	8	8.06	8.19	7.9	8.25	8.34	12.05	8.98	8.81
Salinity in %		0.9				0.7				0.9				1.5	0.6	0	0.1	0.12
Temperature in Deg C		16.5		14.8	18.87	16.9		14.3	19.24	15.8		14.6	16.91	19.58	19.29	16.63	15.97	18.1
Turbidity in NTU		52.3		139	81	0		475	225	229		301	30.1	15.8	381	0	57	103

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-14 - 2000-2013 Pre-RI Groundwater Data - 50 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW15-50 7/30/12	DOCK2-005 8/2/05	DOCK2-010 9/13/05	DOCK2-014 10/29/05	HYD-008 9/13/05	HYD-008 9/14/05	HYD-009 9/15/05	HYD-010 9/16/05	NL-13 12/21/05
Total Petroleum Hydrocarbons (TPH) - without silica gel cleanup										
Gasoline Range Hydrocarbons in ug/L	800	250 U								
Diesel Range Hydrocarbons in ug/L	500									
Oil Range Hydrocarbons in ug/L	500									
Total TPHs D+O (ND=0U) in ug/L	500									
Total TPHs D+O (ND=1/2U) in ug/L	500									
Total TPHs G+D+O (ND=0U) in ug/L	720									
Total TPHs G+D+O (ND=1/2U) in ug/L	720									
Total Petroleum Hydrocarbons (TPH) - with silica gel cleanup										
Diesel Range Hydrocarbons in ug/L	500	260 U								
Oil Range Hydrocarbons in ug/L	500	520 U								
Total TPHs D+O (ND=0U) in ug/L	500	ND								
Total TPHs D+O (ND=1/2U) in ug/L	500	ND								
Total TPHs G+D+O (ND=0U) in ug/L	720	ND								
Total TPHs G+D+O (ND=1/2U) in ug/L	720	ND								
Dissolved Metals										
Arsenic in ug/L	5		0.334 U	0.334 U	114	0.334 U	0.334 U	0.334 U	0.334 U	0.334 U
Chromium (Total) in ug/L			2.42 U	1.3 U	5.1 U	1.41 U	1.29 U	2.71 U	2.2 U	5.09 U
Copper in ug/L	2.4		6.7 U	13.3 U	89	20.7	23.2	20.2 U	0.845 U	2.28 U
Iron in ug/L										
Lead in ug/L	8.1		0.035 U	0.0167 U	2.2 U	0.0167 U	0.06 U	0.0167 U	0.0167 U	0.07 U
Manganese in ug/L										
Mercury in ug/L			0.044 U	0.044 U	0.052 U	0.044 U	0.044 U	0.044 U	0.044 U	0.044 U
Nickel in ug/L	8.2		18.6 J	24.9 U	11.9 U	46.8 J	44.8 J	49.5 J	8.62 U	11.9 J
Sodium in mg/L										
Thallium in ug/L			0.0184 U	0.0184 U	2.6 U	0.0184 U	0.0184 U	0.03 U	0.0184 U	0.0184 U
Zinc in ug/L	81		0.302 U	5.18 U	46 U	2.05 U	7.66 U	11.5 U	0.302 U	0.68 J
Total Metals										
Aluminum in ug/L		7,880								
Antimony in ug/L		0.441 J								
Arsenic in ug/L	5	1.7								
Barium in ug/L		70.3								
Cadmium in ug/L		0.18 J								
Calcium in ug/L		12,200								
Chromium (Total) in ug/L		43.4								
Copper in ug/L	2.4	51.7								
Iron in ug/L		5,040								
Lead in ug/L	8.1	5.42								
Magnesium in ug/L		11,800								
Manganese in ug/L										
Mercury in ug/L		0.2 U								
Nickel in ug/L	8.2	6.76								
Potassium in ug/L		18,600								
Silicon in ug/L		26,000								
Silver in ug/L		0.2 U								
Sodium in mg/L		419								
Strontium in ug/L		139								
Thallium in ug/L		0.0114 J								
Zinc in ug/L	81	31.6								
Metals										
Tetraethyl Lead in ug/L		0.00057 U								
Conventional Chemistry Parameters										
Alkalinity (Total) in mg/L		550								
Bicarbonate in mg/L		527								
Bromide in mg/L		1.14								
Carbon, Dissolved Organic (DOC) in mg/L										
Chloride in mg/L		319								

Aspect Consulting

3/1/2016

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Table B-14

RI

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Table B-14 - 2000-2013 Pre-RI Groundwater Data - 50 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW15-50 7/30/12	DOCK2-005 8/2/05	DOCK2-010 9/13/05	DOCK2-014 10/29/05	HYD-008 9/13/05	HYD-008 9/14/05	HYD-009 9/15/05	HYD-010 9/16/05	NL-13 12/21/05
Dissolved Alkalinity (Total) in mg/L										
Dissolved Biochemical Oxygen Demand in mg/L										
Dissolved Chemical Oxygen Demand in mg/L										
Dissolved Chloride in mg/L										
Dissolved Ethane in mg/L										
Dissolved Ethene in mg/L										
Dissolved Methane in mg/L										
Dissolved Nitrate as Nitrogen in mg/L										
Dissolved Nitrite as Nitrogen in mg/L										
Dissolved Organic Carbon in mg/L			4.47	3.53 U	7.9	1.46 U	5.28 U	4.2 U	10.3 U	
Dissolved Sodium in mg/L										
Dissolved Sulfate in mg/L										
Dissolved Sulfide in mg/L										
pH in pH Units										
Sulfate in mg/L		9.67								
Total Boron in mg/L		0.728								
Total Dissolved Solids in mg/L		1,240								
Total Organic Carbon in mg/L										
Total Sodium in mg/L		419								
Dissolved Ammonia as Nitrogen in mg/L										
Volatile Organic Compounds (VOC)										
1,1,1,2-Tetrachloroethane in ug/L										
1,1,1-Trichloroethane in ug/L										
1,1,2 - Trichlorotrifluoroethane in ug/L										
1,1,2,2-Tetrachloroethane in ug/L	3	0.5 U	0.068 U	0.068 U		0.01 U	0.01 U	0.01 U	0.068 U	0.068 UJ
1,1,2-Trichloroethane in ug/L		0.5 U	0.0939 U	0.0627 U		0.045 U	0.045 U	0.045 U	0.0939 U	0.0627 UJ
1,1-Dichloroethane in ug/L										
1,1-Dichloroethene in ug/L	3.2	0.5 U	0.177 U	0.0595 U		0.025 U	0.025 U	0.025 U	0.177 U	0.0595 UJ
1,1-Dichloropropene in ug/L										
1,2,3-Trichlorobenzene in ug/L										
1,2,3-Trichloropropane in ug/L										
1,2-Dibromo-3-chloropropane in ug/L										
1,2-Dibromoethane (EDB) in ug/L										
1,2-Dichlorobenzene in ug/L										
1,2-Dichloroethane (EDC) in ug/L	99									
1,2-Dichloropropane in ug/L										
1,3-Dichlorobenzene in ug/L										
1,3-Dichloropropane in ug/L										
1,4-Dichloro-2-Butene in ug/L										
1,4-Dichlorobenzene in ug/L										
2,2-Dichloropropane in ug/L										
2-Butanone in ug/L										
2-Chloroethyl Vinyl Ether in ug/L										
2-Chlorotoluene in ug/L										
2-Hexanone in ug/L										
4-Chlorotoluene in ug/L										
4-Methyl-2-pentanone in ug/L										
Acetone in ug/L										
Acrolein in ug/L										
Acrylonitrile in ug/L	0.7									
Benzene in ug/L	58	1.4								
Bromobenzene in ug/L										
Bromochloromethane in ug/L										
Bromodichloromethane in ug/L										
Bromoethane in ug/L										
Bromoform in ug/L										
Bromomethane in ug/L										

Table B-14 - 2000-2013 Pre-RI Groundwater Data - 50 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW15-50 7/30/12	DOCK2-005 8/2/05	DOCK2-010 9/13/05	DOCK2-014 10/29/05	HYD-008 9/13/05	HYD-008 9/14/05	HYD-009 9/15/05	HYD-010 9/16/05	NL-13 12/21/05
Carbon disulfide in ug/L										
Carbon tetrachloride in ug/L		0.5 U	0.137 U	0.137 U		0.075 U	0.075 U	0.075 U	0.137 U	0.097 UJ
Chlorobenzene in ug/L										
Chloroethane in ug/L										
Chloroform in ug/L	470	2.3	0.181 U	0.0717 U		0.02 U	0.02 U	0.02 U	0.181 U	0.0717 UJ
Chloromethane in ug/L										
cis-1,2-Dichloroethene (DCE) in ug/L		0.5 U	1.84	1.07		0.205 J	0.183 J	0.227 J	0.154 U	0.116 J
cis-1,3-Dichloropropene in ug/L										
Dibromochloromethane in ug/L										
Dibromomethane in ug/L										
Dichlorodifluoromethane in ug/L										
Ethylbenzene in ug/L	130	0.06 J								
Isopropylbenzene in ug/L										
Methyl tert-butyl ether (MTBE) in ug/L										
Methylene chloride in ug/L	1,000	2 U	0.155 U	0.0752 U		0.045 U	0.045 U	0.045 U	0.155 U	0.0752 UJ
Methyliodide in ug/L										
n-Butylbenzene in ug/L										
n-Propylbenzene in ug/L										
p-Isopropyltoluene in ug/L										
sec-Butylbenzene in ug/L										
Styrene in ug/L										
tert-Butylbenzene in ug/L										
Tetrachloroethene (PCE) in ug/L	8.9	0.5 U	0.144 U	0.105 J		0.015 U	0.015 U	0.07 J	0.144 U	0.0578 UJ
Toluene in ug/L	520	0.15 J								
trans-1,2-Dichloroethene in ug/L	4,000	0.5 U	0.145 U	0.0584 U		0.02 U	0.02 U	0.02 U	0.145 U	0.0584 UJ
trans-1,3-Dichloropropene in ug/L										
Trichloroethene (TCE) in ug/L	7	0.5 U	0.126 U	3.04		0.22 J	0.202 J	0.221 J	0.126 U	0.0641 UJ
Trichlorofluoromethane in ug/L										
Vinyl acetate in ug/L										
Vinyl chloride in ug/L	1.6	0.5 U	0.535 J	0.0604 U		0.025 U	0.025 U	0.025 U	0.162 U	0.0604 UJ
m,p-Xylenes in ug/L		0.11 J								
o-Xylene in ug/L		0.5 U								
Total Xylenes in ug/L		0.36 J								
Xylenes (total) in ug/L										
Naphthalene in ug/L	4,710									
Field Parameters										
Conductivity in umhos/cm		1.43	14.9	46.6	39.8	54.2	54.9	59.5	8.39	19.9
Dissolved Oxygen in mg/L		0	3.41	0.4	0.76	0.63	0.42	0.38	0.23	0.67
ORP in mVolts		-297	-188	-185	-0200	-129	-148	-137	-139	-301
pH in pH Units		6.85	7.95	8.4	7.9	7.84	7.99	7.78	7.71	8.28
Salinity in %		0.1	0.9	3	2.5	3.5	3.6	3.9	0.5	
Temperature in Deg C		18.14	15.5	13	11.7	14	13.6	13.6	13	11.1
Turbidity in NTU		28.8	266	595	826	999	999	929	35.6	999

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-15 - 2000-2013 Pre-RI Sediment Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Sediment Screening Level (mg/kg)	HW-4 1/23/07 (0-0.33 ft.)	HW-4 1/23/07 (0-2 ft.)	NL-13 12/20/05 (0-1.5 ft.)	NL-16 5/18/06 (0-2 ft.)	NL-25 1/18/07 (0-3 ft.)	NL-26 1/17/07 (0-3 ft.)	NL-27 1/19/07 (0-2 ft.)	NL-29 1/18/07 (0-3 ft.)	NL-30 1/19/07 (0-3 ft.)
Metals										
Arsenic in mg/kg	57			9.02 J		9.3	18.2		4.5	7.2
Chromium () in mg/kg				20.5 J		13.2	24.9		30.9	16.6
Copper in mg/kg	390			123 J		26.4	1,310		31.4	38
Lead in mg/kg	450			18,900 J		137	519		2,130	68.7
Mercury in mg/kg				0.0431		0.15 U	0.13		0.37	0.11
Nickel in mg/kg	140			80.8 J		25.2	62.2		17.9	16.2 J
Thallium in mg/kg				0.0415 J		0.07 J	0.22		0.06 J	0.073 J
Zinc in mg/kg	410			108 J		36	104		90.7	53 J
Conventional Chemistry Parameters										
Total Organic Carbon in %		1.6	0.36					1.78		
Other (Non-PAH) Semivolatiles										
Hexachlorobenzene in mg/kg	0.022			0.0112 U	0.3 J	0.0046 J	0.048		0.09	0.024
Hexachlorobutadiene in mg/kg	0.011			1.5	0.46	0.0038 J	0.035		0.088	0.018
Pentachlorophenol in mg/kg	0.36			0.0193 U	0.7 J				0.086 J	0.0048 U
Volatile Organic Compounds (VOC)										
1,1,2,2-Tetrachloroethane in mg/kg				0.0639	0.011 U	0.0019 U	0.0017 U		0.0021 U	0.0018 UJ
1,1,2-Trichloroethane in mg/kg				0.00961 U	0.01 U	0.00072 U	0.00066 U		0.0008 U	0.0007 U
1,1-Dichloroethene in mg/kg				0.00932 J	0.0093 U	0.0012 U	0.0011 U		0.0013 U	0.0012 U
Carbon tetrachloride in mg/kg				0.211	0.026	0.0012 U	0.0011 U		0.0013 U	0.0012 U
Chloroform in mg/kg				4.82	0.49	0.0021 U	0.002 U		0.0024 U	0.0021 U
cis-1,2-Dichloroethene (DCE) in mg/kg				0.217	0.0071 U	0.0016 U	0.0015 U		0.0035 J	0.0016 U
Methylene chloride in mg/kg				0.00337 U	0.0051 U	0.0069 U	0.018		0.0076 U	0.021 J
Tetrachloroethene (PCE) in mg/kg	0.057			8.11	0.36	0.00081 U	0.00074 U		0.0027 J	0.00079 U
trans-1,2-Dichloroethene in mg/kg				0.0112	0.006 U	0.002 U	0.0019 U		0.0022 U	0.002 U
Trichloroethene (TCE) in mg/kg				0.494	0.016 J	0.0011 U	0.00097 U		0.0024 J	0.001 U
Vinyl chloride in mg/kg				0.0145	0.0087 U	0.0025 U	0.0023 U		0.0028 U	0.0025 U
Polychlorinated Biphenyls (PCBs)										
Aroclor 1016 in mg/kg				0.00449 U						
Aroclor 1221 in mg/kg				0.00449 U						
Aroclor 1232 in mg/kg				0.00449 U						
Aroclor 1242 in mg/kg				0.00449 U						
Aroclor 1248 in mg/kg				0.00449 U						
Aroclor 1254 in mg/kg				0.00247 UJ						
Aroclor 1260 in mg/kg				0.00247 UJ						
Total PCBs (Sum of Aroclors) in mg/kg	0.27531	0.12195		0.00449 UJ		0.13469	0.12963	0.33487	0.24749	0.14 U
PCB 70 in mg/kg	0.0088261	0.0040121				0.0027396	0.0055029	0.0146778	0.00587 J	0.0006598
PCB 77 in mg/kg	0.0003711	0.0001181				5.367E-05	0.0001891	0.0007504	0.000233 J	3.325E-05
PCB 81 in mg/kg	3.23E-06 U	2.58E-06 U				2.396E-05 U	4.365E-05 U	0.000406	7.38E-06 UJ	1.473E-05 U
PCB 99 in mg/kg									0.00398 J	
PCB 105 in mg/kg	0.0041349	0.0023102				0.0036821	0.0022613	0.005105	0.00431 J	0.000184
PCB 114 in mg/kg	0.0002041	0.0001329				0.0002832	0.0001368	0.0001385	0.000224 J	4.69E-06 U
PCB 118 in mg/kg	0.0103366	0.0064342				0.0071977	0.0043965	0.0130089	0.0105 J	0.0003968
PCB 123 in mg/kg	9.63E-06 U	6.97E-06 U				0.000008 U	1.497E-05 U	6.822E-05 U	0.000163 J	4.23E-06 U
PCB 126 in mg/kg	9.132E-05	5.068E-05				5.553E-05	3.064E-05	9.027E-05 U	9.25E-06 UJ	6.47E-06 UJ
PCB 156 in mg/kg	0.0014997	0.0009242				0.0023386	0.0005212	0.0019313	0.00185 J	5.002E-05
PCB 167 in mg/kg	0.000584	0.0002749				0.0003217	0.0001859	0.0016277	0.000618 J	2.703E-05
PCB 169 in mg/kg	0.0002148	7.47E-06 U				2.626E-05 U	3.214E-05 U	0.0001326 U	0.0000129 UJ	8.87E-06 U
PCB 170 in mg/kg	0.0027049	0.0007686				0.0010241	0.0012938	0.0046884	0.00642 J	0.0001156
PCB 180 in mg/kg	0.0097101	0.0026231				0.0020617	0.004442	0.0110116	0.0148 J	0.0004735
PCB 183 in mg/kg	1.396E-05 U	7.79E-06 U				0.0004147	0.0006425	0.0022843	0.0011 J	7.482E-05
PCB 187 in mg/kg	0.0177348	0.0040798				0.0030403	0.0063714	0.0124057	0.00584 J	0.0011168
PCB 189 in mg/kg	0.0001009	3.712E-05				4.471E-05	5.307E-05 U	0.0008674	0.000248 J	2.539E-05 U
Dioxins/Furans										
Tetrachlorodibenzofurans (TCDF), Total in mg/kg	0.0003565	7.57E-05				3.327E-05	6.84E-05	0.0004796	0.00188	8.651E-05
Total HpCDD in mg/kg	0.0007814	0.0001018				6.926E-05	0.0001099	0.0002056	0.00048	3.812E-05
Total HpCDF in mg/kg	0.0005823	0.0001095				8.119E-05	0.0001369	0.0009782	0.00109	3.923E-05
Total HxCDD in mg/kg	6.337E-05	4.884E-06				7.779E-06	1.239E-05	2.101E-05	0.0000634	2.596E-06
Total HxCDF in mg/kg	0.0007168	0.0001347				6.195E-05	0.0001499	0.0005505	0.00151	4.524E-05
Total PeCDD in mg/kg	3.236E-05	5.79E-07				1.76E-07 U	2.983E-06	2.106E-06	0.0000122	1.17E-07 U
Total PeCDF in mg/kg	0.0005515	0.0001345				4.574E-05	6.766E-05	0.0003258	0.00144	3.847E-05
Total TCDD in mg/kg	3.132E-05	1.704E-06				4.23E-07	2.12E-06	1.127E-05	0.0000137	5.68E-07
2,3,7,8-TCDD in mg/kg	7.35E-07 J	1.72E-06 U				1.22E-07 U	3.57E-07 J	1.268E-06 J	1.65E-06	1.02E-07 U
1,2,3,7,8-PeCDD in mg/kg	2.352E-06 J	5.79E-07 J				1.76E-07 U	7.83E-07 J	6.34E-07 U	7.52E-07 U	1.17E-07 U
1,2,3,4,7,8-HxCDD in mg/kg	3.829E-06 J	8.604E-06 U				2.94E-07 U	8.28E-07 J	1.491E-06 U	3.65E-06 J	2.24E-07 U
1,2,3,6,7,8-HxCDD in mg/kg	1.765E-05 J	2.918E-06 J				7.12E-07 J	2.92E-06 J	4.505E-06 J	0.000011	3.44E-07 U
1,2,3,7,8,9-HxCDD in mg/kg	1.104E-05 J	1.966E-06 J				3.23E-07 U	5.26E-07 U	4.258E-06 J	6.27E-06 J	2.6E-07 U
1,2,3,4,6,7,8-HpCDD in mg/kg	0.0002881	4.218E-05				2.18E-05	3.027E-05	9.489E-05	0.00023	9.677E-06
OCDD in mg/kg	0.0025564	0.0003826				0.0002021	0.0002416	0.0005785	0.00233	8.558E-05
2,3,7,8-TCDF in mg/kg	8.342E-05	1.744E-05				1.067E-05	1.697E-05	0.0001282	0.000743	2.428E-05
1,2,3,7,8-PeCDF in mg/kg	9.598E-05	2.381E-05				8.905E-06 J	1.647E-05	0.0001043 J	0.000472	8.996E-06
2,3,4,7,8-PeCDF in mg/kg	4.894E-05	1.16E-05				4.451E-06 J	7.915E-06 J	3.334E-05	0.000173	3.976E-06 J
1,2,3,4,7,8-HxCDF in mg/kg	0.00018	4.017E-05				2.053E-05	4.964E-05	0.0002874 J	0.000777	1.651E-05
1,2,3,6,7,8-HxCDF in mg/kg	5.15E-05	1.111E-05				6.242E-06 J	1.24E-05	8.352E-05 J	0.00018	4.055E-06 J
1,2,3,7,8,9-HxCDF in mg/kg	2.763E-06 J	8.9E-07 J				1.122E-06 U	2.246E-06 J	2.579E-06 U	0.0000124	6.4E-07 U
2,3,4,6,7,8-HxCDF in mg/kg	1.212E-05 J	4.363E-06 J				1.885E-06 J	0.0000247	1.352E-05	0.0000672	3.246E-06 J
1,2,3,4,6,7,8-HpCDF in mg/kg	0.0001867	3.997E-05				4.073E-05	6.387E-05	0.0006356	0.000474	1.891E-05
1,2,3,4,7,8,9-HpCDF in mg/kg	6.113E-05	1.311E-05				1.177E-05	2.089E-05	0.0001392	0.000253	5.381E-06 J
OCDF in mg/kg	0.0010021	0.0001961				0.0002374	0.0002175	0.0021937	0.00207	8.689E-05
Pesticides										
4,4'-DDD in mg/kg				0.000266 U	0.0034 U	0.0027 U	0.0025 U		0.3 U	0.026 U
4,4'-DDE in mg/kg				0.00026 U	0.0034 U	0.0024 U	0.0022 U		0.27 U	0.024 U
4,4'-DDT in mg/kg				0.000306 UJ	0.0034 U	0.0006 U	0.0005 U		0.066 U	0.0059 U
Aldrin in mg/kg				0.000134 U	0.0017 U	0.0021 U	0.0019 U		0.23 U	0.021 U
cis-Chlordane in mg/kg				0.000141 U	0.0017 U	0.0031 U	0.0029 U		0.35 U	0.031 U
Dieldrin in mg/kg				0.000316 U	0.0034 U	0.0016 U	0.0015 U		0.18 U	0.016 U
trans-Chlordane in mg/kg				0.000158 U	0.0017 U	0.0031 U	0.0029 U		0.35 U	0.031 U

Notes

Concentrations in shaded cells indicate value exceeds Sediment Screening Level (mg/kg)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-01 (4-5 ft.)	709-BH-01 (6-7 ft.)	709-BH-01 (15-16 ft.)	709-BH-01 (23-24 ft.)	709-BH-02 (1.5-3.5 ft.)	709-BH-02 (6.5-7.5 ft.)	709-BH-02 (15-16 ft.)	709-BH-02 (23-24 ft.)	709-BH-03 (1.5-2.5 ft.)	709-BH-03 (6-7 ft.)	709-BH-03 (9-10 ft.)	709-BH-03 (23-24 ft.)	709-BH-04 (1.5-2.5 ft.)	709-BH-04 (6.5-7.5 ft.)	709-BH-04 (9-10 ft.)	709-BH-04 (23-24 ft.)	709-BH-05 (4-5 ft.)
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene in mg/kg	210,000	0.0016 J	0.003 U	0.003 U	0.0031 U	0.0027 U	0.003 U	0.003 U	0.0031 U	0.0027 U	0.003 U	0.0031 U	0.0031 U	0.0038	1	0.014	0.0032 U	2.2
Acenaphthylene in mg/kg		0.0027 U	0.003 U	0.003 U	0.0031 U	0.0027 U	0.003 U	0.003 U	0.0031 U	0.0027 U	0.003 U	0.0031 U	0.0031 U	0.028	0.29 U	0.0037 U	0.0032 U	0.79 U
Anthracene in mg/kg	1,050,000	0.0027 U	0.003 U	0.003 U	0.0031 U	0.00074 J	0.003 U	0.003 U	0.00071 J	0.0027 U	0.003 U	0.0031 U	0.0031 U	0.032	0.28	0.00092 J	0.0032 U	0.38
Benzo(g,h,i)perylene in mg/kg																		
Benzo(j,k)fluoranthene in mg/kg																		
Fluoranthene in mg/kg	140,000	0.0027 U	0.003 U	0.003 U	0.0031 U	0.005	0.003 U	0.003 U	0.0031 U	0.003	0.003 U	0.0031 U	0.0031 U	0.18	0.13	0.0028 J	0.0032 U	0.14
Fluorene in mg/kg	140,000	0.0012 J	0.003 U	0.003 U	0.0031 U	0.0027 U	0.003 U	0.00065 J	0.0031 U	0.0027 U	0.003 U	0.0031 U	0.0031 U	0.0056	2.6	0.031	0.0032 U	3.9
Phenanthrene in mg/kg		0.0026 J	0.003 U	0.0038	0.0031 U	0.0042	0.003 U	0.003 U	0.0021 J	0.0043	0.003 U	0.0031 U	0.002 J	0.1	4.2	0.024	0.0025 J	7.1
Pyrene in mg/kg	105,000	0.0027 U	0.003 U	0.0012 J	0.0031 U	0.004	0.003 U	0.003 U	0.0031 U	0.0028	0.003 U	0.0031 U	0.0031 U	0.19	0.23	0.003 J	0.0032 U	0.41
1-Methylnaphthalene in mg/kg	4,500																	
2-Methylnaphthalene in mg/kg	14,000	0.0019 J	0.0016 J	0.0012 J	0.00081 J	0.001 J	0.00054 J	0.0012 J	0.0018 J	0.0049	0.003 U	0.00083 J	0.00086 J	0.031	21	0.083	0.0032 U	43
Naphthalene in mg/kg	6	0.0057	0.0032	0.0019 J	0.00063 J	0.00079 J	0.0012 J	0.001 J	0.00085 J	0.0028	0.003 U	0.00083 J	0.00061 J	0.019	4.8	0.17	0.0013 J	7.8
Benz(a)anthracene in mg/kg		0.0027 U	0.003 U	0.003 U	0.0031 U	0.0022 J	0.003 U	0.003 U	0.00083 J	0.0017 J	0.003 U	0.0031 U	0.0031 U	0.063	0.022 J	0.0017 J	0.0032 U	0.02 J
Benzo(a)pyrene in mg/kg		0.0027 U	0.003 U	0.003 U	0.0031 U	0.0028	0.003 U	0.003 U	0.0031 U	0.0018 J	0.003 U	0.0031 U	0.0031 U	0.11	0.061 U	0.0032 U	0.0032 U	0.054 U
Benzo(b)fluoranthene in mg/kg		0.0027 U	0.003 U	0.0011 J	0.0031 U	0.0053	0.003 U	0.003 U	0.0031 U	0.0037	0.003 U	0.0031 U	0.0031 U	0.21	0.061 U	0.0032 U	0.0032 U	0.054 U
Benzo(k)fluoranthene in mg/kg		0.0027 U	0.003 U	0.003 U	0.0031 U	0.0017 J	0.003 U	0.003 U	0.0031 U	0.0014 J	0.003 U	0.0031 U	0.0031 U	0.074	0.061 U	0.0032 U	0.0032 U	0.054 U
Chrysene in mg/kg		0.0027 U	0.003 U	0.0018 J	0.0031 U	0.0053	0.003 U	0.003 U	0.0031 U	0.0032	0.003 U	0.0031 U	0.0031 U	0.12	0.047 J	0.0019 J	0.0032 U	0.026 J
Dibenzo(a,h)anthracene in mg/kg		0.0027 U	0.003 U	0.003 U	0.0031 U	0.0011 J	0.003 U	0.003 U	0.0031 U	0.0027 U	0.003 U	0.0031 U	0.0031 U	0.043	0.061 U	0.0032 U	0.0032 U	0.054 U
Indeno(1,2,3-cd)pyrene in mg/kg		0.0027 U	0.003 U	0.003 U	0.0031 U	0.0036	0.003 U	0.003 U	0.0031 U	0.0035	0.003 U	0.0031 U	0.0031 U	0.21	0.061 U	0.0032 U	0.0032 U	0.054 U
Total cPAHs TEQ (ND = 1/2 RDL) in mg/kg	10	ND	ND	0.0022 J	ND	0.0042 J	ND	ND	0.0023 J	0.003 J	ND	ND	ND	0.17	0.045 J	0.0024 J	ND	0.04 J
Other (Non-PAH) Semivolatiles																		
1,2,4-Trichlorobenzene in mg/kg																		
1,2,4-Trimethylbenzene in mg/kg																		
1,2-Dichlorobenzene in mg/kg																		
1,3,5-Trimethylbenzene in mg/kg	35,000																	
1,3-Dichlorobenzene in mg/kg																		
1,4-Dichlorobenzene in mg/kg																		
2,4,5-Trichlorophenol in mg/kg																		
2,4,6-Trichlorophenol in mg/kg																		
2,4-Dichlorophenol in mg/kg																		
2,4-Dimethylphenol in mg/kg																		
2,4-Dinitrophenol in mg/kg																		
2-Chloronaphthalene in mg/kg																		
2-Chlorophenol in mg/kg																		
2-Methylphenol in mg/kg																		
2-Nitroaniline in mg/kg																		
2-Nitrophenol in mg/kg																		
3,3'-Dichlorobenzidine in mg/kg																		
3-Nitroaniline in mg/kg																		
4,6-Dinitro-2-methylphenol in mg/kg																		
4-Bromophenyl phenyl ether in mg/kg																		
4-Chloro-3-methylphenol in mg/kg																		
4-Chloroaniline in mg/kg																		
4-Chlorophenyl phenyl ether in mg/kg																		
4-Methylphenol in mg/kg																		
4-Nitroaniline in mg/kg																		
4-Nitrophenol in mg/kg																		
Benzoic acid in mg/kg																		
Benzyl alcohol in mg/kg																		
Benzyl butyl phthalate in mg/kg																		
Bis(2-chloro-1-methylethyl) ether in mg/kg																		
Bis(2-chloroethoxy)methane in mg/kg																		
Bis(2-chloroethyl) ether in mg/kg																		
Bis(2-ethylhexyl) phthalate in mg/kg	0.03																	
Carbazole in mg/kg																		
Dibenzofuran in mg/kg	3,500																	

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-01 5/16/12 (4-5 ft.)	709-BH-01 5/16/12 (6-7 ft.)	709-BH-01 5/16/12 (15-16 ft.)	709-BH-01 5/16/12 (23-24 ft.)	709-BH-02 5/16/12 (1.5-3.5 ft.)	709-BH-02 5/16/12 (6.5-7.5 ft.)	709-BH-02 5/16/12 (15-16 ft.)	709-BH-02 5/16/12 (23-24 ft.)	709-BH-03 5/16/12 (1.5-2.5 ft.)	709-BH-03 5/16/12 (6-7 ft.)	709-BH-03 5/16/12 (9-10 ft.)	709-BH-03 5/16/12 (23-24 ft.)	709-BH-04 5/16/12 (1.5-2.5 ft.)	709-BH-04 5/16/12 (6.5-7.5 ft.)	709-BH-04 5/16/12 (9-10 ft.)	709-BH-04 5/16/12 (23-24 ft.)	709-BH-05 5/17/12 (4-5 ft.)
Diethyl phthalate in mg/kg	2,800,000																	
Dimethyl phthalate in mg/kg																		
Di-n-butyl phthalate in mg/kg																		
Di-n-octyl phthalate in mg/kg																		
Hexachlorobenzene in mg/kg	0.01																	
Hexachlorobutadiene in mg/kg	0.01																	
Hexachlorocyclopentadiene in mg/kg																		
Hexachloroethane in mg/kg																		
Isophorone in mg/kg																		
Nitrobenzene in mg/kg																		
N-Nitroso-di-n-propylamine in mg/kg																		
N-Nitrosodiphenylamine in mg/kg																		
Pentachlorophenol in mg/kg	0.1																	
Phenol in mg/kg	1,050,000																	
2,4-Dinitrotoluene in mg/kg																		
2,6-Dinitrotoluene in mg/kg																		
Polychlorinated Biphenyls (PCBs)																		
Aroclor 1016 in mg/kg		0.0054 U	0.0061 U	0.0061 U	0.0062 U	0.0054 U	0.0059 U	0.006 U	0.0062 U	0.0053 U	0.006 U	0.006 U	0.0062 U	0.0054 U	0.06 U	0.0062 U	0.0063 U	0.015 U
Aroclor 1221 in mg/kg		0.011 U	0.013 U	0.013 U	0.013 U	0.011 U	0.012 U	0.012 U	0.013 U	0.011 U	0.012 U	0.012 U	0.013 U	0.011 U	0.12 U	0.013 U	0.013 U	0.014 U
Aroclor 1232 in mg/kg		0.0054 U	0.0061 U	0.0061 U	0.0062 U	0.0054 U	0.0059 U	0.006 U	0.0062 U	0.0053 U	0.006 U	0.006 U	0.0062 U	0.0054 U	0.06 U	0.0062 U	0.0063 U	0.0078 U
Aroclor 1242 in mg/kg		0.0054 U	0.0061 U	0.0061 U	0.0062 U	0.0054 U	0.0059 U	0.006 U	0.0062 U	0.0053 U	0.006 U	0.006 U	0.0062 U	0.0054 U	0.06 U	0.0062 U	0.0063 U	0.02 U
Aroclor 1248 in mg/kg		0.0054 U	0.0061 U	0.0061 U	0.0062 U	0.0054 U	0.0059 U	0.006 U	0.0062 U	0.0053 U	0.006 U	0.006 U	0.0062 U	0.0054 U	0.06 U	0.0062 U	0.0063 U	0.012 U
Aroclor 1254 in mg/kg		0.0054 U	0.0061 U	0.0061 U	0.0062 U	0.0054 U	0.0059 U	0.006 U	0.0062 U	0.0053 U	0.006 U	0.006 U	0.0062 U	0.14	0.06 U	0.0062 U	0.0063 U	0.008 U
Aroclor 1260 in mg/kg		0.0054 U	0.0061 U	0.0061 U	0.0062 U	0.0054 U	0.0059 U	0.006 U	0.0062 U	0.0053 U	0.006 U	0.006 U	0.0062 U	0.0054 U	0.06 U	0.0062 U	0.0063 U	0.0054 U
Aroclor 1262 in mg/kg																		
Aroclor 1268 in mg/kg																		
Total PCBs (Sum of Aroclors) in mg/kg		0.0054 U	0.0061 U	0.0061 U	0.0062 U	0.0054 U	0.0059 U	0.006 U	0.0062 U	0.0053 U	0.006 U	0.006 U	0.0062 U	0.14	0.06 U	0.0062 U	0.0063 U	0.008 U
PCB 70 in mg/kg																		
PCB 77 in mg/kg																		
PCB 81 in mg/kg																		
PCB 99 in mg/kg																		
PCB 105 in mg/kg																		
PCB 114 in mg/kg																		
PCB 118 in mg/kg																		
PCB 123 in mg/kg																		
PCB 126 in mg/kg																		
PCB 156 in mg/kg																		
PCB 167 in mg/kg																		
PCB 169 in mg/kg																		
PCB 170 in mg/kg																		
PCB 180 in mg/kg																		
PCB 183 in mg/kg																		
PCB 187 in mg/kg																		
PCB 189 in mg/kg																		
Dioxins/Furans																		
Tetrachlorodibenzofurans (TCDF), Total in mg/kg																		
Total HpCDD in mg/kg																		
Total HpCDF in mg/kg																		
Total HxCDD in mg/kg																		
Total HxCDF in mg/kg																		
Total PeCDD in mg/kg																		
Total PeCDF in mg/kg																		
Total TCDD in mg/kg																		
2,3,7,8-TCDD in mg/kg																		
1,2,3,7,8-PeCDD in mg/kg																		
1,2,3,4,7,8-HxCDD in mg/kg																		
1,2,3,6,7,8-HxCDD in mg/kg																		

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-01 (4-5 ft.)	709-BH-01 (6-7 ft.)	709-BH-01 (15-16 ft.)	709-BH-01 (23-24 ft.)	709-BH-02 (1.5-3.5 ft.)	709-BH-02 (6.5-7.5 ft.)	709-BH-02 (15-16 ft.)	709-BH-02 (23-24 ft.)	709-BH-03 (1.5-2.5 ft.)	709-BH-03 (6-7 ft.)	709-BH-03 (9-10 ft.)	709-BH-03 (23-24 ft.)	709-BH-04 (1.5-2.5 ft.)	709-BH-04 (6.5-7.5 ft.)	709-BH-04 (9-10 ft.)	709-BH-04 (23-24 ft.)	709-BH-05 (4-5 ft.)
1,2,3,7,8,9-HxCDD in mg/kg																		
1,2,3,4,6,7,8-HpCDD in mg/kg																		
OCDD in mg/kg																		
2,3,7,8-TCDF in mg/kg																		
1,2,3,7,8-PeCDF in mg/kg																		
2,3,4,7,8-PeCDF in mg/kg																		
1,2,3,4,7,8-HxCDF in mg/kg																		
1,2,3,6,7,8-HxCDF in mg/kg																		
1,2,3,7,8,9-HxCDF in mg/kg																		
2,3,4,6,7,8-HxCDF in mg/kg																		
1,2,3,4,6,7,8-HpCDF in mg/kg																		
1,2,3,4,7,8,9-HpCDF in mg/kg																		
OCDF in mg/kg																		
Pesticides																		
4,4'-DDD in mg/kg																		
4,4'-DDE in mg/kg																		
4,4'-DDT in mg/kg																		
Aldrin in mg/kg																		
cis-Chlordane in mg/kg																		
Dieldrin in mg/kg																		
trans-Chlordane in mg/kg																		
Chlorinated Herbicides																		
Pentachlorophenol in mg/kg	0.1																	
Field Parameters																		
ORP in mVolts																		

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

AVG - Average

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

T - Reported result below associated quantitation limit but above MDL

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-05 5/17/12 (7-8.5 ft.)	709-BH-05 5/20/12 (17-18 ft.)	709-BH-05 5/17/12 (23-24 ft.)	709-BH-06 5/17/12 (2.5-4 ft.)	709-BH-06 5/17/12 (10-11 ft.)	709-MW-06-15 5/19/12 (15 ft.)	709-BH-06 5/20/12 (16-17 ft.)	709-BH-06 5/17/12 (23-24 ft.)	709-BH-07 5/17/12 (3.75-5 ft.)	709-BH-07 5/17/12 (6.25-7.5 ft.)	709-BH-07 5/17/12 (15-16 ft.)	709-BH-07 5/17/12 (23-24 ft.)	709-BH-08 5/18/12 (3.75-4.75 ft.)	709-BH-08 5/18/12 (6.5-7.5 ft.)	709-BH-08 5/18/12 (16-17 ft.)	709-BH-08 5/18/12 (23-24 ft.)	709-BH-09 5/18/12 (3.75-5 ft.)
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene in mg/kg	210,000	1.2	0.0069	0.0031 U	1.3 J	0.003 U	0.0031 U	0.0069	0.003 U	1.1	1.7	0.01	0.0049 U	0.16	3.1	0.0022 J	0.0053 U	0.14
Acenaphthylene in mg/kg		0.73 U	0.0039 J	0.0031 U	0.38 U	0.003 U	0.0029	0.0026 J	0.003 U	0.32 U	0.51 U	0.005 U	0.0049 U	0.038 U	0.94 U	0.0014 J	0.0053 U	0.073 U
Anthracene in mg/kg	1,050,000	0.23 J	0.0079	0.0031 U	0.21 J	0.003 U	0.0016 J	0.0061	0.003 U	0.26	0.58	0.0088	0.0049 U	0.16 U	0.96	0.0045 J	0.0053 U	0.28 U
Benzo(g,h,i)perylene in mg/kg																		
Benzo(j,k)fluoranthene in mg/kg																		
Fluoranthene in mg/kg	140,000	0.03 J	0.034	0.0031 U	0.061 J	0.003 U	0.0031 U	0.028	0.003 U	0.069	0.08	0.036	0.0049 U	0.011	0.12	0.015	0.0011 J	0.026
Fluorene in mg/kg	140,000	2.6	0.014	0.00084 J	1.9 J	0.001 J	0.0031 U	0.011	0.00068 J	1.9	3.3	0.011	0.001 J	0.31	5.3	0.0063	0.0013 J	0.54
Phenanthrene in mg/kg		1.5	0.041	0.0047	4.5 J	0.005	0.0034	0.036	0.0026 J	4.4	7.6	0.044	0.0064	0.98	11	0.024	0.0048 J	1.2
Pyrene in mg/kg	105,000	0.088	0.027	0.00082 J	0.12 J	0.003 U	0.026	0.022	0.003 U	0.13	0.13	0.024	0.0049 U	0.03	0.3	0.013	0.0014 J	0.094
1-Methylnaphthalene in mg/kg	4,500																	
2-Methylnaphthalene in mg/kg	14,000	9.9	0.024	0.0042 U	23 J	0.0071	0.0037	0.028	0.0038 U	13	24	0.05	0.0089	1.5	62	0.019	0.0053 U	1.9 J
Naphthalene in mg/kg	6	3.6	0.016	0.0013 J	3.9 J	0.0011 J	0.0012 J	0.017	0.0009 J	1.1	2.6	0.12	0.0075	0.068	5.3	0.011	0.002 J	0.095 J
Benz(a)anthracene in mg/kg		0.0045	0.009	0.00082 J	0.0059	0.003 U	0.00073 J	0.0081	0.003 U	0.0074 J	0.0085 J	0.0066	0.00077 J	0.009	0.0081 J	0.0041 J	0.0011 J	0.0035 J
Benzo(a)pyrene in mg/kg		0.0031 U	0.0056	0.0031 U	0.0046	0.003 U	0.0031 U	0.0055	0.003 U	0.048 U	0.05 U	0.0036 J	0.0049 U	0.0053 U	0.047 U	0.0027 J	0.0053 U	0.0013 J
Benzo(b)fluoranthene in mg/kg		0.0022 J	0.0077	0.0031 U	0.0035	0.003 U	0.0031 U	0.0069	0.003 U	0.048 U	0.05 U	0.0081	0.0049 U	0.0053 U	0.047 U	0.0027 J	0.0053 U	0.0013 J
Benzo(k)fluoranthene in mg/kg		0.0031 U	0.0024 J	0.0031 U	0.0029 U	0.003 U	0.0031 U	0.0022 J	0.003 U	0.048 U	0.05 U	0.005 U	0.0049 U	0.0053 U	0.047 U	0.0018 J	0.0053 U	0.005 U
Chrysene in mg/kg		0.0082	0.013	0.00095 J	0.011 J	0.003 U	0.00094 J	0.012	0.003 U	0.016 J	0.018 J	0.016	0.0049 U	0.0053 U	0.028 J	0.0067	0.0014 J	0.0089
Dibenzo(a,h)anthracene in mg/kg		0.0031 U	0.00086 J	0.0031 U	0.0012 J	0.003 U	0.0031 U	0.00084 J	0.003 U	0.048 U	0.05 U	0.005 U	0.0049 U	0.0053 U	0.047 U	0.0051 U	0.0053 U	0.005 U
Indeno(1,2,3-cd)pyrene in mg/kg		0.00099 J	0.0048 U	0.0031 U	0.0018 J	0.003 U	0.014	0.005 U	0.003 U	0.048 U	0.05 U	0.0024 J	0.0049 U	0.0053 U	0.047 U	0.0021 J	0.0053 U	0.0011 J
Total cPAHs TEQ (ND = 1/2 RDL) in mg/kg	10	0.0028 J	0.008 J	0.0023 J	0.0061 J	ND	0.0023 J	0.0077 J	ND	0.034 J	0.036 J	0.006 J	0.0035 J	0.0046	0.035 J	0.0041 J	0.0038 J	0.0025 J
Other (Non-PAH) Semivolatiles																		
1,2,4-Trichlorobenzene in mg/kg																		
1,2,4-Trimethylbenzene in mg/kg																		
1,2-Dichlorobenzene in mg/kg																		
1,3,5-Trimethylbenzene in mg/kg	35,000																	
1,3-Dichlorobenzene in mg/kg																		
1,4-Dichlorobenzene in mg/kg																		
2,4,5-Trichlorophenol in mg/kg																		
2,4,6-Trichlorophenol in mg/kg																		
2,4-Dichlorophenol in mg/kg																		
2,4-Dimethylphenol in mg/kg																		
2,4-Dinitrophenol in mg/kg																		
2-Chloronaphthalene in mg/kg																		
2-Chlorophenol in mg/kg																		
2-Methylphenol in mg/kg																		
2-Nitroaniline in mg/kg																		
2-Nitrophenol in mg/kg																		
3,3'-Dichlorobenzidine in mg/kg																		
3-Nitroaniline in mg/kg																		
4,6-Dinitro-2-methylphenol in mg/kg																		
4-Bromophenyl phenyl ether in mg/kg																		
4-Chloro-3-methylphenol in mg/kg																		
4-Chloroaniline in mg/kg																		
4-Chlorophenyl phenyl ether in mg/kg																		
4-Methylphenol in mg/kg																		
4-Nitroaniline in mg/kg																		
4-Nitrophenol in mg/kg																		
Benzoic acid in mg/kg																		
Benzyl alcohol in mg/kg																		
Benzyl butyl phthalate in mg/kg																		
Bis(2-chloro-1-methylethyl) ether in mg/kg																		
Bis(2-chloroethoxy)methane in mg/kg																		
Bis(2-chloroethyl) ether in mg/kg																		
Bis(2-ethylhexyl) phthalate in mg/kg	0.03																	
Carbazole in mg/kg																		
Dibenzofuran in mg/kg	3,500																	

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-05 5/17/12 (7-8.5 ft.)	709-BH-05 5/20/12 (17-18 ft.)	709-BH-05 5/17/12 (23-24 ft.)	709-BH-06 5/17/12 (2.5-4 ft.)	709-BH-06 5/17/12 (10-11 ft.)	709-MW-06-15 5/19/12 (15 ft.)	709-BH-06 5/20/12 (16-17 ft.)	709-BH-06 5/17/12 (23-24 ft.)	709-BH-07 5/17/12 (3.75-5 ft.)	709-BH-07 5/17/12 (6.25-7.5 ft.)	709-BH-07 5/17/12 (15-16 ft.)	709-BH-07 5/17/12 (23-24 ft.)	709-BH-08 5/18/12 (3.75-4.75 ft.)	709-BH-08 5/18/12 (6.5-7.5 ft.)	709-BH-08 5/18/12 (16-17 ft.)	709-BH-08 5/18/12 (23-24 ft.)	709-BH-09 5/18/12 (3.75-5 ft.)
Diethyl phthalate in mg/kg	2,800,000																	
Dimethyl phthalate in mg/kg																		
Di-n-butyl phthalate in mg/kg																		
Di-n-octyl phthalate in mg/kg																		
Hexachlorobenzene in mg/kg	0.01																	
Hexachlorobutadiene in mg/kg	0.01																	
Hexachlorocyclopentadiene in mg/kg																		
Hexachloroethane in mg/kg																		
Isophorone in mg/kg																		
Nitrobenzene in mg/kg																		
N-Nitroso-di-n-propylamine in mg/kg																		
N-Nitrosodiphenylamine in mg/kg																		
Pentachlorophenol in mg/kg	0.1																	
Phenol in mg/kg	1,050,000																	
2,4-Dinitrotoluene in mg/kg																		
2,6-Dinitrotoluene in mg/kg																		
Polychlorinated Biphenyls (PCBs)																		
Aroclor 1016 in mg/kg		0.0061 U	0.01 U	0.0063 U	0.022 U	0.006 U		0.01 U	0.006 U	0.04 U	0.019 U	0.01 U	0.0099 U	0.0099 U	0.056 U	0.01 U	0.01 U	0.01 U
Aroclor 1221 in mg/kg		0.013 U	0.02 U	0.013 U	0.028 U	0.012 U		0.02 U	0.012 U	0.021 U	0.11 U	0.02 U	0.02 U	0.02 U	0.021 U	0.033 U	0.02 U	0.02 U
Aroclor 1232 in mg/kg		0.0061 U	0.01 U	0.0063 U	0.012 U	0.006 U		0.01 U	0.006 U	0.014 U	0.12 U	0.01 U	0.0099 U	0.0099 U	0.032 U	0.01 U	0.01 U	0.01 U
Aroclor 1242 in mg/kg		0.0063 U	0.01 U	0.0063 U	0.068 U	0.006 U		0.01 U	0.006 U	0.061 U	0.023 U	0.01 U	0.0099 U	0.0099 U	0.11 U	0.01 U	0.01 U	0.012 U
Aroclor 1248 in mg/kg		0.0061 U	0.01 U	0.0063 U	0.018 U	0.006 U		0.01 U	0.006 U	0.011 U	0.01 U	0.01 U	0.0099 U	0.0099 U	0.045 U	0.01 U	0.01 U	0.01 U
Aroclor 1254 in mg/kg		0.0061 U	0.01 U	0.0063 U	0.025 U	0.006 U		0.01 U	0.006 U	0.011 U	0.01 U	0.01 U	0.0099 U	0.0099 U	0.032 U	0.01 U	0.01 U	0.01 U
Aroclor 1260 in mg/kg		0.0061 U	0.01 U	0.0063 U	0.0058 U	0.006 U		0.01 U	0.006 U	0.011 U	0.01 U	0.01 U	0.0099 U	0.0099 U	0.0099 U	0.01 U	0.01 U	0.01 U
Aroclor 1262 in mg/kg																		
Aroclor 1268 in mg/kg																		
Total PCBs (Sum of Aroclors) in mg/kg		0.0063 U	0.02 U	0.0063 U	0.068 U	0.006 U		0.02 U	0.006 U	0.061 U	0.023 U	0.02 U	0.0099 U	0.0099 U	0.0099 U	0.033 U	0.02 U	0.02 U
PCB 70 in mg/kg																		
PCB 77 in mg/kg																		
PCB 81 in mg/kg																		
PCB 99 in mg/kg																		
PCB 105 in mg/kg																		
PCB 114 in mg/kg																		
PCB 118 in mg/kg																		
PCB 123 in mg/kg																		
PCB 126 in mg/kg																		
PCB 156 in mg/kg																		
PCB 167 in mg/kg																		
PCB 169 in mg/kg																		
PCB 170 in mg/kg																		
PCB 180 in mg/kg																		
PCB 183 in mg/kg																		
PCB 187 in mg/kg																		
PCB 189 in mg/kg																		
Dioxins/Furans																		
Tetrachlorodibenzofurans (TCDF), Total in mg/kg																		
Total HpCDD in mg/kg																		
Total HpCDF in mg/kg																		
Total HxCDD in mg/kg																		
Total HxCDF in mg/kg																		
Total PeCDD in mg/kg																		
Total PeCDF in mg/kg																		
Total TCDD in mg/kg																		
2,3,7,8-TCDD in mg/kg																		
1,2,3,7,8-PeCDD in mg/kg																		
1,2,3,4,7,8-HxCDD in mg/kg																		
1,2,3,6,7,8-HxCDD in mg/kg																		

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-05 5/17/12 (7-8.5 ft.)	709-BH-05 5/20/12 (17-18 ft.)	709-BH-05 5/17/12 (23-24 ft.)	709-BH-06 5/17/12 (2.5-4 ft.)	709-BH-06 5/17/12 (10-11 ft.)	709-MW-06-15 5/19/12 (15 ft.)	709-BH-06 5/20/12 (16-17 ft.)	709-BH-06 5/17/12 (23-24 ft.)	709-BH-07 5/17/12 (3.75-5 ft.)	709-BH-07 5/17/12 (6.25-7.5 ft.)	709-BH-07 5/17/12 (15-16 ft.)	709-BH-07 5/17/12 (23-24 ft.)	709-BH-08 5/18/12 (3.75-4.75 ft.)	709-BH-08 5/18/12 (6.5-7.5 ft.)	709-BH-08 5/18/12 (16-17 ft.)	709-BH-08 5/18/12 (23-24 ft.)	709-BH-09 5/18/12 (3.75-5 ft.)	
1,2,3,7,8,9-HxCDD in mg/kg																			
1,2,3,4,6,7,8-HpCDD in mg/kg																			
OCDD in mg/kg																			
2,3,7,8-TCDF in mg/kg																			
1,2,3,7,8-PeCDF in mg/kg																			
2,3,4,7,8-PeCDF in mg/kg																			
1,2,3,4,7,8-HxCDF in mg/kg																			
1,2,3,6,7,8-HxCDF in mg/kg																			
1,2,3,7,8,9-HxCDF in mg/kg																			
2,3,4,6,7,8-HxCDF in mg/kg																			
1,2,3,4,6,7,8-HpCDF in mg/kg																			
1,2,3,4,7,8,9-HpCDF in mg/kg																			
OCDF in mg/kg																			
Pesticides																			
4,4'-DDD in mg/kg																			
4,4'-DDE in mg/kg																			
4,4'-DDT in mg/kg																			
Aldrin in mg/kg																			
cis-Chlordane in mg/kg																			
Dieldrin in mg/kg																			
trans-Chlordane in mg/kg																			
Chlorinated Herbicides																			
Pentachlorophenol in mg/kg	0.1																		
Field Parameters																			
ORP in mVolts																			

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

AVG - Average

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

T - Reported result below associated quantitation limit but above MDL

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-09 (6.5-7.5 ft.)	709-BH-09 (17-18 ft.)	709-BH-09 (23-24 ft.)	709-BH-10 (4-5 ft.)	709-BH-10 (7.25-8.75 ft.)	709-BH-10 (16-17 ft.)	709-BH-10 (23-24 ft.)	709-BH-11 (1.5-3 ft.)	709-BH-11 (5.5-6.75 ft.)	709-BH-11 (14-15 ft.)	709-BH-11 (23-24 ft.)	709-MW18(BH-12) (2-3 ft.)	709-MW18(BH-12) (7.5-9 ft.)	709-MW18(BH-12) (15-16 ft.)	709-MW18(BH-12) (22-24 ft.)	709-BH-12B (5 ft.)	709-BH-12B (9 ft.)
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene in mg/kg	210,000	1.2	0.013	0.005 U	0.0048 U	0.37	0.0028 J	0.0057 U	0.0027 U	2.5	0.013	0.003 U	0.005 U	0.005 U	0.0015 J	0.005 U	0.005 U	0.005 U
Acenaphthylene in mg/kg		0.33 U	0.0049 U	0.005 U	0.0048 U	0.13 U	0.0021 J	0.0057 U	0.0027 U	0.75 U	0.0042 U	0.003 U	0.0032 J	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Anthracene in mg/kg	1,050,000	0.21	0.0085	0.005 U	0.0048 U	0.083	0.0036 J	0.0057 U	0.0027 U	0.53	0.00079 J	0.0011 J	0.0092	0.005 U	0.0043 J	0.005 U	0.005 U	0.005 U
Benzo(g,h,i)perylene in mg/kg																		
Benzo(j,k)fluoranthene in mg/kg																		
Fluoranthene in mg/kg	140,000	0.061	0.041	0.005 U	0.0048 U	0.026 J	0.014	0.0057 U	0.0027 U	0.14 J	0.0018 J	0.003 U	0.032	0.005 U	0.0068	0.005 U	0.005 U	0.005 U
Fluorene in mg/kg	140,000	2	0.013	0.00092 J	0.0018 J	0.81	0.0059	0.0057 U	0.00062 J	4.6	0.021	0.00075 J	0.0013 J	0.005 U	0.0028 J	0.005 U	0.005 U	0.005 U
Phenanthrene in mg/kg		3.9	0.034	0.0036 J	0.0075	1.5	0.024	0.0037 J	0.0021 J	9.2	0.005	0.0057	0.021	0.005 U	0.014	0.0037 J	0.0035 J	0.0024 J
Pyrene in mg/kg	105,000	0.15	0.034	0.005 U	0.00076 J	0.069	0.01	0.0057 U	0.0027 U	0.2	0.0017 J	0.0013 J	0.034	0.005 U	0.0054	0.00086 J	0.0008 J	0.005 U
1-Methylnaphthalene in mg/kg	4,500																	
2-Methylnaphthalene in mg/kg	14,000	25	0.016	0.0059 U	0.019	3.7	0.013	0.0057 U	0.018 J	53	0.013	0.0022 J	0.025	0.0008 J	0.021	0.0018 J	0.0026 J	0.0023 J
Naphthalene in mg/kg	6	0.4	0.065	0.00098 J	0.0065	0.14	0.0077	0.00095 J	0.0087 J	0.6	0.024	0.00084 J	0.012	0.0009 J	0.012	0.00084 J	0.0011 J	0.0014 J
Benz(a)anthracene in mg/kg		0.0076 J	0.011	0.00088 J	0.00089 J	0.048 U	0.0047 J	0.0012 J	0.0027 U	0.15 U	0.0013 J	0.00092 J	0.01	0.005 U	0.0029 J	0.005 U	0.001 J	0.00079 J
Benzo(a)pyrene in mg/kg		0.049 U	0.0057	0.005 U	0.0048 U	0.048 U	0.0023 J	0.0057 U	0.0027 U	0.15 U	0.0033 U	0.003 U	0.013	0.005 U	0.0016 J	0.005 U	0.005 U	0.005 U
Benzo(b)fluoranthene in mg/kg		0.049 U	0.0071	0.005 U	0.0048 U	0.048 U	0.0038 J	0.0057 U	0.0027 U	0.15 U	0.0033 U	0.003 U	0.026	0.005 U	0.0017 J	0.005 U	0.005 U	0.005 U
Benzo(k)fluoranthene in mg/kg		0.049 U	0.0041 J	0.005 U	0.0048 U	0.048 U	0.005 U	0.0057 U	0.0027 U	0.15 U	0.0033 U	0.003 U	0.017	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chrysene in mg/kg		0.015 J	0.014	0.00084 J	0.0048 U	0.048 U	0.0081	0.0057 U	0.0027 U	0.15 U	0.0019 J	0.0017 J	0.03	0.005 U	0.0044 J	0.001 J	0.001 J	0.005 U
Dibenzo(a,h)anthracene in mg/kg		0.049 U	0.00086 J	0.005 U	0.0048 U	0.048 U	0.005 U	0.0057 U	0.0027 U	0.15 U	0.0033 U	0.003 U	0.0025 J	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Indeno(1,2,3-cd)pyrene in mg/kg		0.049 U	0.0041 J	0.005 U	0.0048 U	0.048 U	0.0015 J	0.0057 U	0.0027 U	0.15 U	0.0033 U	0.003 U	0.015	0.005 U	0.00088 J	0.005 U	0.005 U	0.005 U
Total cPAHs TEQ (ND = 1/2 RDL) in mg/kg	10	0.035 J	0.0086 J	0.0036 J	0.0035 J	ND	0.0039 J	0.0041 J	ND	ND	0.0024 J	0.0022 J	0.02 J	ND	0.0027 J	0.0038 J	0.0036 J	0.0036 J
Other (Non-PAH) Semivolatiles																		
1,2,4-Trichlorobenzene in mg/kg																		
1,2,4-Trimethylbenzene in mg/kg																		
1,2-Dichlorobenzene in mg/kg																		
1,3,5-Trimethylbenzene in mg/kg	35,000																	
1,3-Dichlorobenzene in mg/kg																		
1,4-Dichlorobenzene in mg/kg																		
2,4,5-Trichlorophenol in mg/kg																		
2,4,6-Trichlorophenol in mg/kg																		
2,4-Dichlorophenol in mg/kg																		
2,4-Dimethylphenol in mg/kg																		
2,4-Dinitrophenol in mg/kg																		
2-Chloronaphthalene in mg/kg																		
2-Chlorophenol in mg/kg																		
2-Methylphenol in mg/kg																		
2-Nitroaniline in mg/kg																		
2-Nitrophenol in mg/kg																		
3,3'-Dichlorobenzidine in mg/kg																		
3-Nitroaniline in mg/kg																		
4,6-Dinitro-2-methylphenol in mg/kg																		
4-Bromophenyl phenyl ether in mg/kg																		
4-Chloro-3-methylphenol in mg/kg																		
4-Chloroaniline in mg/kg																		
4-Chlorophenyl phenyl ether in mg/kg																		
4-Methylphenol in mg/kg																		
4-Nitroaniline in mg/kg																		
4-Nitrophenol in mg/kg																		
Benzoic acid in mg/kg																		
Benzyl alcohol in mg/kg																		
Benzyl butyl phthalate in mg/kg																		
Bis(2-chloro-1-methylethyl) ether in mg/kg																		
Bis(2-chloroethoxy)methane in mg/kg																		
Bis(2-chloroethyl) ether in mg/kg																		
Bis(2-ethylhexyl) phthalate in mg/kg	0.03																	
Carbazole in mg/kg																		
Dibenzofuran in mg/kg	3,500																	

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-09 (6.5-7.5 ft.)	709-BH-09 (17-18 ft.)	709-BH-09 (23-24 ft.)	709-BH-10 (4-5 ft.)	709-BH-10 (7.25-8.75 ft.)	709-BH-10 (16-17 ft.)	709-BH-10 (23-24 ft.)	709-BH-11 (1.5-3 ft.)	709-BH-11 (5.5-6.75 ft.)	709-BH-11 (14-15 ft.)	709-BH-11 (23-24 ft.)	709-MW18(BH-12) (2-3 ft.)	709-MW18(BH-12) (7.5-9 ft.)	709-MW18(BH-12) (15-16 ft.)	709-MW18(BH-12) (22-24 ft.)	709-BH-12B (5 ft.)	709-BH-12B (9 ft.)
Diethyl phthalate in mg/kg	2,800,000																	
Dimethyl phthalate in mg/kg																		
Di-n-butyl phthalate in mg/kg																		
Di-n-octyl phthalate in mg/kg																		
Hexachlorobenzene in mg/kg	0.01																	
Hexachlorobutadiene in mg/kg	0.01																	
Hexachlorocyclopentadiene in mg/kg																		
Hexachloroethane in mg/kg																		
Isophorone in mg/kg																		
Nitrobenzene in mg/kg																		
N-Nitroso-di-n-propylamine in mg/kg																		
N-Nitrosodiphenylamine in mg/kg																		
Pentachlorophenol in mg/kg	0.1																	
Phenol in mg/kg	1,050,000																	
2,4-Dinitrotoluene in mg/kg																		
2,6-Dinitrotoluene in mg/kg																		
Polychlorinated Biphenyls (PCBs)																		
Aroclor 1016 in mg/kg		0.17 U	0.0099 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U									0.0053 U	0.0059 U
Aroclor 1221 in mg/kg		0.24 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U									0.011 U	0.012 U
Aroclor 1232 in mg/kg		0.56 U	0.0099 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U									0.0053 U	0.0059 U
Aroclor 1242 in mg/kg		0.34 U	0.0099 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U									0.0053 U	0.0059 U
Aroclor 1248 in mg/kg		0.077 U	0.0099 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U									0.0053 U	0.0059 U
Aroclor 1254 in mg/kg		0.032 U	0.0099 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U									0.0053 U	0.0059 U
Aroclor 1260 in mg/kg		0.01 U	0.0099 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U									0.0053 U	0.0059 U
Aroclor 1262 in mg/kg																		
Aroclor 1268 in mg/kg																		
Total PCBs (Sum of Aroclors) in mg/kg		0.077 U	0.0099 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U									0.0053 U	0.0059 U
PCB 70 in mg/kg																		
PCB 77 in mg/kg																		
PCB 81 in mg/kg																		
PCB 99 in mg/kg																		
PCB 105 in mg/kg																		
PCB 114 in mg/kg																		
PCB 118 in mg/kg																		
PCB 123 in mg/kg																		
PCB 126 in mg/kg																		
PCB 156 in mg/kg																		
PCB 167 in mg/kg																		
PCB 169 in mg/kg																		
PCB 170 in mg/kg																		
PCB 180 in mg/kg																		
PCB 183 in mg/kg																		
PCB 187 in mg/kg																		
PCB 189 in mg/kg																		
Dioxins/Furans																		
Tetrachlorodibenzofurans (TCDF), Total in mg/kg																		
Total HpCDD in mg/kg																		
Total HpCDF in mg/kg																		
Total HxCDD in mg/kg																		
Total HxCDF in mg/kg																		
Total PeCDD in mg/kg																		
Total PeCDF in mg/kg																		
Total TCDD in mg/kg																		
2,3,7,8-TCDD in mg/kg																		
1,2,3,7,8-PeCDD in mg/kg																		
1,2,3,4,7,8-HxCDD in mg/kg																		
1,2,3,6,7,8-HxCDD in mg/kg																		

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-09 5/18/12 (6.5-7.5 ft.)	709-BH-09 5/18/12 (17-18 ft.)	709-BH-09 5/18/12 (23-24 ft.)	709-BH-10 5/18/12 (4-5 ft.)	709-BH-10 5/18/12 (7.25-8.75 ft.)	709-BH-10 5/18/12 (16-17 ft.)	709-BH-10 5/18/12 (23-24 ft.)	709-BH-11 6/1/12 (1.5-3 ft.)	709-BH-11 6/1/12 (5.5-6.75 ft.)	709-BH-11 6/1/12 (14-15 ft.)	709-BH-11 6/1/12 (23-24 ft.)	709-MW18(BH-12) 6/3/12 (2-3 ft.)	709-MW18(BH-12) 6/3/12 (7.5-9 ft.)	709-MW18(BH-12) 6/3/12 (15-16 ft.)	709-MW18(BH-12) 6/3/12 (22-24 ft.)	709-BH-12B 10/2/12 (5 ft.)	709-BH-12B 10/2/12 (9 ft.)
1,2,3,7,8,9-HxCDD in mg/kg																		
1,2,3,4,6,7,8-HpCDD in mg/kg																		
OCDD in mg/kg																		
2,3,7,8-TCDF in mg/kg																		
1,2,3,7,8-PeCDF in mg/kg																		
2,3,4,7,8-PeCDF in mg/kg																		
1,2,3,4,7,8-HxCDF in mg/kg																		
1,2,3,6,7,8-HxCDF in mg/kg																		
1,2,3,7,8,9-HxCDF in mg/kg																		
2,3,4,6,7,8-HxCDF in mg/kg																		
1,2,3,4,6,7,8-HpCDF in mg/kg																		
1,2,3,4,7,8,9-HpCDF in mg/kg																		
OCDF in mg/kg																		
Pesticides																		
4,4'-DDD in mg/kg																		
4,4'-DDE in mg/kg																		
4,4'-DDT in mg/kg																		
Aldrin in mg/kg																		
cis-Chlordane in mg/kg																		
Dieldrin in mg/kg																		
trans-Chlordane in mg/kg																		
Chlorinated Herbicides																		
Pentachlorophenol in mg/kg	0.1																	
Field Parameters																		
ORP in mVolts																		

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

AVG - Average

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

T - Reported result below associated quantitation limit but above MDL

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-12B 10/2/12 (14 ft.)	709-BH-12B 10/2/12 (18.5 ft.)	709-BH-12B 10/2/12 (24.5 ft.)	709-MW-06-15 5/19/12 (15 ft.)	709-MW-20 6/2/12 (1.5-2.5 ft.)	709-MW-20 6/2/12 (5-6 ft.)	709-MW-20 6/2/12 (10-11 ft.)	709-MW-20 6/2/12 (15-16 ft.)	709-MW-20 6/2/12 (20-21 ft.)	709-MW-20 6/2/12 (24.5-25.5 ft.)	709-MW-21 6/1/12 (2.5-3.5 ft.)	709-MW-21 6/1/12 (9-10 ft.)	709-MW-21 6/1/12 (14-15 ft.)	709-MW-21 6/1/12 (23-24 ft.)	721-MW5-50 6/28/04 (50 ft.)	721-MW6-50 7/1/04 (50 ft.)	721-MW7-15 6/30/04 (15 ft.)
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene in mg/kg	210,000	0.005 U	0.0016 J	0.005 U	0.0031 U	0.0011 J	0.011	0.005 U	0.0049 U	0.012	0.0016 J	0.0029 U	0.083	0.0086	0.0031 U	0.062 U	0.02 U	0.019 U
Acenaphthylene in mg/kg		0.005 U	0.00089 J	0.005 U	0.0029	0.0094	0.0045 J	0.005 U	0.0049 U	0.0035 J	0.005 U	0.0029 U	0.021 U	0.0034 U	0.0031 U	0.062 U	0.036 U	0.019 U
Anthracene in mg/kg	1,050,000	0.00093 J	0.0021 J	0.005 U	0.0016 J	0.021	0.044	0.005 U	0.0049 U	0.013	0.005 U	0.0029 U	0.029	0.00096 J	0.0031 U	0.062 U	0.02 U	0.02 U
Benzo(g,h,i)perylene in mg/kg																0.062 U	0.036 U	0.019 U
Benzo(j,k)fluoranthene in mg/kg																		
Fluoranthene in mg/kg	140,000	0.0034 J	0.0078	0.0011 J	0.0031 U	0.094	0.29	0.0027 J	0.0034 J	0.11	0.005 U	0.0029 U	0.006	0.0013 J	0.0031 U	0.062 U	0.036 U	0.019 U
Fluorene in mg/kg	140,000	0.0015 J	0.0037 J	0.00062 J	0.0031 U	0.0031 J	0.012	0.005 U	0.00086 J	0.021	0.005 U	0.0029 U	0.17	0.011	0.0031 U	0.062 U	0.02 U	0.019 U
Phenanthrene in mg/kg		0.0087	0.014	0.0059	0.0034	0.029	0.18	0.0026 J	0.0061	0.04	0.005 U	0.0026 J	0.35	0.0059	0.0018 J	0.062 U	0.011 J	0.019 U
Pyrene in mg/kg	105,000	0.0034 J	0.0096	0.0013 J	0.026	0.11	0.26	0.0029 J	0.003 J	0.077	0.005 U	0.0029 U	0.011	0.0014 J	0.0031 U	0.062 U	0.039	0.025 U
1-Methylnaphthalene in mg/kg	4,500																	
2-Methylnaphthalene in mg/kg	14,000	0.0041 J	0.0091	0.0062	0.0037	0.011	0.017	0.0021 J	0.0037 J	0.014	0.0016 J	0.006	1.4	0.066	0.002 J	0.31	12	0.019 U
Naphthalene in mg/kg	6	0.23	0.0061	0.0017 J	0.0012 J	0.0063	0.021	0.0014 J	0.0037 J	0.022	0.03	0.0032	0.035	0.027	0.00069 J	0.19	3.5	0.019 U
Benz(a)anthracene in mg/kg		0.0018 J	0.0036 J	0.0013 J	0.00073 J	0.056	0.14	0.0016 J	0.0017 J	0.023	0.005 U	0.0029 U	0.0013 J	0.0013 J	0.0031 U	0.062 U	0.02 U	0.019 U
Benzo(a)pyrene in mg/kg		0.00079 J	0.0028 J	0.005 U	0.0031 U	0.071	0.15	0.0017 J	0.0011 J	0.012	0.005 U	0.0029 U	0.0031 U	0.0015 J	0.0031 U	0.062 U	0.02 U	0.019 U
Benzo(b)fluoranthene in mg/kg		0.0013 J	0.0032 J	0.005 U	0.0031 U	0.11	0.2	0.0023 J	0.0011 J	0.019	0.005 U	0.0029 U	0.0031 U	0.0012 J	0.0031 U	0.062 U	0.036 U	0.019 U
Benzo(k)fluoranthene in mg/kg		0.005 U	0.0012 J	0.005 U	0.0031 U	0.047	0.093	0.00099 J	0.0049 U	0.0077	0.005 U	0.0029 U	0.0031 U	0.0034 U	0.0031 U	0.062 U	0.02 U	0.019 U
Chrysene in mg/kg		0.0025 J	0.0053	0.0022 J	0.00094 J	0.065	0.19	0.0019 J	0.0021 J	0.028	0.005 U	0.0029 U	0.0044	0.0017 J	0.0031 U	0.062 U	0.02 U	0.019 U
Dibenzo(a,h)anthracene in mg/kg		0.005 U	0.0049 U	0.005 U	0.0031 U	0.022	0.031	0.005 U	0.0049 U	0.0024 J	0.005 U	0.0029 U	0.0031 U	0.0011 J	0.0031 U	0.062 U	0.02 U	0.019 U
Indeno(1,2,3-cd)pyrene in mg/kg		0.005 U	0.0014 J	0.005 U	0.014	0.094	0.14	0.005 U	0.0049 U	0.01	0.005 U	0.0029 U	0.0031 U	0.0023 J	0.0031 U	0.062 U	0.036 U	0.019 U
Total cPAHs TEQ (ND = 1/2 RDL) in mg/kg	10	0.0019 J	0.004 J	0.0037 J	0.0023 J	0.1	0.21	0.0027 J	0.0021 J	0.018 J	ND	ND	0.0024 J	0.0023 J	ND	ND	0.027 J	ND
Other (Non-PAH) Semivolatiles																		
1,2,4-Trichlorobenzene in mg/kg																0.062 U	0.036 U	0.0051 U
1,2,4-Trimethylbenzene in mg/kg																19	0.0063 U	0.0031
1,2-Dichlorobenzene in mg/kg																0.062 U	0.036 U	0.019 U
1,3,5-Trimethylbenzene in mg/kg	35,000															4.7	0.0012 U	0.001 U
1,3-Dichlorobenzene in mg/kg																0.062 U	0.16 U	0.15 U
1,4-Dichlorobenzene in mg/kg																0.062 U	0.0012 U	0.001 U
2,4,5-Trichlorophenol in mg/kg																0.31 U	0.18 U	0.096 U
2,4,6-Trichlorophenol in mg/kg																0.31 U	0.18 U	0.096 U
2,4-Dichlorophenol in mg/kg																0.19 U	0.06 U	0.075 U
2,4-Dimethylphenol in mg/kg																0.062 U	0.02 U	0.019 U
2,4-Dinitrophenol in mg/kg																0.62 U	0.2 U	0.19 U
2-Chloronaphthalene in mg/kg																0.062 U	0.02 U	0.019 U
2-Chlorophenol in mg/kg																0.062 U	0.02 U	0.019 U
2-Methylphenol in mg/kg																0.062 U	0.036 U	0.019 U
2-Nitroaniline in mg/kg																0.31 U	0.18 U	0.098 U
2-Nitrophenol in mg/kg																0.31 U	0.18 U	0.096 U
3,3'-Dichlorobenzidine in mg/kg																0.31 U	0.099 U	0.096 U
3-Nitroaniline in mg/kg																0.37 U	0.22 U	0.12 U
4,6-Dinitro-2-methylphenol in mg/kg																0.62 U	0.2 U	0.19 U
4-Bromophenyl phenyl ether in mg/kg																0.062 U	0.02 U	0.019 U
4-Chloro-3-methylphenol in mg/kg																0.12 U	0.04 U	0.039 U
4-Chloroaniline in mg/kg																0.19 U	0.06 U	0.058 U
4-Chlorophenyl phenyl ether in mg/kg																0.062 U	0.02 U	0.02 U
4-Methylphenol in mg/kg																0.062 U	0.02 U	0.019 U
4-Nitroaniline in mg/kg																0.31 U	0.18 U	0.096 U
4-Nitrophenol in mg/kg																0.31 U	0.099 U	0.096 U
Benzoic acid in mg/kg																0.62 U	0.2 U	0.19 U
Benzyl alcohol in mg/kg																0.062 U	0.02 U	0.019 U
Benzyl butyl phthalate in mg/kg																0.062 U	0.02 U	0.019 U
Bis(2-chloro-1-methylethyl) ether in mg/kg																0.062 U	0.02 U	0.019 U
Bis(2-chloroethoxy)methane in mg/kg																0.062 U	0.02 U	0.019 U
Bis(2-chloroethyl) ether in mg/kg																0.12 U	0.04 U	0.039 U
Bis(2-ethylhexyl) phthalate in mg/kg	0.03															0.062 U	0.036 U	0.02 U
Carbazole in mg/kg																0.062 U	0.036 U	0.019 U
Dibenzofuran in mg/kg	3,500															0.062 U	0.3	0.019 U

Aspect Consulting

2/26/2016

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Table B-16

RI

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-12B 10/2/12 (14 ft.)	709-BH-12B 10/2/12 (18.5 ft.)	709-BH-12B 10/2/12 (24.5 ft.)	709-MW-06-15 5/19/12 (15 ft.)	709-MW-20 6/2/12 (1.5-2.5 ft.)	709-MW-20 6/2/12 (5-6 ft.)	709-MW-20 6/2/12 (10-11 ft.)	709-MW-20 6/2/12 (15-16 ft.)	709-MW-20 6/2/12 (20-21 ft.)	709-MW-20 6/2/12 (24.5-25.5 ft.)	709-MW-21 6/1/12 (2.5-3.5 ft.)	709-MW-21 6/1/12 (9-10 ft.)	709-MW-21 6/1/12 (14-15 ft.)	709-MW-21 6/1/12 (23-24 ft.)	721-MW5-50 6/28/04 (50 ft.)	721-MW6-50 7/1/04 (50 ft.)	721-MW7-15 6/30/04 (15 ft.)
Diethyl phthalate in mg/kg	2,800,000															0.062 U	0.02 U	0.019 U
Dimethyl phthalate in mg/kg																0.062 U	0.036 U	0.025 U
Di-n-butyl phthalate in mg/kg																0.062 U	0.02 U	0.019 U
Di-n-octyl phthalate in mg/kg																0.062 U	0.02 U	0.019 U
Hexachlorobenzene in mg/kg	0.01															0.062 U	0.02 U	0.019 U
Hexachlorobutadiene in mg/kg	0.01															0.062 U	0.036 U	0.019 U
Hexachlorocyclopentadiene in mg/kg																2.7 U	0.099 U	0.13 U
Hexachloroethane in mg/kg																0.062 U	0.02 U	0.019 U
Isophorone in mg/kg																0.062 U	0.02 U	0.02 U
Nitrobenzene in mg/kg																0.062 U	0.036 U	0.019 U
N-Nitroso-di-n-propylamine in mg/kg																0.12 U	0.04 U	0.039 U
N-Nitrosodiphenylamine in mg/kg																0.53 U	0.036 U	0.019 U
Pentachlorophenol in mg/kg	0.1															0.31 U	0.18 U	0.096 U
Phenol in mg/kg	1,050,000															0.062 U	0.02 U	0.019 U
2,4-Dinitrotoluene in mg/kg																0.31 U	0.18 U	0.13 U
2,6-Dinitrotoluene in mg/kg																0.31 U	0.099 U	0.096 U
Polychlorinated Biphenyls (PCBs)																		
Aroclor 1016 in mg/kg		0.0067 U	0.0061 U	0.0061 U														
Aroclor 1221 in mg/kg		0.014 U	0.013 U	0.013 U														
Aroclor 1232 in mg/kg		0.0067 U	0.0061 U	0.0061 U														
Aroclor 1242 in mg/kg		0.0067 U	0.0061 U	0.0061 U														
Aroclor 1248 in mg/kg		0.0067 U	0.0061 U	0.0061 U														
Aroclor 1254 in mg/kg		0.0067 U	0.0061 U	0.0061 U														
Aroclor 1260 in mg/kg		0.0067 U	0.0061 U	0.0061 U														
Aroclor 1262 in mg/kg																		
Aroclor 1268 in mg/kg																		
Total PCBs (Sum of Aroclors) in mg/kg		0.0067 U	0.0061 U	0.0061 U														
PCB 70 in mg/kg																		
PCB 77 in mg/kg																		
PCB 81 in mg/kg																		
PCB 99 in mg/kg																		
PCB 105 in mg/kg																		
PCB 114 in mg/kg																		
PCB 118 in mg/kg																		
PCB 123 in mg/kg																		
PCB 126 in mg/kg																		
PCB 156 in mg/kg																		
PCB 167 in mg/kg																		
PCB 169 in mg/kg																		
PCB 170 in mg/kg																		
PCB 180 in mg/kg																		
PCB 183 in mg/kg																		
PCB 187 in mg/kg																		
PCB 189 in mg/kg																		
Dioxins/Furans																		
Tetrachlorodibenzofurans (TCDF), Total in mg/kg																		
Total HpCDD in mg/kg																		
Total HpCDF in mg/kg																		
Total HxCDD in mg/kg																		
Total HxCDF in mg/kg																		
Total PeCDD in mg/kg																		
Total PeCDF in mg/kg																		
Total TCDD in mg/kg																		
2,3,7,8-TCDD in mg/kg																		
1,2,3,7,8-PeCDD in mg/kg																		
1,2,3,4,7,8-HxCDD in mg/kg																		
1,2,3,6,7,8-HxCDD in mg/kg																		

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	709-BH-12B 10/2/12 (14 ft.)	709-BH-12B 10/2/12 (18.5 ft.)	709-BH-12B 10/2/12 (24.5 ft.)	709-MW-06-15 5/19/12 (15 ft.)	709-MW-20 6/2/12 (1.5-2.5 ft.)	709-MW-20 6/2/12 (5-6 ft.)	709-MW-20 6/2/12 (10-11 ft.)	709-MW-20 6/2/12 (15-16 ft.)	709-MW-20 6/2/12 (20-21 ft.)	709-MW-20 6/2/12 (24.5-25.5 ft.)	709-MW-21 6/1/12 (2.5-3.5 ft.)	709-MW-21 6/1/12 (9-10 ft.)	709-MW-21 6/1/12 (14-15 ft.)	709-MW-21 6/1/12 (23-24 ft.)	721-MW5-50 6/28/04 (50 ft.)	721-MW6-50 7/1/04 (50 ft.)	721-MW7-15 6/30/04 (15 ft.)
1,2,3,7,8,9-HxCDD in mg/kg																		
1,2,3,4,6,7,8-HpCDD in mg/kg																		
OCDD in mg/kg																		
2,3,7,8-TCDF in mg/kg																		
1,2,3,7,8-PeCDF in mg/kg																		
2,3,4,7,8-PeCDF in mg/kg																		
1,2,3,4,7,8-HxCDF in mg/kg																		
1,2,3,6,7,8-HxCDF in mg/kg																		
1,2,3,7,8,9-HxCDF in mg/kg																		
2,3,4,6,7,8-HxCDF in mg/kg																		
1,2,3,4,6,7,8-HpCDF in mg/kg																		
1,2,3,4,7,8,9-HpCDF in mg/kg																		
OCDF in mg/kg																		
Pesticides																		
4,4'-DDD in mg/kg																		
4,4'-DDE in mg/kg																		
4,4'-DDT in mg/kg																		
Aldrin in mg/kg																		
cis-Chlordane in mg/kg																		
Dieldrin in mg/kg																		
trans-Chlordane in mg/kg																		
Chlorinated Herbicides																		
Pentachlorophenol in mg/kg	0.1																	
Field Parameters																		
ORP in mVolts																		

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

AVG - Average

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

T - Reported result below associated quantitation limit but above MDL

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-MW8-15 6/30/04 (15 ft.)	721-MW9-50 6/29/04 (50 ft.)	721-MW10 6/5/12 (2-3 ft.)	721-MW10 6/5/12 (5-6 ft.)	721-MW10 6/5/12 (10-11 ft.)	721-MW10 6/5/12 (14.5-15.5 ft.)	721-MW10 6/5/12 (19.5-20.5 ft.)	721-MW10 6/5/12 (24-25 ft.)	721-MW11 7/12/12 (12.5 ft.)	721-MW11 7/12/12 (25 ft.)	721-MW11 7/13/12 (64 ft.)	721-MW11 7/13/12 (75 ft.)	721-BH-01 5/30/12 (3.5-4.5 ft.)	721-BH-01 5/30/12 (9.5-10.5 ft.)	721-BH-01 5/30/12 (19-20 ft.)	721-BH-01 5/30/12 (23-24 ft.)	721-BH-02 5/23/12 (3-4 ft.)
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene in mg/kg	210,000	1.4	0.02 U	0.014	0.086	0.16	0.0037 J	0.005 U	0.005 U	0.014	0.005 U	0.003 U	0.0031 U	0.0027 U	0.23	0.003 U	0.0031 U	0.0036 U
Acenaphthylene in mg/kg		0.089 U	0.02 U	0.031	0.018 U	0.056 U	0.0013 J	0.005 U	0.005 U	0.0013 J	0.005 U	0.003 U	0.0031 U	0.0027 U	0.075 U	0.003 U	0.0031 U	0.0036 U
Anthracene in mg/kg	1,050,000	0.089 U	0.02 U	0.055	0.083 U	0.072	0.0034 J	0.005 U	0.005 U	0.0021 J	0.005 U	0.003 U	0.0031 U	0.0027 U	0.017 J	0.003 U	0.0031 U	0.0036 U
Benzo(g,h,i)perylene in mg/kg		0.089 U	0.02 U															
Benzo(j,k)fluoranthene in mg/kg																		
Fluoranthene in mg/kg	140,000	0.089 U	0.022	0.41	0.017	0.018	0.0098	0.005 U	0.005 U	0.0067	0.005 U	0.003 U	0.0031 U	0.0027 U	0.014 J	0.003 U	0.0031 U	0.001 J
Fluorene in mg/kg	140,000	1.6	0.053	0.022	0.057	0.4	0.0053	0.005 U	0.005 U	0.0044 J	0.00063 J	0.003 U	0.0031 U	0.0027 U	0.58	0.003 U	0.0031 U	0.0036 U
Phenanthrene in mg/kg		1.6	0.051	0.32	0.0096 U	0.39	0.023	0.005 U	0.0043 J	0.017	0.0034 J	0.003 U	0.004	0.0018 J	0.49	0.0027 J	0.0031 U	0.0021 J
Pyrene in mg/kg	105,000	0.055 J	0.027	0.43	0.029	0.027	0.0091	0.005 U	0.001 J	0.0069	0.00085 J	0.003 U	0.00083 J	0.0027 U	0.031	0.0013 J	0.0031 U	0.0014 J
1-Methylnaphthalene in mg/kg	4,500																	
2-Methylnaphthalene in mg/kg	14,000	34	0.17	0.13	0.015	0.11	0.038	0.0008 J	0.0022 J	0.019	0.0023 J	0.00077 J	0.0034	0.0019 J	5.7	0.0039	0.0031 U	0.024
Naphthalene in mg/kg	6	2.6	0.17	0.21	0.024	0.044	0.062	0.005 U	0.001 J	0.24	0.00097 J	0.003 U	0.0012 J	0.0012 J	0.2	0.0021 J	0.0031 U	0.0055
Benz(a)anthracene in mg/kg		0.089 U	0.02 U	0.21	0.0059 J	0.0057 J	0.0044 J	0.005 U	0.00098 J	0.0033 J	0.001 J	0.003 U	0.00073 J	0.00074 J	0.03 U	0.00073 J	0.0031 U	0.0009 J
Benzo(a)pyrene in mg/kg		0.089 U	0.02 U	0.2	0.0096 U	0.0024 J	0.0023 J	0.005 U	0.005 U	0.0027 J	0.005 U	0.003 U	0.0031 U	0.0027 U	0.03 U	0.003 U	0.0031 U	0.00087 J
Benzo(b)fluoranthene in mg/kg		0.089 U	0.02 U	0.25	0.0043 J	0.0041 J	0.0031 J	0.005 U	0.005 U	0.0024 J	0.005 U	0.003 U	0.0031 U	0.0027 U	0.03 U	0.003 U	0.0031 U	0.0013 J
Benzo(k)fluoranthene in mg/kg		0.089 U	0.02 U	0.081	0.0096 U	0.0099 U	0.001 J	0.005 U	0.005 U	0.005 U	0.005 U	0.003 U	0.0031 U	0.0027 U	0.03 U	0.003 U	0.0031 U	0.0036 U
Chrysene in mg/kg		0.089 U	0.02 U	0.26	0.0048 J	0.0062 J	0.008	0.005 U	0.0016 J	0.0049 J	0.005 U	0.003 U	0.0009 J	0.0011 J	0.0085 J	0.003 U	0.0031 U	0.0011 J
Dibenzo(a,h)anthracene in mg/kg		0.089 U	0.02 U	0.034	0.0096 U	0.0099 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.003 U	0.0031 U	0.0027 U	0.03 U	0.003 U	0.0031 U	0.001 J
Indeno(1,2,3-cd)pyrene in mg/kg		0.089 U	0.02 U	0.18	0.0025 J	0.0029 J	0.0012 J	0.005 U	0.005 U	0.00095 J	0.005 U	0.003 U	0.0031 U	0.0027 U	0.03 U	0.003 U	0.0031 U	0.0026 J
Total cPAHs TEQ (ND = 1/2 RDL) in mg/kg	10	ND	ND	0.28	0.0071 J	0.0047 J	0.0036 J	ND	0.0036 J	0.0039 J	0.0036 J	ND	0.0023 J	0.002 J	0.023 J	0.0022 J	ND	0.0016 J
Other (Non-PAH) Semivolatiles																		
1,2,4-Trichlorobenzene in mg/kg		3.4 U	0.02 U															
1,2,4-Trimethylbenzene in mg/kg		1.6	0.0008 U															
1,2-Dichlorobenzene in mg/kg		0.089 U	0.02 U															
1,3,5-Trimethylbenzene in mg/kg	35,000	2.2 M	0.0008 U															
1,3-Dichlorobenzene in mg/kg		0.089 U	0.0008 U															
1,4-Dichlorobenzene in mg/kg		0.089 U	0.02 U															
2,4,5-Trichlorophenol in mg/kg		0.44 U	0.099 U															
2,4,6-Trichlorophenol in mg/kg		0.44 U	0.099 U															
2,4-Dichlorophenol in mg/kg		0.27 U	0.059 U															
2,4-Dimethylphenol in mg/kg		0.089 U	0.02 U															
2,4-Dinitrophenol in mg/kg		0.89 U	0.2 U															
2-Chloronaphthalene in mg/kg		0.089 U	0.02 U															
2-Chlorophenol in mg/kg		0.089 U	0.02 U															
2-Methylphenol in mg/kg		0.089 U	0.02 U															
2-Nitroaniline in mg/kg		0.44 U	0.099 U															
2-Nitrophenol in mg/kg		0.44 U	0.099 U															
3,3'-Dichlorobenzidine in mg/kg		0.44 U	0.099 U															
3-Nitroaniline in mg/kg		0.53 U	0.12 U															
4,6-Dinitro-2-methylphenol in mg/kg		0.89 U	0.2 U															
4-Bromophenyl phenyl ether in mg/kg		0.089 U	0.02 U															
4-Chloro-3-methylphenol in mg/kg		0.18 U	0.039 U															
4-Chloroaniline in mg/kg		0.27 U	0.059 U															
4-Chlorophenyl phenyl ether in mg/kg		0.089 U	0.02 U															
4-Methylphenol in mg/kg		0.089 U	0.02 U															
4-Nitroaniline in mg/kg		0.44 U	0.099 U															
4-Nitrophenol in mg/kg		0.44 U	0.099 U															
Benzoic acid in mg/kg		0.89 U	0.2 U															
Benzyl alcohol in mg/kg		0.089 U	0.02 U															
Benzyl butyl phthalate in mg/kg		0.089 U	0.02 U															
Bis(2-chloro-1-methylethyl) ether in mg/kg		0.089 U	0.02 U															
Bis(2-chloroethoxy)methane in mg/kg		0.089 U	0.02 U															
Bis(2-chloroethyl) ether in mg/kg		0.18 U	0.039 U															
Bis(2-ethylhexyl) phthalate in mg/kg	0.03	0.089 U	0.02 U															
Carbazole in mg/kg		0.089 U	0.02 U															
Dibenzofuran in mg/kg	3,500	0.72	0.022															

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-MW8-15 6/30/04 (15 ft.)	721-MW9-50 6/29/04 (50 ft.)	721-MW10 6/5/12 (2-3 ft.)	721-MW10 6/5/12 (5-6 ft.)	721-MW10 6/5/12 (10-11 ft.)	721-MW10 6/5/12 (14.5-15.5 ft.)	721-MW10 6/5/12 (19.5-20.5 ft.)	721-MW10 6/5/12 (24-25 ft.)	721-MW11 7/12/12 (12.5 ft.)	721-MW11 7/12/12 (25 ft.)	721-MW11 7/13/12 (64 ft.)	721-MW11 7/13/12 (75 ft.)	721-BH-01 5/30/12 (3.5-4.5 ft.)	721-BH-01 5/30/12 (9.5-10.5 ft.)	721-BH-01 5/30/12 (19-20 ft.)	721-BH-01 5/30/12 (23-24 ft.)	721-BH-02 5/23/12 (3-4 ft.)
Diethyl phthalate in mg/kg	2,800,000	0.089 U	0.02 U															
Dimethyl phthalate in mg/kg		0.089 U	0.02 U															
Di-n-butyl phthalate in mg/kg		0.089 U	0.02 U															
Di-n-octyl phthalate in mg/kg		0.089 U	0.02 U															
Hexachlorobenzene in mg/kg	0.01	0.089 U	0.02 U															
Hexachlorobutadiene in mg/kg	0.01	0.089 U	0.02 U															
Hexachlorocyclopentadiene in mg/kg		0.44 U	0.099 U															
Hexachloroethane in mg/kg		0.089 U	0.02 U															
Isophorone in mg/kg		0.089 U	0.02 U															
Nitrobenzene in mg/kg		0.089 U	0.02 U															
N-Nitroso-di-n-propylamine in mg/kg		0.18 U	0.039 U															
N-Nitrosodiphenylamine in mg/kg		0.089 U	0.02 U															
Pentachlorophenol in mg/kg	0.1	0.44 U	0.099 U															
Phenol in mg/kg	1,050,000	0.089 U	0.02 U															
2,4-Dinitrotoluene in mg/kg		0.44 U	0.099 U															
2,6-Dinitrotoluene in mg/kg		0.44 U	0.099 U															
Polychlorinated Biphenyls (PCBs)																		
Aroclor 1016 in mg/kg										0.01 U	0.01 U	0.01 U	0.01 U					
Aroclor 1221 in mg/kg										0.02 U	0.02 U	0.02 U	0.02 U					
Aroclor 1232 in mg/kg										0.01 U	0.01 U	0.01 U	0.01 U					
Aroclor 1242 in mg/kg										0.01 U	0.01 U	0.01 U	0.01 U					
Aroclor 1248 in mg/kg										0.01 U	0.01 U	0.01 U	0.01 U					
Aroclor 1254 in mg/kg										0.01 U	0.01 U	0.01 U	0.01 U					
Aroclor 1260 in mg/kg										0.01 U	0.01 U	0.01 U	0.01 U					
Aroclor 1262 in mg/kg																		
Aroclor 1268 in mg/kg																		
Total PCBs (Sum of Aroclors) in mg/kg										0.02 U	0.02 U	0.02 U	0.02 U					
PCB 70 in mg/kg																		
PCB 77 in mg/kg																		
PCB 81 in mg/kg																		
PCB 99 in mg/kg																		
PCB 105 in mg/kg																		
PCB 114 in mg/kg																		
PCB 118 in mg/kg																		
PCB 123 in mg/kg																		
PCB 126 in mg/kg																		
PCB 156 in mg/kg																		
PCB 167 in mg/kg																		
PCB 169 in mg/kg																		
PCB 170 in mg/kg																		
PCB 180 in mg/kg																		
PCB 183 in mg/kg																		
PCB 187 in mg/kg																		
PCB 189 in mg/kg																		
Dioxins/Furans																		
Tetrachlorodibenzofurans (TCDF), Total in mg/kg																		
Total HpCDD in mg/kg																		
Total HpCDF in mg/kg																		
Total HxCDD in mg/kg																		
Total HxCDF in mg/kg																		
Total PeCDD in mg/kg																		
Total PeCDF in mg/kg																		
Total TCDD in mg/kg																		
2,3,7,8-TCDD in mg/kg																		
1,2,3,7,8-PeCDD in mg/kg																		
1,2,3,4,7,8-HxCDD in mg/kg																		
1,2,3,6,7,8-HxCDD in mg/kg																		

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-MW8-15 6/30/04 (15 ft.)	721-MW9-50 6/29/04 (50 ft.)	721-MW10 6/5/12 (2-3 ft.)	721-MW10 6/5/12 (5-6 ft.)	721-MW10 6/5/12 (10-11 ft.)	721-MW10 6/5/12 (14.5-15.5 ft.)	721-MW10 6/5/12 (19.5-20.5 ft.)	721-MW10 6/5/12 (24-25 ft.)	721-MW11 7/12/12 (12.5 ft.)	721-MW11 7/12/12 (25 ft.)	721-MW11 7/13/12 (64 ft.)	721-MW11 7/13/12 (75 ft.)	721-BH-01 5/30/12 (3.5-4.5 ft.)	721-BH-01 5/30/12 (9.5-10.5 ft.)	721-BH-01 5/30/12 (19-20 ft.)	721-BH-01 5/30/12 (23-24 ft.)	721-BH-02 5/23/12 (3-4 ft.)	
1,2,3,7,8,9-HxCDD in mg/kg																			
1,2,3,4,6,7,8-HpCDD in mg/kg																			
OCDD in mg/kg																			
2,3,7,8-TCDF in mg/kg																			
1,2,3,7,8-PeCDF in mg/kg																			
2,3,4,7,8-PeCDF in mg/kg																			
1,2,3,4,7,8-HxCDF in mg/kg																			
1,2,3,6,7,8-HxCDF in mg/kg																			
1,2,3,7,8,9-HxCDF in mg/kg																			
2,3,4,6,7,8-HxCDF in mg/kg																			
1,2,3,4,6,7,8-HpCDF in mg/kg																			
1,2,3,4,7,8,9-HpCDF in mg/kg																			
OCDF in mg/kg																			
Pesticides																			
4,4'-DDD in mg/kg																			
4,4'-DDE in mg/kg																			
4,4'-DDT in mg/kg																			
Aldrin in mg/kg																			
cis-Chlordane in mg/kg																			
Dieldrin in mg/kg																			
trans-Chlordane in mg/kg																			
Chlorinated Herbicides																			
Pentachlorophenol in mg/kg	0.1																		
Field Parameters																			
ORP in mVolts																			

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

AVG - Average

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

T - Reported result below associated quantitation limit but above MDL

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-02 (9-10 ft.)	721-BH-02 (16.5-17.5 ft.)	721-BH-02 (23-24 ft.)	721-BH-03 (0.5-1.5 ft.)	721-BH-03 (7.5-8.5 ft.)	721-BH-04 (3.5-4.5 ft.)	721-BH-04 (7.5-8.5 ft.)	721-BH-04 (16-17 ft.)	721-BH-04 (23-24 ft.)	721-BH-05 (2.5-3.5 ft.)	721-BH-05 (5-6 ft.)	721-BH-07 (3-4 ft.)	721-BH-07 (5-6 ft.)	721-BH-07 (16-17 ft.)	721-BH-07 (23-24 ft.)	721-BH-08 (2.5-3.5 ft.)	721-BH-08 (4-5 ft.)
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene in mg/kg	210,000	0.47	0.011	0.0042 U	0.15 J	0.26	0.005 U	0.22	0.01	0.0049 U	0.0027 U	0.59	0.0028 U	0.7	0.0063	0.0031 U	0.0014 J	6.4
Acenaphthylene in mg/kg		0.16 U	0.0035 J	0.0042 U	0.15 J	0.16 U	0.0021 J	0.16 U	0.0034 J	0.0049 U	0.002 J	0.3 U	0.0028 U	0.24 U	0.002 J	0.0031 U	0.0062	2.5 U
Anthracene in mg/kg	1,050,000	0.036 J	0.015	0.0042 U	0.05 J	0.077	0.005 U	0.058 U	0.025	0.0049 U	0.0015 J	0.19	0.0028 U	0.15 J	0.0094	0.0031 U	0.013	1.5
Benzo(g,h,i)perylene in mg/kg																		
Benzo(j,k)fluoranthene in mg/kg																		
Fluoranthene in mg/kg	140,000	0.024 J	0.086	0.0042 U	0.33	0.04	0.0061	0.02	0.073	0.001 J	0.025	0.088	0.0028 U	0.084 J	0.046	0.0031 U	0.097	0.32
Fluorene in mg/kg	140,000	1.2	0.025	0.0042 U	0.29	0.8	0.005 U	0.58	0.023	0.0011 J	0.0011 J	1.5	0.0028 U	1.8	0.012	0.0031 U	0.0052	11
Phenanthrene in mg/kg		0.94	0.067	0.0035 J	0.77	1.2	0.014	0.66	0.059	0.0058	0.023	2.9	0.0017 J	2.8	0.034	0.0028 J	0.075	22
Pyrene in mg/kg	105,000	0.037 J	0.063	0.00081 J	0.62	0.054	0.0082	0.038	0.052	0.0012 J	0.02	0.12	0.0028 U	0.24	0.035	0.0031 U	0.12	0.44
1-Methylnaphthalene in mg/kg	4,500																	
2-Methylnaphthalene in mg/kg	14,000	17	0.038	0.0042 U	0.48	6.4	0.02	1.8	0.032	0.0079	0.012	21	0.0023 J	15	0.016	0.0021 J	0.11	160
Naphthalene in mg/kg	6	0.98	0.025	0.00083 J	0.11 J	0.87	0.0085	0.081	0.24	0.0027 J	0.01	3.9	0.0011 J	4.1	0.014	0.00093 J	0.19	31
Benz(a)anthracene in mg/kg		0.081 U	0.021	0.00089 J	0.15 J	0.016 J	0.0024 J	0.0093	0.017	0.0013 J	0.0081	0.022 J	0.0028 U	0.16 U	0.011	0.0031 U	0.06	0.09 J
Benzo(a)pyrene in mg/kg		0.081 U	0.012	0.0042 U	0.27 U	0.0083 J	0.0027 J	0.0019 J	0.009	0.0049 U	0.0087	0.014 J	0.0028 U	0.16 U	0.0075	0.0031 U	0.095	0.28 U
Benzo(b)fluoranthene in mg/kg		0.081 U	0.018	0.0042 U	0.21 J	0.014 J	0.0044 J	0.0022 J	0.013	0.0049 U	0.028	0.018 J	0.0028 U	0.16 U	0.01	0.0031 U	0.12	0.28 U
Benzo(k)fluoranthene in mg/kg		0.081 U	0.0055	0.0042 U	0.052 J	0.0084 J	0.0019 J	0.0049 U	0.004 J	0.0049 U	0.0061	0.0099 J	0.0028 U	0.16 U	0.0041	0.0031 U	0.034	0.28 U
Chrysene in mg/kg		0.022 J	0.023	0.0042 U	0.19 J	0.037	0.0032 J	0.024	0.02	0.0017 J	0.025	0.046	0.00084 J	0.052 J	0.017	0.0008 J	0.09	0.14 J
Dibenzo(a,h)anthracene in mg/kg		0.081 U	0.0016 J	0.0042 U	0.05 J	0.0084 J	0.0019 J	0.0011 J	0.0014 J	0.0049 U	0.0036	0.0097 J	0.0028 U	0.16 U	0.0011 J	0.0031 U	0.014	0.28 U
Indeno(1,2,3-cd)pyrene in mg/kg		0.081 U	0.0072	0.0042 U	0.12 J	0.0085 J	0.0092	0.0049 U	0.0058	0.0049 U	0.017	0.013 J	0.0028 U	0.16 U	0.0038	0.0031 U	0.11	0.28 U
Total cPAHs TEQ (ND = 1/2 RDL) in mg/kg	10	0.06 J	0.018 J	0.0031 J	0.2 J	0.014 J	0.0047 J	0.0039 J	0.013 J	0.0035 J	0.015	0.022 J	0.0021 J	0.12 J	0.011 J	0.0024 J	0.13	0.21 J
Other (Non-PAH) Semivolatiles																		
1,2,4-Trichlorobenzene in mg/kg																		
1,2,4-Trimethylbenzene in mg/kg																		
1,2-Dichlorobenzene in mg/kg																		
1,3,5-Trimethylbenzene in mg/kg	35,000																	
1,3-Dichlorobenzene in mg/kg																		
1,4-Dichlorobenzene in mg/kg																		
2,4,5-Trichlorophenol in mg/kg																		
2,4,6-Trichlorophenol in mg/kg																		
2,4-Dichlorophenol in mg/kg																		
2,4-Dimethylphenol in mg/kg																		
2,4-Dinitrophenol in mg/kg																		
2-Chloronaphthalene in mg/kg																		
2-Chlorophenol in mg/kg																		
2-Methylphenol in mg/kg																		
2-Nitroaniline in mg/kg																		
2-Nitrophenol in mg/kg																		
3,3'-Dichlorobenzidine in mg/kg																		
3-Nitroaniline in mg/kg																		
4,6-Dinitro-2-methylphenol in mg/kg																		
4-Bromophenyl phenyl ether in mg/kg																		
4-Chloro-3-methylphenol in mg/kg																		
4-Chloroaniline in mg/kg																		
4-Chlorophenyl phenyl ether in mg/kg																		
4-Methylphenol in mg/kg																		
4-Nitroaniline in mg/kg																		
4-Nitrophenol in mg/kg																		
Benzoic acid in mg/kg																		
Benzyl alcohol in mg/kg																		
Benzyl butyl phthalate in mg/kg																		
Bis(2-chloro-1-methylethyl) ether in mg/kg																		
Bis(2-chloroethoxy)methane in mg/kg																		
Bis(2-chloroethyl) ether in mg/kg																		
Bis(2-ethylhexyl) phthalate in mg/kg	0.03																	
Carbazole in mg/kg																		
Dibenzofuran in mg/kg	3,500																	

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-02 (9-10 ft.)	721-BH-02 (16.5-17.5 ft.)	721-BH-02 (23-24 ft.)	721-BH-03 (0.5-1.5 ft.)	721-BH-03 (7.5-8.5 ft.)	721-BH-04 (3.5-4.5 ft.)	721-BH-04 (7.5-8.5 ft.)	721-BH-04 (16-17 ft.)	721-BH-04 (23-24 ft.)	721-BH-05 (2.5-3.5 ft.)	721-BH-05 (5-6 ft.)	721-BH-07 (3-4 ft.)	721-BH-07 (5-6 ft.)	721-BH-07 (16-17 ft.)	721-BH-07 (23-24 ft.)	721-BH-08 (2.5-3.5 ft.)	721-BH-08 (4-5 ft.)
Diethyl phthalate in mg/kg	2,800,000																	
Dimethyl phthalate in mg/kg																		
Di-n-butyl phthalate in mg/kg																		
Di-n-octyl phthalate in mg/kg																		
Hexachlorobenzene in mg/kg	0.01																	
Hexachlorobutadiene in mg/kg	0.01																	
Hexachlorocyclopentadiene in mg/kg																		
Hexachloroethane in mg/kg																		
Isophorone in mg/kg																		
Nitrobenzene in mg/kg																		
N-Nitroso-di-n-propylamine in mg/kg																		
N-Nitrosodiphenylamine in mg/kg																		
Pentachlorophenol in mg/kg	0.1																	
Phenol in mg/kg	1,050,000																	
2,4-Dinitrotoluene in mg/kg																		
2,6-Dinitrotoluene in mg/kg																		
Polychlorinated Biphenyls (PCBs)																		
Aroclor 1016 in mg/kg																		
Aroclor 1221 in mg/kg																		
Aroclor 1232 in mg/kg																		
Aroclor 1242 in mg/kg																		
Aroclor 1248 in mg/kg																		
Aroclor 1254 in mg/kg																		
Aroclor 1260 in mg/kg																		
Aroclor 1262 in mg/kg																		
Aroclor 1268 in mg/kg																		
Total PCBs (Sum of Aroclors) in mg/kg																		
PCB 70 in mg/kg																		
PCB 77 in mg/kg																		
PCB 81 in mg/kg																		
PCB 99 in mg/kg																		
PCB 105 in mg/kg																		
PCB 114 in mg/kg																		
PCB 118 in mg/kg																		
PCB 123 in mg/kg																		
PCB 126 in mg/kg																		
PCB 156 in mg/kg																		
PCB 167 in mg/kg																		
PCB 169 in mg/kg																		
PCB 170 in mg/kg																		
PCB 180 in mg/kg																		
PCB 183 in mg/kg																		
PCB 187 in mg/kg																		
PCB 189 in mg/kg																		
Dioxins/Furans																		
Tetrachlorodibenzofurans (TCDF), Total in mg/kg																		
Total HpCDD in mg/kg																		
Total HpCDF in mg/kg																		
Total HxCDD in mg/kg																		
Total HxCDF in mg/kg																		
Total PeCDD in mg/kg																		
Total PeCDF in mg/kg																		
Total TCDD in mg/kg																		
2,3,7,8-TCDD in mg/kg																		
1,2,3,7,8-PeCDD in mg/kg																		
1,2,3,4,7,8-HxCDD in mg/kg																		
1,2,3,6,7,8-HxCDD in mg/kg																		

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-02 (9-10 ft.)	721-BH-02 (16.5-17.5 ft.)	721-BH-02 (23-24 ft.)	721-BH-03 (0.5-1.5 ft.)	721-BH-03 (7.5-8.5 ft.)	721-BH-04 (3.5-4.5 ft.)	721-BH-04 (7.5-8.5 ft.)	721-BH-04 (16-17 ft.)	721-BH-04 (23-24 ft.)	721-BH-05 (2.5-3.5 ft.)	721-BH-05 (5-6 ft.)	721-BH-07 (3-4 ft.)	721-BH-07 (5-6 ft.)	721-BH-07 (16-17 ft.)	721-BH-07 (23-24 ft.)	721-BH-08 (2.5-3.5 ft.)	721-BH-08 (4-5 ft.)
1,2,3,7,8,9-HxCDD in mg/kg																		
1,2,3,4,6,7,8-HpCDD in mg/kg																		
OCDD in mg/kg																		
2,3,7,8-TCDF in mg/kg																		
1,2,3,7,8-PeCDF in mg/kg																		
2,3,4,7,8-PeCDF in mg/kg																		
1,2,3,4,7,8-HxCDF in mg/kg																		
1,2,3,6,7,8-HxCDF in mg/kg																		
1,2,3,7,8,9-HxCDF in mg/kg																		
2,3,4,6,7,8-HxCDF in mg/kg																		
1,2,3,4,6,7,8-HpCDF in mg/kg																		
1,2,3,4,7,8,9-HpCDF in mg/kg																		
OCDF in mg/kg																		
Pesticides																		
4,4'-DDD in mg/kg																		
4,4'-DDE in mg/kg																		
4,4'-DDT in mg/kg																		
Aldrin in mg/kg																		
cis-Chlordane in mg/kg																		
Dieldrin in mg/kg																		
trans-Chlordane in mg/kg																		
Chlorinated Herbicides																		
Pentachlorophenol in mg/kg	0.1																	
Field Parameters																		
ORP in mVolts																		

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-09 (0-5 ft.)	721-BH-09 (5-10 ft.)	721-BH-09 (10-15 ft.)	721-BH-10 (3-4 ft.)	721-BH-10 (6-7 ft.)	721-BH-11 (3-4 ft.)	721-BH-11 (7-8 ft.)	721-BH-11 (16-17 ft.)	721-BH-11 (23-24 ft.)	721-BH-12 (3.75-4.75 ft.)	721-BH-12 (5-6 ft.)	721-BH-12 (16-17 ft.)	721-BH-12 (23-24 ft.)	721-BH-13 (4-5 ft.)	721-BH-13 (6-7.25 ft.)	721-BH-13 (16-17 ft.)	721-BH-13 (23-24 ft.)
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene in mg/kg	210,000	0.19	2.6	0.16	0.02	2.5	0.0049 U	0.0048 U	0.0093	0.0049 U	0.045	4.2	0.0064	0.0042 U	0.11	5	0.036	0.0049 U
Acenaphthylene in mg/kg		0.072 U	0.76 U	0.046 U	0.012 J	0.7 U	0.0049 U	0.0048 U	0.002 J	0.0049 U	0.027	1.2 U	0.0014 J	0.0042 U	0.047	1.5 U	0.0049 U	0.0049 U
Anthracene in mg/kg	1,050,000	0.078	0.7	0.055	0.029	0.65	0.0049 U	0.0048 U	0.013	0.0049 U	0.033 U	0.79	0.0079	0.0042 U	0.033 U	1.2	0.0038 J	0.0009 J
Benzo(g,h,i)perylene in mg/kg																		
Benzo(j,k)fluoranthene in mg/kg																		
Fluoranthene in mg/kg	140,000	0.065	0.13	0.012	0.21	0.11 J	0.0049 U	0.0048 U	0.057	0.0049 U	0.057	0.18 J	0.041	0.001 J	0.056	0.25 J	0.015	0.0049 U
Fluorene in mg/kg	140,000	0.38	4.5	0.32	0.04	4.9	0.0049 U	0.00071 J	0.02	0.0049 U	0.07	7.5	0.014	0.00068 J	0.18	9.4	0.02	0.0012 J
Phenanthrene in mg/kg		0.97	10	0.77	0.16	11	0.0046 J	0.0031 J	0.046	0.0016 J	0.12	14	0.037	0.0044	0.35	18	0.026	0.0055
Pyrene in mg/kg	105,000	0.069	0.14	0.016	0.26	0.25	0.00083 J	0.0048 U	0.039	0.0049 U	0.076	0.28 J	0.031	0.00097 J	0.1	0.43 J	0.012	0.0049 U
1-Methylnaphthalene in mg/kg	4,500																	
2-Methylnaphthalene in mg/kg	14,000	4.4	62	2.3	0.49	52	0.0049 U	0.012 U	0.019	0.0049 U	1.2	94	0.025	0.0058 U	4.7	120	0.45	0.0089 U
Naphthalene in mg/kg	6	1 J	10	0.29	0.34	8.5	0.0049 U	0.0048 U	0.013	0.0049 U	0.4	18	0.042	0.0017 J	1.3	21	1.1	0.0061
Benz(a)anthracene in mg/kg		0.013	0.05 U	0.0021 J	0.076	0.15 U	0.00091 J	0.00073 J	0.012	0.0049 U	0.033	0.3 U	0.01	0.00099 J	0.023 J	0.49 U	0.005	0.0011 J
Benzo(a)pyrene in mg/kg		0.02	0.05 U	0.0025 J	0.064	0.15 U	0.0049 U	0.0048 U	0.0056	0.0049 U	0.023	0.3 U	0.005	0.0042 U	0.014 J	0.49 U	0.0026 J	0.0049 U
Benzo(b)fluoranthene in mg/kg		0.032	0.05 U	0.003 J	0.12	0.15 U	0.0049 U	0.0048 U	0.0099	0.0049 U	0.044	0.3 U	0.0082	0.0042 U	0.033	0.48 U	0.0043 J	0.0049 U
Benzo(k)fluoranthene in mg/kg		0.0091	0.05 U	0.005 U	0.038	0.15 U	0.0049 U	0.0048 U	0.0041 J	0.0049 U	0.024	0.3 U	0.0029 J	0.0042 U	0.013 J	0.49 U	0.0013 J	0.0049 U
Chrysene in mg/kg		0.042	0.023 J	0.0054	0.12	0.15 U	0.00094 J	0.0048 U	0.017	0.0049 U	0.049	0.3 U	0.014	0.0012 J	0.035	0.49 U	0.0095	0.0014 J
Dibenzo(a,h)anthracene in mg/kg		0.0036 J	0.05 U	0.005 U	0.023	0.15 U	0.0049 U	0.0048 U	0.00083 J	0.0049 U	0.019	0.3 U	0.0037 U	0.0042 U	0.0083 J	0.49 U	0.0049 U	0.00082 J
Indeno(1,2,3-cd)pyrene in mg/kg		0.014	0.05 U	0.005 U	0.069	0.15 U	0.0049 U	0.0048 U	0.0047 U	0.0049 U	0.026	0.3 U	0.0027 J	0.0042 U	0.018 J	0.48 U	0.0049 U	0.0049 U
Total cPAHs TEQ (ND = 1/2 RDL) in mg/kg	10	0.028 J	0.038 J	0.0038 J	0.098	ND	0.0035 J	0.0035 J	0.0087 J	ND	0.038	ND	0.0077 J	0.0031 J	0.024 J	0.35 J	0.0042 J	0.0033 J
Other (Non-PAH) Semivolatiles																		
1,2,4-Trichlorobenzene in mg/kg																		
1,2,4-Trimethylbenzene in mg/kg																		
1,2-Dichlorobenzene in mg/kg																		
1,3,5-Trimethylbenzene in mg/kg	35,000																	
1,3-Dichlorobenzene in mg/kg																		
1,4-Dichlorobenzene in mg/kg																		
2,4,5-Trichlorophenol in mg/kg																		
2,4,6-Trichlorophenol in mg/kg																		
2,4-Dichlorophenol in mg/kg																		
2,4-Dimethylphenol in mg/kg																		
2,4-Dinitrophenol in mg/kg																		
2-Chloronaphthalene in mg/kg																		
2-Chlorophenol in mg/kg																		
2-Methylphenol in mg/kg																		
2-Nitroaniline in mg/kg																		
2-Nitrophenol in mg/kg																		
3,3'-Dichlorobenzidine in mg/kg																		
3-Nitroaniline in mg/kg																		
4,6-Dinitro-2-methylphenol in mg/kg																		
4-Bromophenyl phenyl ether in mg/kg																		
4-Chloro-3-methylphenol in mg/kg																		
4-Chloroaniline in mg/kg																		
4-Chlorophenyl phenyl ether in mg/kg																		
4-Methylphenol in mg/kg																		
4-Nitroaniline in mg/kg																		
4-Nitrophenol in mg/kg																		
Benzoic acid in mg/kg																		
Benzyl alcohol in mg/kg																		
Benzyl butyl phthalate in mg/kg																		
Bis(2-chloro-1-methylethyl) ether in mg/kg																		
Bis(2-chloroethoxy)methane in mg/kg																		
Bis(2-chloroethyl) ether in mg/kg																		
Bis(2-ethylhexyl) phthalate in mg/kg	0.03																	
Carbazole in mg/kg																		
Dibenzofuran in mg/kg	3,500																	

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-09 (0-5 ft.)	721-BH-09 (5-10 ft.)	721-BH-09 (10-15 ft.)	721-BH-10 (3-4 ft.)	721-BH-10 (6-7 ft.)	721-BH-11 (3-4 ft.)	721-BH-11 (7-8 ft.)	721-BH-11 (16-17 ft.)	721-BH-11 (23-24 ft.)	721-BH-12 (3.75-4.75 ft.)	721-BH-12 (5-6 ft.)	721-BH-12 (16-17 ft.)	721-BH-12 (23-24 ft.)	721-BH-13 (4-5 ft.)	721-BH-13 (6-7.25 ft.)	721-BH-13 (16-17 ft.)	721-BH-13 (23-24 ft.)
Diethyl phthalate in mg/kg	2,800,000																	
Dimethyl phthalate in mg/kg																		
Di-n-butyl phthalate in mg/kg																		
Di-n-octyl phthalate in mg/kg																		
Hexachlorobenzene in mg/kg	0.01																	
Hexachlorobutadiene in mg/kg	0.01																	
Hexachlorocyclopentadiene in mg/kg																		
Hexachloroethane in mg/kg																		
Isophorone in mg/kg																		
Nitrobenzene in mg/kg																		
N-Nitroso-di-n-propylamine in mg/kg																		
N-Nitrosodiphenylamine in mg/kg																		
Pentachlorophenol in mg/kg	0.1																	
Phenol in mg/kg	1,050,000																	
2,4-Dinitrotoluene in mg/kg																		
2,6-Dinitrotoluene in mg/kg																		
Polychlorinated Biphenyls (PCBs)																		
Aroclor 1016 in mg/kg							0.0099 U	0.0099 U	0.01 U	0.0099 U					0.0099 U	0.098 U	0.01 U	0.01 U
Aroclor 1221 in mg/kg							0.02 U	0.02 U	0.02 U	0.02 U					0.02 U	0.17 U	0.02 U	0.02 U
Aroclor 1232 in mg/kg							0.0099 U	0.0099 U	0.01 U	0.0099 U					0.0099 U	0.081 U	0.01 U	0.01 U
Aroclor 1242 in mg/kg							0.0099 U	0.0099 U	0.01 U	0.0099 U					0.0099 U	0.12 U	0.01 U	0.01 U
Aroclor 1248 in mg/kg							0.0099 U	0.0099 U	0.01 U	0.0099 U					0.0099 U	0.034 U	0.01 U	0.01 U
Aroclor 1254 in mg/kg							0.0099 U	0.0099 U	0.01 U	0.0099 U					0.0099 U	0.015 U	0.01 U	0.01 U
Aroclor 1260 in mg/kg							0.0099 U	0.0099 U	0.01 U	0.0099 U					0.0054 J	0.01 U	0.01 U	0.01 U
Aroclor 1262 in mg/kg																		
Aroclor 1268 in mg/kg																		
Total PCBs (Sum of Aroclors) in mg/kg							0.0099 U	0.0099 U	0.02 U	0.0099 U					0.0054	0.098 U	0.02 U	0.02 U
PCB 70 in mg/kg																		
PCB 77 in mg/kg																		
PCB 81 in mg/kg																		
PCB 99 in mg/kg																		
PCB 105 in mg/kg																		
PCB 114 in mg/kg																		
PCB 118 in mg/kg																		
PCB 123 in mg/kg																		
PCB 126 in mg/kg																		
PCB 156 in mg/kg																		
PCB 167 in mg/kg																		
PCB 169 in mg/kg																		
PCB 170 in mg/kg																		
PCB 180 in mg/kg																		
PCB 183 in mg/kg																		
PCB 187 in mg/kg																		
PCB 189 in mg/kg																		
Dioxins/Furans																		
Tetrachlorodibenzofurans (TCDF), Total in mg/kg																		
Total HpCDD in mg/kg																		
Total HpCDF in mg/kg																		
Total HxCDD in mg/kg																		
Total HxCDF in mg/kg																		
Total PeCDD in mg/kg																		
Total PeCDF in mg/kg																		
Total TCDD in mg/kg																		
2,3,7,8-TCDD in mg/kg																		
1,2,3,7,8-PeCDD in mg/kg																		
1,2,3,4,7,8-HxCDD in mg/kg																		
1,2,3,6,7,8-HxCDD in mg/kg																		

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-09 (0-5 ft.)	721-BH-09 (5-10 ft.)	721-BH-09 (10-15 ft.)	721-BH-10 (3-4 ft.)	721-BH-10 (6-7 ft.)	721-BH-11 (3-4 ft.)	721-BH-11 (7-8 ft.)	721-BH-11 (16-17 ft.)	721-BH-11 (23-24 ft.)	721-BH-12 (3.75-4.75 ft.)	721-BH-12 (5-6 ft.)	721-BH-12 (16-17 ft.)	721-BH-12 (23-24 ft.)	721-BH-13 (4-5 ft.)	721-BH-13 (6-7.25 ft.)	721-BH-13 (16-17 ft.)	721-BH-13 (23-24 ft.)
1,2,3,7,8,9-HxCDD in mg/kg																		
1,2,3,4,6,7,8-HpCDD in mg/kg																		
OCDD in mg/kg																		
2,3,7,8-TCDF in mg/kg																		
1,2,3,7,8-PeCDF in mg/kg																		
2,3,4,7,8-PeCDF in mg/kg																		
1,2,3,4,7,8-HxCDF in mg/kg																		
1,2,3,6,7,8-HxCDF in mg/kg																		
1,2,3,7,8,9-HxCDF in mg/kg																		
2,3,4,6,7,8-HxCDF in mg/kg																		
1,2,3,4,6,7,8-HpCDF in mg/kg																		
1,2,3,4,7,8,9-HpCDF in mg/kg																		
OCDF in mg/kg																		
Pesticides																		
4,4'-DDD in mg/kg																		
4,4'-DDE in mg/kg																		
4,4'-DDT in mg/kg																		
Aldrin in mg/kg																		
cis-Chlordane in mg/kg																		
Dieldrin in mg/kg																		
trans-Chlordane in mg/kg																		
Chlorinated Herbicides																		
Pentachlorophenol in mg/kg	0.1																	
Field Parameters																		
ORP in mVolts																		

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

AVG - Average

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

T - Reported result below associated quantitation limit but above MDL

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-14 (2-3 ft.)	721-BH-14 (7-8 ft.)	721-BH-14 (16-17 ft.)	721-BH-14 (23-24 ft.)	721-BH-15 (3.75-4.75 ft.)	721-BH-15 (5-6 ft.)	721-BH-15 (17.5-18.5 ft.)	721-BH-15 (23-24 ft.)	721-BH-16 (0.25-1.25 ft.)	721-BH-16 (6.25-7.25 ft.)	721-BH-16 (17.5-18.5 ft.)	721-BH-16 (23-24 ft.)	721-BH-17 (5 ft.)	721-BH-17 (9.5 ft.)	721-BH-17 (14 ft.)	721-BH-17 (19 ft.)	721-BH-17 (24.8 ft.)
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene in mg/kg	210,000	0.0049 U	0.0049 U	0.0059	0.0049 U	0.0072	3	0.019	0.0049 U	0.0024 J	3.2	0.0055	0.005 U	0.41	0.057	0.011	0.0023 J	0.011 U
Acenaphthylene in mg/kg		0.0049 U	0.0049 U	0.0029 J	0.0049 U	0.0049 U	0.89 U	0.005 U	0.0049 U	0.0013 J	0.91 U	0.0018 J	0.005 U	0.15 U	0.018 U	0.01 U	0.0014 J	0.011 U
Anthracene in mg/kg	1,050,000	0.0049 U	0.0049 U	0.0088	0.0049 U	0.002 J	0.59	0.0036 J	0.0049 U	0.0049	0.61	0.0049 J	0.005 U	0.15	0.038	0.0018 J	0.0022 J	0.011 U
Benzo(g,h,i)perylene in mg/kg																		
Benzo(j,k)fluoranthene in mg/kg																		
Fluoranthene in mg/kg	140,000	0.0049 U	0.0049 U	0.036	0.0049 U	0.0012 J	0.16 J	0.014	0.0049 U	0.0081	0.15	0.022	0.0011 J	0.073	0.035	0.009 J	0.0092 J	0.011 U
Fluorene in mg/kg	140,000	0.0049 U	0.0049 U	0.013	0.00068 J	0.022	5.5	0.018	0.0049 U	0.0022 J	5.7	0.012	0.005 U	0.83	0.19	0.016	0.0045 J	0.011 U
Phenanthrene in mg/kg		0.0035 J	0.0018 J	0.038	0.0045 J	0.041	11	0.026	0.0029 J	0.06	12	0.037	0.0039 J	1.9 J	0.5	0.025	0.02	0.0056 J
Pyrene in mg/kg	105,000	0.0049 U	0.0049 U	0.027	0.00087 J	0.0014 J	0.21	0.011	0.0049 U	0.034	0.4	0.015	0.00092 J	0.08	0.032	0.0063 J	0.009 J	0.011 U
1-Methylnaphthalene in mg/kg	4,500																	
2-Methylnaphthalene in mg/kg	14,000	0.0049 U	0.0049 U	0.024	0.0049 U	0.23	70	0.13	0.0049 U	0.083	77	0.03	0.019	7.7	0.81	0.11	0.011	0.0029 J
Naphthalene in mg/kg	6	0.00084 J	0.0011 J	0.016	0.0049 U	0.06	10	0.038	0.0016 J	0.019	1.1	0.063	0.0052	0.031	0.016	0.011	0.0092 U	0.011 U
Benz(a)anthracene in mg/kg		0.00085 J	0.00081 J	0.0097	0.0013 J	0.0049 U	0.022	0.0048 J	0.00084 J	0.012	0.049 U	0.0063	0.0008 J	0.022	0.01 J	0.0024 J	0.004 J	0.0016 J
Benzo(a)pyrene in mg/kg		0.0049 U	0.0049 U	0.0054	0.0049 U	0.0049 U	0.0054	0.0022 J	0.0049 U	0.0099	0.049 U	0.0041 J	0.005 U	0.009 J	0.0043 J	0.01 U	0.0028 J	0.011 U
Benzo(b)fluoranthene in mg/kg		0.0049 U	0.0049 U	0.0077	0.0049 U	0.0049 U	0.0053	0.0036 J	0.0049 U	0.018	0.049 U	0.0051	0.005 U	0.014	0.0064 J	0.01 U	0.0026 J	0.011 U
Benzo(k)fluoranthene in mg/kg		0.0049 U	0.0049 U	0.0027 J	0.0049 U	0.0049 U	0.0049 U	0.0014 J	0.0049 U	0.0048 U	0.049 U	0.0015 J	0.005 U	0.0047 J	0.0023 J	0.01 U	0.0092 U	0.011 U
Chrysene in mg/kg		0.0049 U	0.0049 U	0.013	0.0011 J	0.0049 U	0.026	0.0071	0.0049 U	0.018	0.11	0.0093	0.0011 J	0.019	0.0084 J	0.0021 J	0.005 J	0.011 U
Dibenzo(a,h)anthracene in mg/kg		0.0049 U	0.0049 U	0.0009 J	0.0049 U	0.0049 U	0.0019 J	0.0011 J	0.0049 U	0.01	0.049 U	0.0012 J	0.005 U	0.0016 J	0.011 U	0.01 U	0.0092 U	0.011 U
Indeno(1,2,3-cd)pyrene in mg/kg		0.0049 U	0.0049 U	0.005 U	0.0049 U	0.0049 U	0.0015 J	0.0024 J	0.0049 U	0.0066 U	0.049 U	0.005 U	0.005 U	0.0048 J	0.011 U	0.01 U	0.0092 U	0.011 U
Total cPAHs TEQ (ND = 1/2 RDL) in mg/kg	10	0.0035 J	0.0035 J	0.0079 J	0.0035 J	ND	0.009 J	0.0036 J	0.0035 J	0.015	0.037	0.0059 J	0.0036 J	0.014 J	0.0074 J	0.0073 J	0.0049 J	0.0079 J
Other (Non-PAH) Semivolatiles																		
1,2,4-Trichlorobenzene in mg/kg																		
1,2,4-Trimethylbenzene in mg/kg																		
1,2-Dichlorobenzene in mg/kg																		
1,3,5-Trimethylbenzene in mg/kg	35,000																	
1,3-Dichlorobenzene in mg/kg																		
1,4-Dichlorobenzene in mg/kg																		
2,4,5-Trichlorophenol in mg/kg																		
2,4,6-Trichlorophenol in mg/kg																		
2,4-Dichlorophenol in mg/kg																		
2,4-Dimethylphenol in mg/kg																		
2,4-Dinitrophenol in mg/kg																		
2-Chloronaphthalene in mg/kg																		
2-Chlorophenol in mg/kg																		
2-Methylphenol in mg/kg																		
2-Nitroaniline in mg/kg																		
2-Nitrophenol in mg/kg																		
3,3'-Dichlorobenzidine in mg/kg																		
3-Nitroaniline in mg/kg																		
4,6-Dinitro-2-methylphenol in mg/kg																		
4-Bromophenyl phenyl ether in mg/kg																		
4-Chloro-3-methylphenol in mg/kg																		
4-Chloroaniline in mg/kg																		
4-Chlorophenyl phenyl ether in mg/kg																		
4-Methylphenol in mg/kg																		
4-Nitroaniline in mg/kg																		
4-Nitrophenol in mg/kg																		
Benzoic acid in mg/kg																		
Benzyl alcohol in mg/kg																		
Benzyl butyl phthalate in mg/kg																		
Bis(2-chloro-1-methylethyl) ether in mg/kg																		
Bis(2-chloroethoxy)methane in mg/kg																		
Bis(2-chloroethyl) ether in mg/kg																		
Bis(2-ethylhexyl) phthalate in mg/kg	0.03																	
Carbazole in mg/kg																		
Dibenzofuran in mg/kg	3,500																	

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-14 (2-3 ft.)	721-BH-14 (7-8 ft.)	721-BH-14 (16-17 ft.)	721-BH-14 (23-24 ft.)	721-BH-15 (3.75-4.75 ft.)	721-BH-15 (5-6 ft.)	721-BH-15 (17.5-18.5 ft.)	721-BH-15 (23-24 ft.)	721-BH-16 (0.25-1.25 ft.)	721-BH-16 (6.25-7.25 ft.)	721-BH-16 (17.5-18.5 ft.)	721-BH-16 (23-24 ft.)	721-BH-17 (5 ft.)	721-BH-17 (9.5 ft.)	721-BH-17 (14 ft.)	721-BH-17 (19 ft.)	721-BH-17 (24.8 ft.)
Diethyl phthalate in mg/kg	2,800,000																	
Dimethyl phthalate in mg/kg																		
Di-n-butyl phthalate in mg/kg																		
Di-n-octyl phthalate in mg/kg																		
Hexachlorobenzene in mg/kg	0.01																	
Hexachlorobutadiene in mg/kg	0.01																	
Hexachlorocyclopentadiene in mg/kg																		
Hexachloroethane in mg/kg																		
Isophorone in mg/kg																		
Nitrobenzene in mg/kg																		
N-Nitroso-di-n-propylamine in mg/kg																		
N-Nitrosodiphenylamine in mg/kg																		
Pentachlorophenol in mg/kg	0.1																	
Phenol in mg/kg	1,050,000																	
2,4-Dinitrotoluene in mg/kg																		
2,6-Dinitrotoluene in mg/kg																		
Polychlorinated Biphenyls (PCBs)																		
Aroclor 1016 in mg/kg		0.01 U	0.01 U	0.01 U	0.01 U					0.01 U	0.051 U	0.01 U	0.0099 U	0.018 U	0.0063 U	0.0067 U	0.0061 U	0.0058 U
Aroclor 1221 in mg/kg		0.02 U	0.02 U	0.02 U	0.02 U					0.02 U	0.085 U	0.02 U	0.02 U	0.065 U	0.013 U	0.014 U	0.013 U	0.012 U
Aroclor 1232 in mg/kg		0.01 U	0.01 U	0.01 U	0.01 U					0.01 U	0.051 U	0.01 U	0.0099 U	0.014 U	0.0063 U	0.0067 U	0.0061 U	0.0058 U
Aroclor 1242 in mg/kg		0.01 U	0.01 U	0.01 U	0.01 U					0.01 U	0.07 U	0.01 U	0.0099 U	0.0058 U	0.0063 U	0.0067 U	0.0061 U	0.0058 U
Aroclor 1248 in mg/kg		0.01 U	0.01 U	0.01 U	0.01 U					0.01 U	0.031 U	0.01 U	0.0099 U	0.0053 U	0.0063 U	0.0067 U	0.0061 U	0.0058 U
Aroclor 1254 in mg/kg		0.01 U	0.01 U	0.01 U	0.01 U					0.01 U	0.012 U	0.01 U	0.0099 U	0.0053 U	0.0063 U	0.0067 U	0.0061 U	0.0058 U
Aroclor 1260 in mg/kg		0.01 U	0.01 U	0.01 U	0.01 U					0.01 U	0.0099 U	0.01 U	0.0099 U	0.0053 U	0.0063 U	0.0067 U	0.0061 U	0.0058 U
Aroclor 1262 in mg/kg																		
Aroclor 1268 in mg/kg																		
Total PCBs (Sum of Aroclors) in mg/kg		0.02 U	0.02 U	0.02 U	0.02 U					0.02 U	0.0099 U	0.02 U	0.0099 U	0.065 U	0.0063 U	0.0067 U	0.0061 U	0.0058 U
PCB 70 in mg/kg																		
PCB 77 in mg/kg																		
PCB 81 in mg/kg																		
PCB 99 in mg/kg																		
PCB 105 in mg/kg																		
PCB 114 in mg/kg																		
PCB 118 in mg/kg																		
PCB 123 in mg/kg																		
PCB 126 in mg/kg																		
PCB 156 in mg/kg																		
PCB 167 in mg/kg																		
PCB 169 in mg/kg																		
PCB 170 in mg/kg																		
PCB 180 in mg/kg																		
PCB 183 in mg/kg																		
PCB 187 in mg/kg																		
PCB 189 in mg/kg																		
Dioxins/Furans																		
Tetrachlorodibenzofurans (TCDF), Total in mg/kg																		
Total HpCDD in mg/kg																		
Total HpCDF in mg/kg																		
Total HxCDD in mg/kg																		
Total HxCDF in mg/kg																		
Total PeCDD in mg/kg																		
Total PeCDF in mg/kg																		
Total TCDD in mg/kg																		
2,3,7,8-TCDD in mg/kg																		
1,2,3,7,8-PeCDD in mg/kg																		
1,2,3,4,7,8-HxCDD in mg/kg																		
1,2,3,6,7,8-HxCDD in mg/kg																		

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-14 (2-3 ft.)	721-BH-14 (7-8 ft.)	721-BH-14 (16-17 ft.)	721-BH-14 (23-24 ft.)	721-BH-15 (3.75-4.75 ft.)	721-BH-15 (5-6 ft.)	721-BH-15 (17.5-18.5 ft.)	721-BH-15 (23-24 ft.)	721-BH-16 (0.25-1.25 ft.)	721-BH-16 (6.25-7.25 ft.)	721-BH-16 (17.5-18.5 ft.)	721-BH-16 (23-24 ft.)	721-BH-17 (5 ft.)	721-BH-17 (9.5 ft.)	721-BH-17 (14 ft.)	721-BH-17 (19 ft.)	721-BH-17 (24.8 ft.)
1,2,3,7,8,9-HxCDD in mg/kg																		
1,2,3,4,6,7,8-HpCDD in mg/kg																		
OCDD in mg/kg																		
2,3,7,8-TCDF in mg/kg																		
1,2,3,7,8-PeCDF in mg/kg																		
2,3,4,7,8-PeCDF in mg/kg																		
1,2,3,4,7,8-HxCDF in mg/kg																		
1,2,3,6,7,8-HxCDF in mg/kg																		
1,2,3,7,8,9-HxCDF in mg/kg																		
2,3,4,6,7,8-HxCDF in mg/kg																		
1,2,3,4,6,7,8-HpCDF in mg/kg																		
1,2,3,4,7,8,9-HpCDF in mg/kg																		
OCDF in mg/kg																		
Pesticides																		
4,4'-DDD in mg/kg																		
4,4'-DDE in mg/kg																		
4,4'-DDT in mg/kg																		
Aldrin in mg/kg																		
cis-Chlordane in mg/kg																		
Dieldrin in mg/kg																		
trans-Chlordane in mg/kg																		
Chlorinated Herbicides																		
Pentachlorophenol in mg/kg	0.1																	
Field Parameters																		
ORP in mVolts																		

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

AVG - Average

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

T - Reported result below associated quantitation limit but above MDL

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-17 10/1/12 (30 ft.)	721-BH-18 6/19/12 (5 ft.)	721-BH-18 6/19/12 (7.5 ft.)	721-BH-18 6/19/12 (15 ft.)	721-BH-18 6/19/12 (22.5 ft.)	721-GP5 6/23/04	HC08-B113 10/1/08 (2.5-4 ft.)	HC08-EP17 10/24/08 (0.5-2.5 ft.)	HC08-EP18 10/24/08 (1.5-3 ft.)	HC08-EP18 10/24/08 (8-9.5 ft.)	HC-N11-TP-1-2 9/26/11 (8.5-9.5 ft.)	HC-N11-TP-3-2 9/26/11 (8-9 ft.)	HW-4 1/23/07 (8-10 ft.)	NL-05 6/7/04 (6-7.4 ft.)	NL-05 6/7/04 (10-12 ft.)	NL-05 6/7/04 (15.4-17.4 ft.)	NL-05 6/7/04 (20.4-22.4 ft.)	
Polycyclic Aromatic Hydrocarbons (PAHs)																			
Acenaphthene in mg/kg	210,000	0.011 J	0.0051 U	0.005 U	0.0022 J	0.005 U	0.019 U	0.36 U	0.064 U	0.74		0.82	0.013						
Acenaphthylene in mg/kg		0.013 U	0.0051 U	0.005 U	0.0012 J	0.005 U	0.019 U	0.36 U	0.064 U	0.48 U		0.048	0.0089 U						
Anthracene in mg/kg	1,050,000	0.0031 J	0.0051 U	0.005 U	0.0025 J	0.0022 J	0.019 U	0.36 U	0.064 U	0.48 U		0.26	0.0089 U						
Benzo(g,h,i)perylene in mg/kg							0.019 U	0.36 U	0.064 U	0.68		0.015	0.0089 U						
Benzo(j,k)fluoranthene in mg/kg												0.04	0.0089 U						
Fluoranthene in mg/kg	140,000	0.0051 J	0.0017 J	0.005 U	0.0093	0.0024 J	0.019 U	0.32 T	0.064 U	1.7		0.33	0.0089 U						
Fluorene in mg/kg	140,000	0.0095 J	0.0013 J	0.005 U	0.0038 J	0.00062 J	0.019 U	0.36 U	0.064 U	2.2		1.4	0.02						
Phenanthrene in mg/kg		0.046	0.006	0.0023 J	0.012	0.012	0.019 U	0.36 U	0.064 U	5.8		2	0.029						
Pyrene in mg/kg	105,000	0.0076 J	0.0027 J	0.00094 J	0.0079	0.0032 J	0.019 U	0.22 T	0.064 U	2.1		0.34	0.0089 U						
1-Methylnaphthalene in mg/kg	4,500											15	0.14						
2-Methylnaphthalene in mg/kg	14,000	0.046	0.0053 U	0.005 U	0.0063	0.012	0.019 U	0.36 U	0.064 U	11		21	0.089						
Naphthalene in mg/kg	6	0.028	0.0051 U	0.005 U	0.0051	0.0053	0.019 U	0.36 U	0.064 U	2.1	11	3.8	0.0089 U						
Benz(a)anthracene in mg/kg		0.0068 J	0.0018 J	0.005 U	0.0036 J	0.0026 J	0.019 U	0.36 U	0.064 U	0.58		0.092	0.0089 U						
Benzo(a)pyrene in mg/kg		0.0031 J	0.0026 J	0.005 U	0.002 J	0.00079 J	0.019 U	0.36 U	0.064 U	0.81		0.05	0.0089 U						
Benzo(b)fluoranthene in mg/kg		0.0028 J	0.0043 J	0.005 U	0.0026 J	0.0011 J	0.019 U	0.36 U	0.064 U	1.2		0.053	0.0089 U						
Benzo(k)fluoranthene in mg/kg		0.013 U	0.0051 U	0.005 U	0.0013 J	0.005 U	0.019 U	0.36 U	0.064 U	0.77									
Chrysene in mg/kg		0.009 J	0.0041 J	0.0011 J	0.0047 J	0.004 J	0.019 U	0.36 U	0.064 U	1		0.083	0.0089 U						
Dibenzo(a,h)anthracene in mg/kg		0.013 U	0.0022 J	0.005 U	0.005 U	0.005 U	0.019 U	0.36 U	0.064 U	0.48 U		0.008 U	0.0089 U						
Indeno(1,2,3-cd)pyrene in mg/kg		0.013 U	0.0051 U	0.005 U	0.005 U	0.005 U	0.019 U	0.36 U	0.064 U	0.61		0.013	0.0089 U						
Total cPAHs TEQ (ND = 1/2 RDL) in mg/kg	10	0.0061 J	0.004 J	0.0038 J	0.0033 J	0.002 J	ND	ND	ND	1.2		0.067	0.0062						
Other (Non-PAH) Semivolatiles																			
1,2,4-Trichlorobenzene in mg/kg							0.019 U	0.46 U	0.064 U	2.8 U	6.6 U								
1,2,4-Trimethylbenzene in mg/kg							0.0009 U	0.091 U	0.0012 U	8.3	56								
1,2-Dichlorobenzene in mg/kg							0.0009 U	0.36 U	0.064 U	0.48 U	1.3 U								
1,3,5-Trimethylbenzene in mg/kg	35,000						0.001 U	0.091 U	0.0012 U	2.5	19								
1,3-Dichlorobenzene in mg/kg							0.019 U	0.36 U	0.064 U	0.48 U	1.3 U								
1,4-Dichlorobenzene in mg/kg							0.019 U	0.36 U	0.064 U	0.48 U	1.3 U								
2,4,5-Trichlorophenol in mg/kg							0.095 U												
2,4,6-Trichlorophenol in mg/kg							0.095 U												
2,4-Dichlorophenol in mg/kg							0.058 U												
2,4-Dimethylphenol in mg/kg							0.019 U												
2,4-Dinitrophenol in mg/kg							0.19 U												
2-Chloronaphthalene in mg/kg							0.019 U												
2-Chlorophenol in mg/kg							0.019 U												
2-Methylphenol in mg/kg							0.019 U												
2-Nitroaniline in mg/kg							0.095 U												
2-Nitrophenol in mg/kg							0.095 U												
3,3'-Dichlorobenzidine in mg/kg							0.095 U												
3-Nitroaniline in mg/kg							0.11 U												
4,6-Dinitro-2-methylphenol in mg/kg							0.19 U												
4-Bromophenyl phenyl ether in mg/kg							0.019 U												
4-Chloro-3-methylphenol in mg/kg							0.038 U												
4-Chloroaniline in mg/kg							0.057 U												
4-Chlorophenyl phenyl ether in mg/kg							0.019 U												
4-Methylphenol in mg/kg							0.019 U												
4-Nitroaniline in mg/kg							0.095 U												
4-Nitrophenol in mg/kg							0.095 U												
Benzoic acid in mg/kg							0.19 U												
Benzyl alcohol in mg/kg							0.019 U												
Benzyl butyl phthalate in mg/kg							0.019 U												
Bis(2-chloro-1-methylethyl) ether in mg/kg							0.019 U												
Bis(2-chloroethoxy)methane in mg/kg							0.019 U												
Bis(2-chloroethyl) ether in mg/kg							0.038 U												
Bis(2-ethylhexyl) phthalate in mg/kg	0.03						0.019 U												
Carbazole in mg/kg							0.019 U												
Dibenzofuran in mg/kg	3,500						0.019 U												

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-17 10/1/12 (30 ft.)	721-BH-18 6/19/12 (5 ft.)	721-BH-18 6/19/12 (7.5 ft.)	721-BH-18 6/19/12 (15 ft.)	721-BH-18 6/19/12 (22.5 ft.)	721-GP5 6/23/04	HC08-B113 10/1/08 (2.5-4 ft.)	HC08-EP17 10/24/08 (0.5-2.5 ft.)	HC08-EP18 10/24/08 (1.5-3 ft.)	HC08-EP18 10/24/08 (8-9.5 ft.)	HC-N11-TP-1-2 9/26/11 (8.5-9.5 ft.)	HC-N11-TP-3-2 9/26/11 (8-9 ft.)	HW-4 1/23/07 (8-10 ft.)	NL-05 6/7/04 (6-7.4 ft.)	NL-05 6/7/04 (10-12 ft.)	NL-05 6/7/04 (15.4-17.4 ft.)	NL-05 6/7/04 (20.4-22.4 ft.)
Diethyl phthalate in mg/kg	2,800,000						0.019 U											
Dimethyl phthalate in mg/kg							0.019 U											
Di-n-butyl phthalate in mg/kg							0.019 U											
Di-n-octyl phthalate in mg/kg							0.019 U											
Hexachlorobenzene in mg/kg	0.01						0.019 U								9.8 U	0.7472 U	0.0813 U	0.0737 U
Hexachlorobutadiene in mg/kg	0.01						0.019 U	1.6	0.064 U	0.48 U	6.6 U							
Hexachlorocyclopentadiene in mg/kg							0.095 U											
Hexachloroethane in mg/kg							0.019 U	0.45	0.064 U	0.48 U								
Isophorone in mg/kg							0.019 U											
Nitrobenzene in mg/kg							0.019 U											
N-Nitroso-di-n-propylamine in mg/kg							0.038 U											
N-Nitrosodiphenylamine in mg/kg							0.019 U											
Pentachlorophenol in mg/kg	0.1						0.095 U								9.8 U	0.7274 U	0.0791 U	0.0718 U
Phenol in mg/kg	1,050,000						0.019 U											
2,4-Dinitrotoluene in mg/kg							0.097 U											
2,6-Dinitrotoluene in mg/kg							0.095 U											
Polychlorinated Biphenyls (PCBs)																		
Aroclor 1016 in mg/kg		0.0086 U						3.2 U	0.03 U						0.1058 U	0.0243 U	0.0132 U	0.012 U
Aroclor 1221 in mg/kg		0.018 U						3.2 U	0.03 U						0.0594 U	0.0136 U	0.0074 U	0.0067 U
Aroclor 1232 in mg/kg		0.0086 U						3.2 U	0.03 U						0.043 U	0.01 U	0.005 U	0.005 U
Aroclor 1242 in mg/kg		0.0086 U						13 U	0.03 U						0.0281 U	0.0064 U	0.0035 U	0.0032 U
Aroclor 1248 in mg/kg		0.0086 U						3.2 U	0.03 U						0.0151 U	0.0035 U	0.0019 U	0.0017 U
Aroclor 1254 in mg/kg		0.0086 U						3.2 U	0.03 U						0.0173 U	0.004 U	0.0022 U	0.002 U
Aroclor 1260 in mg/kg		0.0086 U						3.2 U	0.03 U						0.6 J	0.14 J	0.0049 U	0.0044 U
Aroclor 1262 in mg/kg																		
Aroclor 1268 in mg/kg																		
Total PCBs (Sum of Aroclors) in mg/kg		0.0086 U						13 U	0.03 U					0.00477	0.6	0.14	0.0074 U	0.0067 U
PCB 70 in mg/kg														0.0001688				
PCB 77 in mg/kg														5.54E-06				
PCB 81 in mg/kg														1.04E-06 U				
PCB 99 in mg/kg																		
PCB 105 in mg/kg														0.0000637				
PCB 114 in mg/kg														1.15E-06 U				
PCB 118 in mg/kg														0.0001706				
PCB 123 in mg/kg														1.03E-06 U				
PCB 126 in mg/kg														1.33E-06 U				
PCB 156 in mg/kg														2.073E-05				
PCB 167 in mg/kg														7.83E-06				
PCB 169 in mg/kg														2.74E-06 U				
PCB 170 in mg/kg														3.736E-05				
PCB 180 in mg/kg														0.0001589				
PCB 183 in mg/kg														4.72E-06 U				
PCB 187 in mg/kg														0.0002577				
PCB 189 in mg/kg														2.84E-06 U				
Dioxins/Furans																		
Tetrachlorodibenzofurans (TCDF), Total in mg/kg														2.442E-06				
Total HpCDD in mg/kg														5.933E-06				
Total HpCDF in mg/kg														5.915E-06				
Total HxCDD in mg/kg														7.17E-07				
Total HxCDF in mg/kg														3.734E-06				
Total PeCDD in mg/kg														8.249E-06 U				
Total PeCDF in mg/kg														5.803E-06				
Total TCDD in mg/kg														1.649E-06 U				
2,3,7,8-TCDD in mg/kg														1.649E-06 U				
1,2,3,7,8-PeCDD in mg/kg														8.249E-06 U				
1,2,3,4,7,8-HxCDD in mg/kg														8.249E-06 U				
1,2,3,6,7,8-HxCDD in mg/kg														2.64E-07 J				

Aspect Consulting

2/26/2016

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Table B-16

RI

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	721-BH-17 10/1/12 (30 ft.)	721-BH-18 6/19/12 (5 ft.)	721-BH-18 6/19/12 (7.5 ft.)	721-BH-18 6/19/12 (15 ft.)	721-BH-18 6/19/12 (22.5 ft.)	721-GP5 6/23/04	HC08-B113 10/1/08 (2.5-4 ft.)	HC08-EP17 10/24/08 (0.5-2.5 ft.)	HC08-EP18 10/24/08 (1.5-3 ft.)	HC08-EP18 10/24/08 (8-9.5 ft.)	HC-N11-TP-1-2 9/26/11 (8.5-9.5 ft.)	HC-N11-TP-3-2 9/26/11 (8-9 ft.)	HW-4 1/23/07 (8-10 ft.)	NL-05 6/7/04 (6-7.4 ft.)	NL-05 6/7/04 (10-12 ft.)	NL-05 6/7/04 (15.4-17.4 ft.)	NL-05 6/7/04 (20.4-22.4 ft.)
1,2,3,7,8,9-HxCDD in mg/kg														8.249E-06	U			
1,2,3,4,6,7,8-HpCDD in mg/kg														2.522E-06	J			
OCDD in mg/kg														2.236E-05				
2,3,7,8-TCDF in mg/kg														1.329E-06	J			
1,2,3,7,8-PeCDF in mg/kg														8.64E-07	J			
2,3,4,7,8-PeCDF in mg/kg														5.15E-07	J			
1,2,3,4,7,8-HxCDF in mg/kg														1.567E-06	J			
1,2,3,6,7,8-HxCDF in mg/kg														3.88E-07	J			
1,2,3,7,8,9-HxCDF in mg/kg														8.249E-06	U			
2,3,4,6,7,8-HxCDF in mg/kg														8.249E-06	U			
1,2,3,4,6,7,8-HpCDF in mg/kg														2.043E-06	J			
1,2,3,4,7,8,9-HpCDF in mg/kg														6.73E-07	J			
OCDF in mg/kg														9.877E-06	J			
Pesticides																		
4,4'-DDD in mg/kg																		
4,4'-DDE in mg/kg																		
4,4'-DDT in mg/kg																		
Aldrin in mg/kg																		
cis-Chlordane in mg/kg																		
Dieldrin in mg/kg																		
trans-Chlordane in mg/kg																		
Chlorinated Herbicides																		
Pentachlorophenol in mg/kg	0.1																	
Field Parameters																		
ORP in mVolts																		

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

AVG - Average

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

T - Reported result below associated quantitation limit but above MDL

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-06 5/31/05 (0-2 ft.)	NL-06 5/31/05 (3-4 ft.)	NL-06 5/31/05 (4-8 ft.)	NL-06 5/31/05 (8-9 ft.)	NL-06 5/31/05 (12-14 ft.)	NL-06 5/31/05 (16-17 ft.)	NL-06 5/31/05 (17-19 ft.)	NL-07 5/31/05 (1-3 ft.)	NL-07 5/31/05 (3-4 ft.)	NL-07 5/31/05 (5-8 ft.)	NL-07 5/31/05 (12-14 ft.)	NL-07 5/31/05 (17-19 ft.)	NL-07 5/31/05 (23-25 ft.)	NL-08 5/31/05 (1-4 ft.)	NL-08 5/31/05 (10-11 ft.)	NL-08 6/1/05 (13-15 ft.)	NL-08 6/1/05 (18-20 ft.)
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene in mg/kg	210,000																	
Acenaphthylene in mg/kg																		
Anthracene in mg/kg	1,050,000																	
Benzo(g,h,i)perylene in mg/kg																		
Benzo(j,k)fluoranthene in mg/kg																		
Fluoranthene in mg/kg	140,000																	
Fluorene in mg/kg	140,000																	
Phenanthrene in mg/kg																		
Pyrene in mg/kg	105,000																	
1-Methylnaphthalene in mg/kg	4,500																	
2-Methylnaphthalene in mg/kg	14,000																	
Naphthalene in mg/kg	6																	
Benz(a)anthracene in mg/kg																		
Benzo(a)pyrene in mg/kg																		
Benzo(b)fluoranthene in mg/kg																		
Benzo(k)fluoranthene in mg/kg																		
Chrysene in mg/kg																		
Dibenzo(a,h)anthracene in mg/kg																		
Indeno(1,2,3-cd)pyrene in mg/kg																		
Total cPAHs TEQ (ND = 1/2 RDL) in mg/kg	10																	
Other (Non-PAH) Semivolatiles																		
1,2,4-Trichlorobenzene in mg/kg																		
1,2,4-Trimethylbenzene in mg/kg																		
1,2-Dichlorobenzene in mg/kg																		
1,3,5-Trimethylbenzene in mg/kg	35,000																	
1,3-Dichlorobenzene in mg/kg																		
1,4-Dichlorobenzene in mg/kg																		
2,4,5-Trichlorophenol in mg/kg																		
2,4,6-Trichlorophenol in mg/kg																		
2,4-Dichlorophenol in mg/kg																		
2,4-Dimethylphenol in mg/kg																		
2,4-Dinitrophenol in mg/kg																		
2-Chloronaphthalene in mg/kg																		
2-Chlorophenol in mg/kg																		
2-Methylphenol in mg/kg																		
2-Nitroaniline in mg/kg																		
2-Nitrophenol in mg/kg																		
3,3'-Dichlorobenzidine in mg/kg																		
3-Nitroaniline in mg/kg																		
4,6-Dinitro-2-methylphenol in mg/kg																		
4-Bromophenyl phenyl ether in mg/kg																		
4-Chloro-3-methylphenol in mg/kg																		
4-Chloroaniline in mg/kg																		
4-Chlorophenyl phenyl ether in mg/kg																		
4-Methylphenol in mg/kg																		
4-Nitroaniline in mg/kg																		
4-Nitrophenol in mg/kg																		
Benzoic acid in mg/kg																		
Benzyl alcohol in mg/kg																		
Benzyl butyl phthalate in mg/kg																		
Bis(2-chloro-1-methylethyl) ether in mg/kg																		
Bis(2-chloroethoxy)methane in mg/kg																		
Bis(2-chloroethyl) ether in mg/kg																		
Bis(2-ethylhexyl) phthalate in mg/kg	0.03																	
Carbazole in mg/kg																		
Dibenzofuran in mg/kg	3,500																	

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-06 5/31/05 (0-2 ft.)	NL-06 5/31/05 (3-4 ft.)	NL-06 5/31/05 (4-8 ft.)	NL-06 5/31/05 (8-9 ft.)	NL-06 5/31/05 (12-14 ft.)	NL-06 5/31/05 (16-17 ft.)	NL-06 5/31/05 (17-19 ft.)	NL-07 5/31/05 (1-3 ft.)	NL-07 5/31/05 (3-4 ft.)	NL-07 5/31/05 (5-8 ft.)	NL-07 5/31/05 (12-14 ft.)	NL-07 5/31/05 (17-19 ft.)	NL-07 5/31/05 (23-25 ft.)	NL-08 5/31/05 (1-4 ft.)	NL-08 5/31/05 (10-11 ft.)	NL-08 6/1/05 (13-15 ft.)	NL-08 6/1/05 (18-20 ft.)
Diethyl phthalate in mg/kg	2,800,000																	
Dimethyl phthalate in mg/kg																		
Di-n-butyl phthalate in mg/kg																		
Di-n-octyl phthalate in mg/kg																		
Hexachlorobenzene in mg/kg	0.01	1.8 U	2.5 U	2.5 U	0.28 J	0.42 U	2.3 U	0.42 U	67 U	0.56 J	0.75	0.74 U	0.4 U	0.4 U	3.1 U	3.7 U	14 U	2 U
Hexachlorobutadiene in mg/kg	0.01	1.8 U	2.5 U	2.5 U	0.48 J	0.42 U	2.3 U	0.42 U	67 U	3.1 U	0.64 U	0.74 U	0.4 U	0.4 U	3.1 U	3.7 U	14 U	2 U
Hexachlorocyclopentadiene in mg/kg																		
Hexachloroethane in mg/kg																		
Isophorone in mg/kg																		
Nitrobenzene in mg/kg																		
N-Nitroso-di-n-propylamine in mg/kg																		
N-Nitrosodiphenylamine in mg/kg																		
Pentachlorophenol in mg/kg	0.1	3.6 UJ	4.9 U	5 U	7.2 U	0.85 U	4.5 U	0.83 U	130 U	6.1 U	1.3 U	1.5 U	0.8 U	0.81 U	6.3 U	7.3 U	29 U	4 U
Phenol in mg/kg	1,050,000																	
2,4-Dinitrotoluene in mg/kg																		
2,6-Dinitrotoluene in mg/kg																		
Polychlorinated Biphenyls (PCBs)																		
Aroclor 1016 in mg/kg		9.1 U	13 U	190 U	92 U	0.064 U	0.068 U	0.063 U	4.7 U	0.093 U	0.097 U	0.11 U	0.061 U	0.061 U	0.78 U	0.77 U	0.17 U	0.06 U
Aroclor 1221 in mg/kg		9.1 U	13 U	190 U	92 U	0.064 U	0.068 U	0.063 U	4.7 U	0.093 U	0.097 U	0.11 U	0.061 U	0.061 U	0.78 U	0.77 U	0.17 U	0.06 U
Aroclor 1232 in mg/kg		9.1 U	13 U	190 U	92 U	0.064 U	0.068 U	0.063 U	4.7 U	0.093 U	0.097 U	0.11 U	0.061 U	0.061 U	0.78 U	0.77 U	0.17 U	0.06 U
Aroclor 1242 in mg/kg		9.1 U	13 U	190 U	92 U	0.064 U	0.068 U	0.063 U	4.7 U	0.093 U	0.097 U	0.11 U	0.061 U	0.061 U	0.78 U	0.11 U	0.17 U	0.06 U
Aroclor 1248 in mg/kg		9.1 U	13 U	190 U	92 U	0.064 U	0.068 U	0.063 U	4.7 U	0.093 U	0.097 U	0.11 U	0.061 U	0.061 U	0.78 U	0.11 U	0.17 U	0.06 U
Aroclor 1254 in mg/kg		9.1 U	13 U	190 U	92 U	0.064 U	0.068 U	0.063 U	4.7 U	0.093 U	0.097 U	0.11 U	0.061 U	0.061 U	0.78 U	0.11 U	0.17 U	0.06 U
Aroclor 1260 in mg/kg		9.1 U	13 U	190 U	92 U	0.064 U	0.063 J	0.063 U	4.7 U	0.44	0.21	0.11 U	0.061 U	0.061 U	0.78 U	0.11 U	0.17 U	0.06 U
Aroclor 1262 in mg/kg																		
Aroclor 1268 in mg/kg																		
Total PCBs (Sum of Aroclors) in mg/kg		9.1 U	13 U	190 U	92 U	0.064 U	0.063 J	0.063 U	4.7 U	0.44	0.21	0.11 U	0.061 U	0.061 U	0.78 U	0.77 U	0.17 U	0.06 U
PCB 70 in mg/kg																		
PCB 77 in mg/kg																		
PCB 81 in mg/kg																		
PCB 99 in mg/kg																		
PCB 105 in mg/kg																		
PCB 114 in mg/kg																		
PCB 118 in mg/kg																		
PCB 123 in mg/kg																		
PCB 126 in mg/kg																		
PCB 156 in mg/kg																		
PCB 167 in mg/kg																		
PCB 169 in mg/kg																		
PCB 170 in mg/kg																		
PCB 180 in mg/kg																		
PCB 183 in mg/kg																		
PCB 187 in mg/kg																		
PCB 189 in mg/kg																		
Dioxins/Furans																		
Tetrachlorodibenzofurans (TCDF), Total in mg/kg																		
Total HpCDD in mg/kg																		
Total HpCDF in mg/kg																		
Total HxCDD in mg/kg																		
Total HxCDF in mg/kg																		
Total PeCDD in mg/kg																		
Total PeCDF in mg/kg																		
Total TCDD in mg/kg																		
2,3,7,8-TCDD in mg/kg																		
1,2,3,7,8-PeCDD in mg/kg																		
1,2,3,4,7,8-HxCDD in mg/kg																		
1,2,3,6,7,8-HxCDD in mg/kg																		

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-06 5/31/05 (0-2 ft.)	NL-06 5/31/05 (3-4 ft.)	NL-06 5/31/05 (4-8 ft.)	NL-06 5/31/05 (8-9 ft.)	NL-06 5/31/05 (12-14 ft.)	NL-06 5/31/05 (16-17 ft.)	NL-06 5/31/05 (17-19 ft.)	NL-07 5/31/05 (1-3 ft.)	NL-07 5/31/05 (3-4 ft.)	NL-07 5/31/05 (5-8 ft.)	NL-07 5/31/05 (12-14 ft.)	NL-07 5/31/05 (17-19 ft.)	NL-07 5/31/05 (23-25 ft.)	NL-08 5/31/05 (1-4 ft.)	NL-08 5/31/05 (10-11 ft.)	NL-08 6/1/05 (13-15 ft.)	NL-08 6/1/05 (18-20 ft.)
1,2,3,7,8,9-HxCDD in mg/kg																		
1,2,3,4,6,7,8-HpCDD in mg/kg																		
OCDD in mg/kg																		
2,3,7,8-TCDF in mg/kg																		
1,2,3,7,8-PeCDF in mg/kg																		
2,3,4,7,8-PeCDF in mg/kg																		
1,2,3,4,7,8-HxCDF in mg/kg																		
1,2,3,6,7,8-HxCDF in mg/kg																		
1,2,3,7,8,9-HxCDF in mg/kg																		
2,3,4,6,7,8-HxCDF in mg/kg																		
1,2,3,4,6,7,8-HpCDF in mg/kg																		
1,2,3,4,7,8,9-HpCDF in mg/kg																		
OCDF in mg/kg																		
Pesticides																		
4,4'-DDD in mg/kg																		
4,4'-DDE in mg/kg																		
4,4'-DDT in mg/kg																		
Aldrin in mg/kg																		
cis-Chlordane in mg/kg																		
Dieldrin in mg/kg																		
trans-Chlordane in mg/kg																		
Chlorinated Herbicides																		
Pentachlorophenol in mg/kg	0.1																	
Field Parameters																		
ORP in mVolts																		

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

AVG - Average

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

T - Reported result below associated quantitation limit but above MDL

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-08 6/1/05 (22-23 ft.)	NL-09 6/1/05 (1-2 ft.)	NL-09 6/1/05 (5-6 ft.)	NL-09 6/1/05 (13-15 ft.)	NL-09 6/1/05 (18-20 ft.)	NL-09 6/1/05 (20-21 ft.)	NL-13 12/20/05 (3-4.5 ft.)	NL-13 12/20/05 (6-7.5 ft.)	NL-13 12/20/05 (9-10.5 ft.)	NL-13 12/20/05 (12-13.5 ft.)	NL-13 12/21/05 (15-16.5 ft.)	NL-13 12/21/05 (18-19.5 ft.)	NL-13 12/21/05 (21-22.5 ft.)	NL-13 12/21/05 (24-25.5 ft.)	NL-13 12/21/05 (27-28.5 ft.)	NL-16 5/18/06 (5-7 ft.)	NL-16 5/18/06 (8-10 ft.)
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene in mg/kg	210,000																	
Acenaphthylene in mg/kg																		
Anthracene in mg/kg	1,050,000																	
Benzo(g,h,i)perylene in mg/kg																		
Benzo(j,k)fluoranthene in mg/kg																		
Fluoranthene in mg/kg	140,000																	
Fluorene in mg/kg	140,000																	
Phenanthrene in mg/kg																		
Pyrene in mg/kg	105,000																	
1-Methylnaphthalene in mg/kg	4,500																	
2-Methylnaphthalene in mg/kg	14,000																	
Naphthalene in mg/kg	6																	
Benz(a)anthracene in mg/kg																		
Benzo(a)pyrene in mg/kg																		
Benzo(b)fluoranthene in mg/kg																		
Benzo(k)fluoranthene in mg/kg																		
Chrysene in mg/kg																		
Dibenzo(a,h)anthracene in mg/kg																		
Indeno(1,2,3-cd)pyrene in mg/kg																		
Total cPAHs TEQ (ND = 1/2 RDL) in mg/kg	10																	
Other (Non-PAH) Semivolatiles																		
1,2,4-Trichlorobenzene in mg/kg																		
1,2,4-Trimethylbenzene in mg/kg																		
1,2-Dichlorobenzene in mg/kg																		
1,3,5-Trimethylbenzene in mg/kg	35,000																	
1,3-Dichlorobenzene in mg/kg																		
1,4-Dichlorobenzene in mg/kg																		
2,4,5-Trichlorophenol in mg/kg																		
2,4,6-Trichlorophenol in mg/kg																		
2,4-Dichlorophenol in mg/kg																		
2,4-Dimethylphenol in mg/kg																		
2,4-Dinitrophenol in mg/kg																		
2-Chloronaphthalene in mg/kg																		
2-Chlorophenol in mg/kg																		
2-Methylphenol in mg/kg																		
2-Nitroaniline in mg/kg																		
2-Nitrophenol in mg/kg																		
3,3'-Dichlorobenzidine in mg/kg																		
3-Nitroaniline in mg/kg																		
4,6-Dinitro-2-methylphenol in mg/kg																		
4-Bromophenyl phenyl ether in mg/kg																		
4-Chloro-3-methylphenol in mg/kg																		
4-Chloroaniline in mg/kg																		
4-Chlorophenyl phenyl ether in mg/kg																		
4-Methylphenol in mg/kg																		
4-Nitroaniline in mg/kg																		
4-Nitrophenol in mg/kg																		
Benzoic acid in mg/kg																		
Benzyl alcohol in mg/kg																		
Benzyl butyl phthalate in mg/kg																		
Bis(2-chloro-1-methylethyl) ether in mg/kg																		
Bis(2-chloroethoxy)methane in mg/kg																		
Bis(2-chloroethyl) ether in mg/kg																		
Bis(2-ethylhexyl) phthalate in mg/kg	0.03																	
Carbazole in mg/kg																		
Dibenzofuran in mg/kg	3,500																	

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-08 6/1/05 (22-23 ft.)	NL-09 6/1/05 (1-2 ft.)	NL-09 6/1/05 (5-6 ft.)	NL-09 6/1/05 (13-15 ft.)	NL-09 6/1/05 (18-20 ft.)	NL-09 6/1/05 (20-21 ft.)	NL-13 12/20/05 (3-4.5 ft.)	NL-13 12/20/05 (6-7.5 ft.)	NL-13 12/20/05 (9-10.5 ft.)	NL-13 12/20/05 (12-13.5 ft.)	NL-13 12/21/05 (15-16.5 ft.)	NL-13 12/21/05 (18-19.5 ft.)	NL-13 12/21/05 (21-22.5 ft.)	NL-13 12/21/05 (24-25.5 ft.)	NL-13 12/21/05 (27-28.5 ft.)	NL-16 5/18/06 (5-7 ft.)	NL-16 5/18/06 (8-10 ft.)
Diethyl phthalate in mg/kg	2,800,000																	
Dimethyl phthalate in mg/kg																		
Di-n-butyl phthalate in mg/kg																		
Di-n-octyl phthalate in mg/kg																		
Hexachlorobenzene in mg/kg	0.01	0.41 U	1.9 U	3.5 UJ	2.3 U	0.4 U	0.4 U	0.433	0.771	0.311	0.279	0.0368	0.000906 U	0.000986 U	0.000943 U	0.000918 U	0.49 J	0.17 J
Hexachlorobutadiene in mg/kg	0.01	0.41 U	1.9 U	3.5 UJ	2.3 U	0.4 U	0.4 U	1.39	2.39	0.825	0.332	0.0564	0.00429 J	0.00359 U	0.00343 U	0.00334 U	1	0.49
Hexachlorocyclopentadiene in mg/kg																		
Hexachloroethane in mg/kg																		
Isophorone in mg/kg																		
Nitrobenzene in mg/kg																		
N-Nitroso-di-n-propylamine in mg/kg																		
N-Nitrosodiphenylamine in mg/kg																		
Pentachlorophenol in mg/kg	0.1	0.82 U	3.8 U	7 UJ	4.6 U	0.79 U	0.8 U	0.0162 U	0.359 J	0.324 J	0.545 J	0.00151 U	0.00166 J	0.0017 U	0.00163 U	0.00158 U	1.1 J	0.37 J
Phenol in mg/kg	1,050,000																	
2,4-Dinitrotoluene in mg/kg																		
2,6-Dinitrotoluene in mg/kg																		
Polychlorinated Biphenyls (PCBs)																		
Aroclor 1016 in mg/kg		0.062 U	1.1 U	8.9 U	0.69 U	0.06 U	0.061 U	0.00392 U	0.00381 U	0.00366 U	0.00737 U	0.0035 U	0.00351 U	0.00385 U	0.00372 U	0.00361 U		
Aroclor 1221 in mg/kg		0.062 U	1.1 U	8.9 U	0.69 U	0.06 U	0.061 U	0.00392 U	0.00381 U	0.00366 U	0.00737 U	0.0035 U	0.00351 U	0.00385 U	0.00372 U	0.00361 U		
Aroclor 1232 in mg/kg		0.062 U	1.1 U	8.9 U	0.69 U	0.06 U	0.061 U	0.00392 U	0.00381 U	0.00366 U	0.00737 U	0.0035 U	0.00351 U	0.00385 U	0.00372 U	0.00361 U		
Aroclor 1242 in mg/kg		0.062 U	1.1 U	8.9 U	0.69 U	0.06 U	0.061 U	0.00392 U	0.00381 U	0.00366 U	0.00737 U	0.0035 U	0.00351 U	0.00385 U	0.00372 U	0.00361 U		
Aroclor 1248 in mg/kg		0.062 U	1.1 U	8.9 U	0.69 U	0.06 U	0.061 U	0.00392 U	0.00381 U	0.00366 U	0.00737 U	0.0035 U	0.00351 U	0.00385 U	0.00372 U	0.00361 U		
Aroclor 1254 in mg/kg		0.062 U	1.1 U	8.9 U	0.69 U	0.06 U	0.061 U	0.00215 UJ	0.00209 UJ	0.00201 UJ	0.00405 UJ	0.00192 U	0.00193 U	0.00212 U	0.00204 U	0.00198 U		
Aroclor 1260 in mg/kg		0.062 U	1.1 U	8.9 U	0.69 U	0.06 U	0.061 U	0.00215 UJ	0.00209 UJ	0.00201 UJ	0.00405 UJ	0.00192 U	0.00193 U	0.00212 U	0.00204 U	0.00198 U		
Aroclor 1262 in mg/kg																		
Aroclor 1268 in mg/kg																		
Total PCBs (Sum of Aroclors) in mg/kg		0.062 U	1.1 U	8.9 U	0.69 U	0.06 U	0.061 U	0.00392 UJ	0.00381 UJ	0.00366 UJ	0.00737 UJ	0.0035 U	0.00351 U	0.00385 U	0.00372 U	0.00361 U		
PCB 70 in mg/kg																		
PCB 77 in mg/kg																		
PCB 81 in mg/kg																		
PCB 99 in mg/kg																		
PCB 105 in mg/kg																		
PCB 114 in mg/kg																		
PCB 118 in mg/kg																		
PCB 123 in mg/kg																		
PCB 126 in mg/kg																		
PCB 156 in mg/kg																		
PCB 167 in mg/kg																		
PCB 169 in mg/kg																		
PCB 170 in mg/kg																		
PCB 180 in mg/kg																		
PCB 183 in mg/kg																		
PCB 187 in mg/kg																		
PCB 189 in mg/kg																		
Dioxins/Furans																		
Tetrachlorodibenzofurans (TCDF), Total in mg/kg																		
Total HpCDD in mg/kg																		
Total HpCDF in mg/kg																		
Total HxCDD in mg/kg																		
Total HxCDF in mg/kg																		
Total PeCDD in mg/kg																		
Total PeCDF in mg/kg																		
Total TCDD in mg/kg																		
2,3,7,8-TCDD in mg/kg																		
1,2,3,7,8-PeCDD in mg/kg																		
1,2,3,4,7,8-HxCDD in mg/kg																		
1,2,3,6,7,8-HxCDD in mg/kg																		

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-08 6/1/05 (22-23 ft.)	NL-09 6/1/05 (1-2 ft.)	NL-09 6/1/05 (5-6 ft.)	NL-09 6/1/05 (13-15 ft.)	NL-09 6/1/05 (18-20 ft.)	NL-09 6/1/05 (20-21 ft.)	NL-13 12/20/05 (3-4.5 ft.)	NL-13 12/20/05 (6-7.5 ft.)	NL-13 12/20/05 (9-10.5 ft.)	NL-13 12/20/05 (12-13.5 ft.)	NL-13 12/21/05 (15-16.5 ft.)	NL-13 12/21/05 (18-19.5 ft.)	NL-13 12/21/05 (21-22.5 ft.)	NL-13 12/21/05 (24-25.5 ft.)	NL-13 12/21/05 (27-28.5 ft.)	NL-16 5/18/06 (5-7 ft.)	NL-16 5/18/06 (8-10 ft.)
1,2,3,7,8,9-HxCDD in mg/kg																		
1,2,3,4,6,7,8-HpCDD in mg/kg																		
OCDD in mg/kg																		
2,3,7,8-TCDF in mg/kg																		
1,2,3,7,8-PeCDF in mg/kg																		
2,3,4,7,8-PeCDF in mg/kg																		
1,2,3,4,7,8-HxCDF in mg/kg																		
1,2,3,6,7,8-HxCDF in mg/kg																		
1,2,3,7,8,9-HxCDF in mg/kg																		
2,3,4,6,7,8-HxCDF in mg/kg																		
1,2,3,4,6,7,8-HpCDF in mg/kg																		
1,2,3,4,7,8,9-HpCDF in mg/kg																		
OCDF in mg/kg																		
Pesticides																		
4,4'-DDD in mg/kg								0.000241 U	0.000222 U	0.000243 U	0.00049 U	0.000222 U	0.000211 U	0.000233 U	0.000228 U	0.000227 U	0.004 U	0.0029 U
4,4'-DDE in mg/kg								0.0501 J	0.0753 J	0.000239 U	0.00048 U	0.00456	0.000206 U	0.000228 U	0.000223 U	0.000222 U	0.004 U	0.0029 U
4,4'-DDT in mg/kg								0.000277 UJ	0.000256 UJ	0.00028 UJ	0.000564 UJ	0.000255 UJ	0.000243 UJ	0.000268 UJ	0.000262 UJ	0.000261 UJ	0.004 U	0.0029 U
Aldrin in mg/kg								0.000121 U	0.000112 U	0.000123 U	0.000247 U	0.000112 U	0.000106 U	0.000118 U	0.000115 U	0.000115 U	0.002 U	0.0014 U
cis-Chlordane in mg/kg								0.000127 U	0.000118 U	0.000129 U	0.000259 U	0.000117 U	0.000111 U	0.000123 U	0.000121 U	0.00012 U	0.002 U	0.0014 U
Dieldrin in mg/kg								0.000287 U	0.000264 U	0.00029 U	0.000583 U	0.000264 U	0.000251 U	0.000277 U	0.000271 U	0.00027 U	0.004 U	0.0029 U
trans-Chlordane in mg/kg								0.000143 U	0.000132 U	0.000144 U	0.00029 U	0.000132 U	0.000125 U	0.000138 U	0.000135 U	0.000135 U	0.002 U	0.0014 U
Chlorinated Herbicides																		
Pentachlorophenol in mg/kg	0.1																	
Field Parameters																		
ORP in mVolts																		

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

AVG - Average

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

T - Reported result below associated quantitation limit but above MDL

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-16 5/19/06 (11-13 ft.)	NL-16 5/19/06 (14-16 ft.)	NL-16 5/19/06 (17-19 ft.)	NL-16 5/19/06 (20-22 ft.)	NL-18 8/1/06 (2-4 ft.)	NL-18 8/1/06 (4-6 ft.)	NL-18 8/1/06 (8-10 ft.)	NL-18 8/1/06 (12-14 ft.)	NL-18 8/1/06 (18-20 ft.)	NL-18 8/1/06 (24-26 ft.)	NL-19 7/27/06 (2-4 ft.)	NL-19 7/27/06 (4-6 ft.)	NL-19 7/27/06 (8-10 ft.)	NL-19 7/27/06 (12-14 ft.)	NL-19 8/1/06 (18-20 ft.)	NL-19 8/1/06 (24-26 ft.)	NL-20 7/27/06 (2-4 ft.)
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene in mg/kg	210,000																	
Acenaphthylene in mg/kg																		
Anthracene in mg/kg	1,050,000																	
Benzo(g,h,i)perylene in mg/kg																		
Benzo(j,k)fluoranthene in mg/kg																		
Fluoranthene in mg/kg	140,000																	
Fluorene in mg/kg	140,000																	
Phenanthrene in mg/kg																		
Pyrene in mg/kg	105,000																	
1-Methylnaphthalene in mg/kg	4,500																	
2-Methylnaphthalene in mg/kg	14,000																	
Naphthalene in mg/kg	6																	
Benz(a)anthracene in mg/kg																		
Benzo(a)pyrene in mg/kg																		
Benzo(b)fluoranthene in mg/kg																		
Benzo(k)fluoranthene in mg/kg																		
Chrysene in mg/kg																		
Dibenzo(a,h)anthracene in mg/kg																		
Indeno(1,2,3-cd)pyrene in mg/kg																		
Total cPAHs TEQ (ND = 1/2 RDL) in mg/kg	10																	
Other (Non-PAH) Semivolatiles																		
1,2,4-Trichlorobenzene in mg/kg																		
1,2,4-Trimethylbenzene in mg/kg																		
1,2-Dichlorobenzene in mg/kg																		
1,3,5-Trimethylbenzene in mg/kg	35,000																	
1,3-Dichlorobenzene in mg/kg																		
1,4-Dichlorobenzene in mg/kg																		
2,4,5-Trichlorophenol in mg/kg																		
2,4,6-Trichlorophenol in mg/kg																		
2,4-Dichlorophenol in mg/kg																		
2,4-Dimethylphenol in mg/kg																		
2,4-Dinitrophenol in mg/kg																		
2-Chloronaphthalene in mg/kg																		
2-Chlorophenol in mg/kg																		
2-Methylphenol in mg/kg																		
2-Nitroaniline in mg/kg																		
2-Nitrophenol in mg/kg																		
3,3'-Dichlorobenzidine in mg/kg																		
3-Nitroaniline in mg/kg																		
4,6-Dinitro-2-methylphenol in mg/kg																		
4-Bromophenyl phenyl ether in mg/kg																		
4-Chloro-3-methylphenol in mg/kg																		
4-Chloroaniline in mg/kg																		
4-Chlorophenyl phenyl ether in mg/kg																		
4-Methylphenol in mg/kg																		
4-Nitroaniline in mg/kg																		
4-Nitrophenol in mg/kg																		
Benzoic acid in mg/kg																		
Benzyl alcohol in mg/kg																		
Benzyl butyl phthalate in mg/kg																		
Bis(2-chloro-1-methylethyl) ether in mg/kg																		
Bis(2-chloroethoxy)methane in mg/kg																		
Bis(2-chloroethyl) ether in mg/kg																		
Bis(2-ethylhexyl) phthalate in mg/kg	0.03																	
Carbazole in mg/kg																		
Dibenzofuran in mg/kg	3,500																	

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-16 5/19/06 (11-13 ft.)	NL-16 5/19/06 (14-16 ft.)	NL-16 5/19/06 (17-19 ft.)	NL-16 5/19/06 (20-22 ft.)	NL-18 8/1/06 (2-4 ft.)	NL-18 8/1/06 (4-6 ft.)	NL-18 8/1/06 (8-10 ft.)	NL-18 8/1/06 (12-14 ft.)	NL-18 8/1/06 (18-20 ft.)	NL-18 8/1/06 (24-26 ft.)	NL-19 7/27/06 (2-4 ft.)	NL-19 7/27/06 (4-6 ft.)	NL-19 7/27/06 (8-10 ft.)	NL-19 7/27/06 (12-14 ft.)	NL-19 8/1/06 (18-20 ft.)	NL-19 8/1/06 (24-26 ft.)	NL-20 7/27/06 (2-4 ft.)	
Diethyl phthalate in mg/kg	2,800,000																		
Dimethyl phthalate in mg/kg																			
Di-n-butyl phthalate in mg/kg																			
Di-n-octyl phthalate in mg/kg																			
Hexachlorobenzene in mg/kg	0.01	0.0025 J	0.06 J	0.0011 J	0.00095 UJ	0.097	0.0021 U	0.002 U	0.002 U	0.002 U	0.002 U	0.0017 U	0.0017 U	0.0021 U	0.002 U	0.002 U	0.0019 U	0.0018 U	
Hexachlorobutadiene in mg/kg	0.01	0.0038 U	0.085	0.003 U	0.0035 U	0.15	0.021	0.0093	0.001 U	0.00099 U	0.001 U	0.0094	0.007	0.001 U	0.00099 U	0.00098 U	0.00097 U	0.00091 U	
Hexachlorocyclopentadiene in mg/kg																			
Hexachloroethane in mg/kg																			
Isophorone in mg/kg																			
Nitrobenzene in mg/kg																			
N-Nitroso-di-n-propylamine in mg/kg																			
N-Nitrosodiphenylamine in mg/kg																			
Pentachlorophenol in mg/kg	0.1	0.024 J	0.096 J	0.002 J		0.046	0.0043 U	0.004 U	0.0042 U	0.0041 U	0.0042 U	0.0035 U	0.0035 U	0.0043 U	0.0041 U	0.004 U	0.004 U	0.0038 U	
Phenol in mg/kg	1,050,000																		
2,4-Dinitrotoluene in mg/kg																			
2,6-Dinitrotoluene in mg/kg																			
Polychlorinated Biphenyls (PCBs)																			
Aroclor 1016 in mg/kg																			
Aroclor 1221 in mg/kg																			
Aroclor 1232 in mg/kg																			
Aroclor 1242 in mg/kg																			
Aroclor 1248 in mg/kg																			
Aroclor 1254 in mg/kg																			
Aroclor 1260 in mg/kg																			
Aroclor 1262 in mg/kg																			
Aroclor 1268 in mg/kg																			
Total PCBs (Sum of Aroclors) in mg/kg						0.11 U	0.013 U	0.14537	0.012 U	0.012 U	0.013 U	0.01 U	0.01 U	0.013 U	0.012 U	0.012 U	0.012 U	0.011 U	
PCB 70 in mg/kg								0.0025886											
PCB 77 in mg/kg								0.0001679											
PCB 81 in mg/kg								1.116E-05 U											
PCB 99 in mg/kg																			
PCB 105 in mg/kg								0.0021256											
PCB 114 in mg/kg								1.73E-06 U											
PCB 118 in mg/kg								0.0064993											
PCB 123 in mg/kg								1.66E-06 U											
PCB 126 in mg/kg								9.564E-05											
PCB 156 in mg/kg								0.0007805											
PCB 167 in mg/kg								0.0003649											
PCB 169 in mg/kg								1.082E-05											
PCB 170 in mg/kg								0.0014018											
PCB 180 in mg/kg								0.0029615											
PCB 183 in mg/kg								0.000466											
PCB 187 in mg/kg								0.0035468											
PCB 189 in mg/kg								6.175E-05											
Dioxins/Furans																			
Tetrachlorodibenzofurans (TCDF), Total in mg/kg								8.924E-05											
Total HpCDD in mg/kg								8.528E-05											
Total HpCDF in mg/kg								0.0001234											
Total HxCDD in mg/kg								7.572E-05											
Total HxCDF in mg/kg								0.0001766											
Total PeCDD in mg/kg								5.078E-05											
Total PeCDF in mg/kg								0.0002167											
Total TCDD in mg/kg								3.995E-05											
2,3,7,8-TCDD in mg/kg								8.21E-07 J											
1,2,3,7,8-PeCDD in mg/kg								2.767E-06 J											
1,2,3,4,7,8-HxCDD in mg/kg								2.235E-06 J											
1,2,3,6,7,8-HxCDD in mg/kg								5.008E-06 J											

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-16 5/19/06 (11-13 ft.)	NL-16 5/19/06 (14-16 ft.)	NL-16 5/19/06 (17-19 ft.)	NL-16 5/19/06 (20-22 ft.)	NL-18 8/1/06 (2-4 ft.)	NL-18 8/1/06 (4-6 ft.)	NL-18 8/1/06 (8-10 ft.)	NL-18 8/1/06 (12-14 ft.)	NL-18 8/1/06 (18-20 ft.)	NL-18 8/1/06 (24-26 ft.)	NL-19 7/27/06 (2-4 ft.)	NL-19 7/27/06 (4-6 ft.)	NL-19 7/27/06 (8-10 ft.)	NL-19 7/27/06 (12-14 ft.)	NL-19 8/1/06 (18-20 ft.)	NL-19 8/1/06 (24-26 ft.)	NL-20 7/27/06 (2-4 ft.)
1,2,3,7,8,9-HxCDD in mg/kg								4.481E-06 J										
1,2,3,4,6,7,8-HpCDD in mg/kg								4.149E-05										
OCDD in mg/kg								0.0001725										
2,3,7,8-TCDF in mg/kg								3.037E-05										
1,2,3,7,8-PeCDF in mg/kg								1.981E-05										
2,3,4,7,8-PeCDF in mg/kg								2.072E-05										
1,2,3,4,7,8-HxCDF in mg/kg								4.786E-05										
1,2,3,6,7,8-HxCDF in mg/kg								1.987E-05										
1,2,3,7,8,9-HxCDF in mg/kg								7.58E-07 J										
2,3,4,6,7,8-HxCDF in mg/kg								1.591E-05										
1,2,3,4,6,7,8-HpCDF in mg/kg								7.544E-05										
1,2,3,4,7,8,9-HpCDF in mg/kg								1.225E-05										
OCDF in mg/kg								0.000109										
Pesticides																		
4,4'-DDD in mg/kg		0.0028 U	0.069 J	0.0022 U	0.0026 U													
4,4'-DDE in mg/kg		0.0028 U	0.047 J	0.0022 U	0.0026 U													
4,4'-DDT in mg/kg		0.0028 U	0.0034 U	0.0022 U	0.0026 U													
Aldrin in mg/kg		0.0014 U	0.0017 U	0.0011 U	0.0013 U													
cis-Chlordane in mg/kg		0.0014 U	0.0017 U	0.0011 U	0.0013 U													
Dieldrin in mg/kg		0.0028 U	0.0034 U	0.0022 U	0.0026 U													
trans-Chlordane in mg/kg		0.0014 U	0.0017 U	0.0011 U	0.0013 U													
Chlorinated Herbicides																		
Pentachlorophenol in mg/kg	0.1																	
Field Parameters																		
ORP in mVolts																		

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

AVG - Average

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

T - Reported result below associated quantitation limit but above MDL

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-20 7/27/06 (4-6 ft.)	NL-20 7/27/06 (8-10 ft.)	NL-20 7/27/06 (12-14 ft.)	NL-20 7/27/06 (18-20 ft.)	NL-20 7/27/06 (24-26 ft.)	NL-21 7/25/06 (2-4 ft.)	NL-21 7/25/06 (4-6 ft.)	NL-21 7/25/06 (8-10 ft.)	NL-21 7/25/06 (12-14 ft.)	NL-21 7/25/06 (18-20 ft.)	NL-21 7/25/06 (24-26 ft.)	NL-25 1/18/07 (5-8 ft.)	NL-25 1/18/07 (10-13 ft.)	NL-25 1/18/07 (15-18 ft.)	NL-25 1/19/07 (20-23 ft.)	NL-26 1/17/07 (5-8 ft.)	NL-26 1/17/07 (10-13 ft.)	
Polycyclic Aromatic Hydrocarbons (PAHs)																			
Acenaphthene in mg/kg	210,000																		
Acenaphthylene in mg/kg																			
Anthracene in mg/kg	1,050,000																		
Benzo(g,h,i)perylene in mg/kg																			
Benzo(j,k)fluoranthene in mg/kg																			
Fluoranthene in mg/kg	140,000																		
Fluorene in mg/kg	140,000																		
Phenanthrene in mg/kg																			
Pyrene in mg/kg	105,000																		
1-Methylnaphthalene in mg/kg	4,500																		
2-Methylnaphthalene in mg/kg	14,000																		
Naphthalene in mg/kg	6																		
Benz(a)anthracene in mg/kg																			
Benzo(a)pyrene in mg/kg																			
Benzo(b)fluoranthene in mg/kg																			
Benzo(k)fluoranthene in mg/kg																			
Chrysene in mg/kg																			
Dibenzo(a,h)anthracene in mg/kg																			
Indeno(1,2,3-cd)pyrene in mg/kg																			
Total cPAHs TEQ (ND = 1/2 RDL) in mg/kg	10																		
Other (Non-PAH) Semivolatiles																			
1,2,4-Trichlorobenzene in mg/kg																			
1,2,4-Trimethylbenzene in mg/kg																			
1,2-Dichlorobenzene in mg/kg																			
1,3,5-Trimethylbenzene in mg/kg	35,000																		
1,3-Dichlorobenzene in mg/kg																			
1,4-Dichlorobenzene in mg/kg																			
2,4,5-Trichlorophenol in mg/kg																			
2,4,6-Trichlorophenol in mg/kg																			
2,4-Dichlorophenol in mg/kg																			
2,4-Dimethylphenol in mg/kg																			
2,4-Dinitrophenol in mg/kg																			
2-Chloronaphthalene in mg/kg																			
2-Chlorophenol in mg/kg																			
2-Methylphenol in mg/kg																			
2-Nitroaniline in mg/kg																			
2-Nitrophenol in mg/kg																			
3,3'-Dichlorobenzidine in mg/kg																			
3-Nitroaniline in mg/kg																			
4,6-Dinitro-2-methylphenol in mg/kg																			
4-Bromophenyl phenyl ether in mg/kg																			
4-Chloro-3-methylphenol in mg/kg																			
4-Chloroaniline in mg/kg																			
4-Chlorophenyl phenyl ether in mg/kg																			
4-Methylphenol in mg/kg																			
4-Nitroaniline in mg/kg																			
4-Nitrophenol in mg/kg																			
Benzoic acid in mg/kg																			
Benzyl alcohol in mg/kg																			
Benzyl butyl phthalate in mg/kg																			
Bis(2-chloro-1-methylethyl) ether in mg/kg																			
Bis(2-chloroethoxy)methane in mg/kg																			
Bis(2-chloroethyl) ether in mg/kg																			
Bis(2-ethylhexyl) phthalate in mg/kg	0.03																		
Carbazole in mg/kg																			
Dibenzofuran in mg/kg	3,500																		

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-20 7/27/06 (4-6 ft.)	NL-20 7/27/06 (8-10 ft.)	NL-20 7/27/06 (12-14 ft.)	NL-20 7/27/06 (18-20 ft.)	NL-20 7/27/06 (24-26 ft.)	NL-21 7/25/06 (2-4 ft.)	NL-21 7/25/06 (4-6 ft.)	NL-21 7/25/06 (8-10 ft.)	NL-21 7/25/06 (12-14 ft.)	NL-21 7/25/06 (18-20 ft.)	NL-21 7/25/06 (24-26 ft.)	NL-25 1/18/07 (5-8 ft.)	NL-25 1/18/07 (10-13 ft.)	NL-25 1/18/07 (15-18 ft.)	NL-25 1/19/07 (20-23 ft.)	NL-26 1/17/07 (5-8 ft.)	NL-26 1/17/07 (10-13 ft.)	
Diethyl phthalate in mg/kg	2,800,000																		
Dimethyl phthalate in mg/kg																			
Di-n-butyl phthalate in mg/kg																			
Di-n-octyl phthalate in mg/kg																			
Hexachlorobenzene in mg/kg	0.01	0.0018 U	0.002 U	0.0021 U	0.002 U	0.0021 U	0.000738 J	0.00014 J	0.0000975 J	0.00159 U	0.00119 U	0.00132 U	0.0022 U	0.0021 U	0.0022 U	0.0022 U	0.002 U	0.0028 J	
Hexachlorobutadiene in mg/kg	0.01	0.00088 U	0.001 U	0.001 U	0.00098 U	0.0011 U							0.0017 J	0.0036 J	0.0011 U	0.0011 U	0.00098 U	0.0017 J	
Hexachlorocyclopentadiene in mg/kg																			
Hexachloroethane in mg/kg																			
Isophorone in mg/kg																			
Nitrobenzene in mg/kg																			
N-Nitroso-di-n-propylamine in mg/kg																			
N-Nitrosodiphenylamine in mg/kg																			
Pentachlorophenol in mg/kg	0.1	0.0036 U	0.0042 U	0.0042 U	0.0041 U	0.0043 U													
Phenol in mg/kg	1,050,000																		
2,4-Dinitrotoluene in mg/kg																			
2,6-Dinitrotoluene in mg/kg																			
Polychlorinated Biphenyls (PCBs)																			
Aroclor 1016 in mg/kg							0.027 U	0.031 U	0.0323 U	0.0398 U	0.0298 U	0.033 U							
Aroclor 1221 in mg/kg							0.054 U	0.0621 U	0.0646 U	0.0795 U	0.0596 U	0.066 U							
Aroclor 1232 in mg/kg							0.027 U	0.031 U	0.0323 U	0.0398 U	0.0298 U	0.033 U							
Aroclor 1242 in mg/kg							0.027 U	0.031 U	0.0323 U	0.0398 U	0.0298 U	0.033 U							
Aroclor 1248 in mg/kg							0.027 U	0.031 U	0.0323 U	0.0398 U	0.0298 U	0.033 U							
Aroclor 1254 in mg/kg							0.027 U	0.031 U	0.0323 U	0.0398 U	0.0298 U	0.033 U							
Aroclor 1260 in mg/kg							0.027 U	0.031 U	0.0323 U	0.0398 U	0.0298 U	0.033 U							
Aroclor 1262 in mg/kg							0.027 U	0.031 U	0.0323 U	0.0398 U	0.0298 U	0.033 U							
Aroclor 1268 in mg/kg							0.027 U	0.031 U	0.0323 U	0.0398 U	0.0298 U	0.033 U							
Total PCBs (Sum of Aroclors) in mg/kg		0.011 U	0.013 U	0.013 U	0.012 U	0.013 U	0.054 U	0.0621 U	0.0646 U	0.0795 U	0.0596 U	0.066 U	0.013 U	0.013 U	0.013 U	0.014 U	0.012 U	0.0109	
PCB 70 in mg/kg													0.00116 J						0.000368 J
PCB 77 in mg/kg													0.0000441 J						0.0000224 J
PCB 81 in mg/kg													1.06E-06 UJ						7.66E-07 UJ
PCB 99 in mg/kg													0.000534 J						0.000161 J
PCB 105 in mg/kg													0.000613 J						0.000186 J
PCB 114 in mg/kg													0.0000286 J						8.59E-06 J
PCB 118 in mg/kg													0.00143 J						0.000444 J
PCB 123 in mg/kg													0.0000174 J						0.0000174 J
PCB 126 in mg/kg													5.03E-06 UJ						0.0000133 J
PCB 156 in mg/kg													0.0002 J						0.0000646 J
PCB 167 in mg/kg													0.0000648 J						0.0000445 J
PCB 169 in mg/kg													3.12E-06 UJ						1.72E-06 UJ
PCB 170 in mg/kg													0.000399 J						0.000174 J
PCB 180 in mg/kg													0.00104 J						0.000538 J
PCB 183 in mg/kg													0.00011 J						0.000058 J
PCB 187 in mg/kg													0.000422 J						0.000228 J
PCB 189 in mg/kg													6.12E-06 UJ						3.08E-06 UJ
Dioxins/Furans																			
Tetrachlorodibenzofurans (TCDF), Total in mg/kg													0.0000294						0.0000135
Total HpCDD in mg/kg													0.0000215						0.0000145
Total HpCDF in mg/kg													0.000038						0.0000208
Total HxCDD in mg/kg													2.02E-07 U						1.52E-06 J
Total HxCDF in mg/kg													0.0000497						0.0000307
Total PeCDD in mg/kg													8.05E-07 J						1.22E-06 J
Total PeCDF in mg/kg													0.0000475						0.0000313
Total TCDD in mg/kg													0.0000002 U						4.92E-07 J
2,3,7,8-TCDD in mg/kg													0.0000002 U						1.02E-07 U
1,2,3,7,8-PeCDD in mg/kg													2.93E-07 U						1.45E-07 J
1,2,3,4,7,8-HxCDD in mg/kg													2.02E-07 U						2.44E-07 U
1,2,3,6,7,8-HxCDD in mg/kg													6.01E-07 J						7.22E-07 J

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-20 7/27/06 (4-6 ft.)	NL-20 7/27/06 (8-10 ft.)	NL-20 7/27/06 (12-14 ft.)	NL-20 7/27/06 (18-20 ft.)	NL-20 7/27/06 (24-26 ft.)	NL-21 7/25/06 (2-4 ft.)	NL-21 7/25/06 (4-6 ft.)	NL-21 7/25/06 (8-10 ft.)	NL-21 7/25/06 (12-14 ft.)	NL-21 7/25/06 (18-20 ft.)	NL-21 7/25/06 (24-26 ft.)	NL-25 1/18/07 (5-8 ft.)	NL-25 1/18/07 (10-13 ft.)	NL-25 1/18/07 (15-18 ft.)	NL-25 1/19/07 (20-23 ft.)	NL-26 1/17/07 (5-8 ft.)	NL-26 1/17/07 (10-13 ft.)
1,2,3,7,8,9-HxCDD in mg/kg													2.06E-07 U					2.53E-07 U
1,2,3,4,6,7,8-HpCDD in mg/kg													8.51E-06					6.11E-06 J
OCDD in mg/kg													0.0000854					0.000053
2,3,7,8-TCDF in mg/kg													0.0000104					4.33E-06
1,2,3,7,8-PeCDF in mg/kg													0.0000119					3.25E-06 J
2,3,4,7,8-PeCDF in mg/kg													5.19E-06 J					1.95E-06 J
1,2,3,4,7,8-HxCDF in mg/kg													0.0000182					7.28E-06 J
1,2,3,6,7,8-HxCDF in mg/kg													0.0000049 J					2.09E-06 J
1,2,3,7,8,9-HxCDF in mg/kg													6.58E-07 J					5.62E-07 U
2,3,4,6,7,8-HxCDF in mg/kg													3.98E-06 J					1.47E-06 J
1,2,3,4,6,7,8-HpCDF in mg/kg													0.0000169					8.19E-06 J
1,2,3,4,7,8,9-HpCDF in mg/kg													5.61E-06 J					2.42E-06 J
OCDF in mg/kg													0.0000952					0.0000448
Pesticides																		
4,4'-DDD in mg/kg													0.0024 U	0.0024 U	0.0024 U	0.0025 U	0.0022 U	0.0023 U
4,4'-DDE in mg/kg													0.0022 U	0.0021 U	0.0022 U	0.0022 U	0.002 U	0.0021 U
4,4'-DDT in mg/kg													0.0005 U	0.0005 U	0.0005 U	0.0006 U	0.0005 U	0.0005 U
Aldrin in mg/kg													0.0019 U	0.0019 U	0.0019 U	0.0019 U	0.0017 U	0.0018 U
cis-Chlordane in mg/kg													0.0028 U	0.0028 U	0.0028 U	0.0029 U	0.0026 U	0.0027 U
Dieldrin in mg/kg													0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0013 U	0.0014 U
trans-Chlordane in mg/kg													0.0028 U	0.0028 U	0.0028 U	0.0029 U	0.0026 U	0.0027 U
Chlorinated Herbicides																		
Pentachlorophenol in mg/kg	0.1						0.0324 U	0.0324 U	0.0326 U	0.0327 U	0.0325 U	0.0328 U						
Field Parameters																		
ORP in mVolts																		

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

AVG - Average

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

T - Reported result below associated quantitation limit but above MDL

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-26 1/18/07 (15-18 ft.)	NL-26 1/18/07 (20-23 ft.)	NL-27 1/19/07 (6-8 ft.)	NL-28 1/17/07 (5-8 ft.)	NL-28 1/17/07 (10-13 ft.)	NL-28 1/17/07 (15-18 ft.)	NL-28 1/17/07 (20-23 ft.)	NL-29 1/18/07 (5-8 ft.)	NL-29 1/18/07 (10-13 ft.)	NL-29 1/18/07 (15-18 ft.)	NL-29 1/18/07 (20-23 ft.)	NL-30 1/19/07 (5-8 ft.)	NL-30 1/19/07 (10-13 ft.)	NL-30 1/19/07 (15-18 ft.)	NL-30 1/19/07 (20-23 ft.)	WMUL-01 6/7/12 (1.5-2.5 ft.)	WMUL-01 6/7/12 (5-6 ft.)	
Polycyclic Aromatic Hydrocarbons (PAHs)																			
Acenaphthene in mg/kg	210,000																	0.0028 U	0.003 U
Acenaphthylene in mg/kg																		0.0028 U	0.003 U
Anthracene in mg/kg	1,050,000																	0.0028 U	0.003 U
Benzo(g,h,i)perylene in mg/kg																			
Benzo(j,k)fluoranthene in mg/kg																			
Fluoranthene in mg/kg	140,000																	0.0028 U	0.003 U
Fluorene in mg/kg	140,000																	0.0028 U	0.003 U
Phenanthrene in mg/kg																		0.0028 U	0.002 J
Pyrene in mg/kg	105,000																	0.0028 U	0.003 U
1-Methylnaphthalene in mg/kg	4,500																		
2-Methylnaphthalene in mg/kg	14,000																	0.00054 J	0.00083 J
Naphthalene in mg/kg	6																	0.0028 U	0.003 U
Benz(a)anthracene in mg/kg																		0.0028 U	0.003 U
Benzo(a)pyrene in mg/kg																		0.0028 U	0.003 U
Benzo(b)fluoranthene in mg/kg																		0.0028 U	0.003 U
Benzo(k)fluoranthene in mg/kg																		0.0028 U	0.003 U
Chrysene in mg/kg																		0.0028 U	0.003 U
Dibenzo(a,h)anthracene in mg/kg																		0.0028 U	0.003 U
Indeno(1,2,3-cd)pyrene in mg/kg																		0.0028 U	0.003 U
Total cPAHs TEQ (ND = 1/2 RDL) in mg/kg	10																	ND	ND
Other (Non-PAH) Semivolatiles																			
1,2,4-Trichlorobenzene in mg/kg																			
1,2,4-Trimethylbenzene in mg/kg																			
1,2-Dichlorobenzene in mg/kg																			
1,3,5-Trimethylbenzene in mg/kg	35,000																		
1,3-Dichlorobenzene in mg/kg																			
1,4-Dichlorobenzene in mg/kg																			
2,4,5-Trichlorophenol in mg/kg																			
2,4,6-Trichlorophenol in mg/kg																			
2,4-Dichlorophenol in mg/kg																			
2,4-Dimethylphenol in mg/kg																			
2,4-Dinitrophenol in mg/kg																			
2-Chloronaphthalene in mg/kg																			
2-Chlorophenol in mg/kg																			
2-Methylphenol in mg/kg																			
2-Nitroaniline in mg/kg																			
2-Nitrophenol in mg/kg																			
3,3'-Dichlorobenzidine in mg/kg																			
3-Nitroaniline in mg/kg																			
4,6-Dinitro-2-methylphenol in mg/kg																			
4-Bromophenyl phenyl ether in mg/kg																			
4-Chloro-3-methylphenol in mg/kg																			
4-Chloroaniline in mg/kg																			
4-Chlorophenyl phenyl ether in mg/kg																			
4-Methylphenol in mg/kg																			
4-Nitroaniline in mg/kg																			
4-Nitrophenol in mg/kg																			
Benzoic acid in mg/kg																			
Benzyl alcohol in mg/kg																			
Benzyl butyl phthalate in mg/kg																			
Bis(2-chloro-1-methylethyl) ether in mg/kg																			
Bis(2-chloroethoxy)methane in mg/kg																			
Bis(2-chloroethyl) ether in mg/kg																			
Bis(2-ethylhexyl) phthalate in mg/kg	0.03																		
Carbazole in mg/kg																			
Dibenzofuran in mg/kg	3,500																		

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-26 1/18/07 (15-18 ft.)	NL-26 1/18/07 (20-23 ft.)	NL-27 1/19/07 (6-8 ft.)	NL-28 1/17/07 (5-8 ft.)	NL-28 1/17/07 (10-13 ft.)	NL-28 1/17/07 (15-18 ft.)	NL-28 1/17/07 (20-23 ft.)	NL-29 1/18/07 (5-8 ft.)	NL-29 1/18/07 (10-13 ft.)	NL-29 1/18/07 (15-18 ft.)	NL-29 1/18/07 (20-23 ft.)	NL-30 1/19/07 (5-8 ft.)	NL-30 1/19/07 (10-13 ft.)	NL-30 1/19/07 (15-18 ft.)	NL-30 1/19/07 (20-23 ft.)	WMUL-01 6/7/12 (1.5-2.5 ft.)	WMUL-01 6/7/12 (5-6 ft.)
Diethyl phthalate in mg/kg	2,800,000																	
Dimethyl phthalate in mg/kg																		
Di-n-butyl phthalate in mg/kg																		
Di-n-octyl phthalate in mg/kg																		
Hexachlorobenzene in mg/kg	0.01	0.002 U	0.011		0.31	0.023	0.0057 J	0.0021 U	0.059	0.0096	0.0019 U	0.0021 U	0.0022 U	0.0022 U	0.0021 U	0.002 U		
Hexachlorobutadiene in mg/kg	0.01	0.0011 J	0.013		0.39	0.016	0.0061 J	0.0011 U	0.052	0.0037 J	0.00094 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0014 J		
Hexachlorocyclopentadiene in mg/kg																		
Hexachloroethane in mg/kg																		
Isophorone in mg/kg																		
Nitrobenzene in mg/kg																		
N-Nitroso-di-n-propylamine in mg/kg																		
N-Nitrosodiphenylamine in mg/kg																		
Pentachlorophenol in mg/kg	0.1		0.0041 U		0.077 J				0.036 J				0.0045 U	0.0044 U	0.0044 U	0.0041 U		
Phenol in mg/kg	1,050,000																	
2,4-Dinitrotoluene in mg/kg																		
2,6-Dinitrotoluene in mg/kg																		
Polychlorinated Biphenyls (PCBs)																		
Aroclor 1016 in mg/kg																		
Aroclor 1221 in mg/kg																		
Aroclor 1232 in mg/kg																		
Aroclor 1242 in mg/kg																		
Aroclor 1248 in mg/kg																		
Aroclor 1254 in mg/kg																		
Aroclor 1260 in mg/kg																		
Aroclor 1262 in mg/kg																		
Aroclor 1268 in mg/kg																		
Total PCBs (Sum of Aroclors) in mg/kg		0.012 U	0.012 U	0.35926	2.25486	0.11882	0.0228	0.013 U	2 U	0.013 U	0.012 U	0.013 U	0.013 U	0.013 U	0.013 U	0.012 U		
PCB 70 in mg/kg			0.00307 J	0.0140423	0.0818368	0.00681 J	0.000927 J		0.0111162	0.0016 J								
PCB 77 in mg/kg			0.000187 J	0.0008583	0.0039886	0.000381 J	0.0000618 J		0.0003933	0.000216 J								
PCB 81 in mg/kg			6.89E-06 J	3.119E-05 U	0.0002307	0.000011 J	2.62E-06 J		1.461E-05	8.94E-06 J								
PCB 99 in mg/kg			0.00125 J			0.00189 J	0.000277 J			0.00101 J								
PCB 105 in mg/kg			0.00145 J	0.006198	0.0317175	0.00223 J	0.000302 J		0.0060422	0.000628 J								
PCB 114 in mg/kg			0.0000728 J	9.694E-05 U	0.0031059	0.000104 J	0.0000154 J		0.0004924	0.0000473 J								
PCB 118 in mg/kg			0.0000265 J	0.0186458	0.0663848	0.0044 J	0.000629 J		0.0142953	0.00172 J								
PCB 123 in mg/kg			0.0000704 J	0.0018298	0.0013529	0.000112 J	0.0000144 J		7.51E-06 U	0.000147 J								
PCB 126 in mg/kg			0.0000282 J	0.0001016 U	0.0005003	0.0000359 J	6.55E-06 J		6.678E-05	0.00294 J								
PCB 156 in mg/kg			0.00046 J	0.0020941	0.0094501	0.000508 J	0.0000797 J		0.005072	0.000283 J								
PCB 167 in mg/kg			0.000194 J	0.0014256	0.0029683	0.000223 J	0.0000382 J		0.0007093	0.000403 J								
PCB 169 in mg/kg			0.0000107 UJ	0.0001985 U	4.167E-05 U	9.42E-06 J	0.0000019 UJ		2.949E-05 U	0.0000566 J								
PCB 170 in mg/kg			0.00136 J	0.0022984	0.0249694	0.00153 J	0.000441 J		0.0038821	0.000791 J								
PCB 180 in mg/kg			0.0043 J	0.0077236	0.0709369	0.00485 J	0.00138 J		0.010002	0.00292 J								
PCB 183 in mg/kg			0.000404 J	0.0024801	3.235E-05 U	0.000541 J	0.000158 J		0.0016911	0.000707 J								
PCB 187 in mg/kg			0.00187 J	0.0103965	0.1384065	0.00226 J	0.000636 J		0.0135918	0.00139 J								
PCB 189 in mg/kg			0.0000276 UJ	0.00025 U	0.0018398	0.0000534 J	2.86E-06 UJ		0.000222	0.0000755 J								
Dioxins/Furans																		
Tetrachlorodibenzofurans (TCDF), Total in mg/kg			0.000128	0.0001086	0.0293914	0.00049	0.000156		0.0005568	0.000251								
Total HpCDD in mg/kg			0.000122	1.884E-05	0.0007115	0.0000579	0.0000095		0.0002176	0.000073								
Total HpCDF in mg/kg			0.000174	0.0002709	0.0053419	0.000165	0.0000427		0.0003224	0.000344								
Total HxCDD in mg/kg			0.0000309	6.26E-07 U	0.0002382	0.0000296	1.19E-07 U		3.367E-05	0.0000358								
Total HxCDF in mg/kg			0.000223	0.0001955	0.0099398	0.00024	0.0000778		0.0004098	0.000401								
Total PeCDD in mg/kg			0.000012	3.42E-07 U	0.0001147	0.0000281	1.19E-06 J		1.389E-05	0.0000387								
Total PeCDF in mg/kg			0.000248	7.159E-05	0.0158754	0.000278	0.000102		0.0003563	0.000251								
Total TCDD in mg/kg			9.14E-06	7.698E-06	0.0001603	0.0000267	8.64E-07 J		5.649E-06	0.0000326								
2,3,7,8-TCDD in mg/kg			3.15E-07 J	1.15E-07 U	2.075E-05	4.29E-07 J	8.8E-08 U		6.15E-07 J	6.4E-07 J								
1,2,3,7,8-PeCDD in mg/kg			6.36E-07 J	3.42E-07 U	1.086E-05 J	8.52E-07 J	1.61E-07 U		1.048E-06 J	1.38E-06 J								
1,2,3,4,7,8-HxCDD in mg/kg			1.9E-08 U	6.26E-07 U	1.311E-05 J	9.84E-07 J	1.19E-07 U		1.107E-06 J	1.48E-06 J								
1,2,3,6,7,8-HxCDD in mg/kg			4.47E-06 J	1.031E-06 J	2.176E-05	2.66E-06 J	3.99E-07 J		3.85E-06 J	3.16E-06 J								

Table B-16

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RI

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	NL-26 1/18/07 (15-18 ft.)	NL-26 1/18/07 (20-23 ft.)	NL-27 1/19/07 (6-8 ft.)	NL-28 1/17/07 (5-8 ft.)	NL-28 1/17/07 (10-13 ft.)	NL-28 1/17/07 (15-18 ft.)	NL-28 1/17/07 (20-23 ft.)	NL-29 1/18/07 (5-8 ft.)	NL-29 1/18/07 (10-13 ft.)	NL-29 1/18/07 (15-18 ft.)	NL-29 1/18/07 (20-23 ft.)	NL-30 1/19/07 (5-8 ft.)	NL-30 1/19/07 (10-13 ft.)	NL-30 1/19/07 (15-18 ft.)	NL-30 1/19/07 (20-23 ft.)	WMUL-01 6/7/12 (1.5-2.5 ft.)	WMUL-01 6/7/12 (5-6 ft.)
1,2,3,7,8,9-HxCDD in mg/kg			1.93E-08 U	6.58E-07 U	4.885E-06 J	2.61E-06 J	2.49E-07 J		2.682E-06 J	3.02E-06 J								
1,2,3,4,6,7,8-HpCDD in mg/kg			0.0000537	1.398E-05	0.0002913 J	0.0000285	4.44E-06 J		9.72E-05	0.0000376								
OCDD in mg/kg			0.000453	8.675E-05	0.0018248	0.000182	0.000037		0.000835	0.000293								
2,3,7,8-TCDF in mg/kg			0.0000331	2.149E-05	0.0115901	0.000177	0.0000715		0.0002018	0.0000692 J								
1,2,3,7,8-PeCDF in mg/kg			0.0000288	2.492E-05	0.004913	0.0000819	0.0000331		0.000144	0.0000624								
2,3,4,7,8-PeCDF in mg/kg			0.0000154	8.571E-06 J	0.0023655	0.0000362	0.0000126		5.991E-05	0.0000247								
1,2,3,4,7,8-HxCDF in mg/kg			0.0000641	8.354E-05	0.0024905	0.000121	0.0000459		0.0002047	0.000127								
1,2,3,6,7,8-HxCDF in mg/kg			0.0000154	2.437E-05 J	0.0010713	0.0000264	9.15E-06		4.68E-05	0.0000436								
1,2,3,7,8,9-HxCDF in mg/kg			0.0000012 J	8.08E-07 U	9.717E-05	2.02E-06 U	8.55E-07 J		3.836E-06 J	5.31E-06 J								
2,3,4,6,7,8-HxCDF in mg/kg			9.26E-06	8.7E-07 U	0.0001349	0.0000135	3.43E-06 J		8.328E-06	0.0000481								
1,2,3,4,6,7,8-HpCDF in mg/kg			0.0000725	0.0001423 J	0.0027616	0.0000852	0.0000219		0.0001548	0.000212 J								
1,2,3,4,7,8,9-HpCDF in mg/kg			0.0000212	5.616E-05	0.0009349	0.0000287	8.49E-06		5.134E-05	0.0000536								
OCDF in mg/kg			0.000353	0.0007302	0.0077404	0.000476	0.0000771		0.0007008	0.00128								
Pesticides																		
4,4'-DDD in mg/kg		0.0023 U	0.0022 U		0.27 U	0.0023 U	0.0023 U	0.0024 U	0.36 U	0.0023 U	0.0021 UJ	0.0024 U	0.0024 U	0.0024 U	0.0024 U	0.0024 U	0.0022 U	
4,4'-DDE in mg/kg		0.002 U	0.002 U		0.24 U	0.0021 U	0.002 U	0.0021 U	0.32 U	0.0021 U	0.0019 U	0.0021 U	0.0022 U	0.0022 U	0.0021 U	0.0021 U	0.002 U	
4,4'-DDT in mg/kg		0.0005 U	0.0005 U		0.061 U	0.0005 U	0.0005 U	0.0005 U	0.081 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	
Aldrin in mg/kg		0.0018 U	0.0017 U		0.21 U	0.0018 U	0.0018 U	0.0018 U	0.28 U	0.0018 U	0.0017 UJ	0.0018 U	0.0019 U	0.0019 U	0.0019 U	0.0019 U	0.0017 U	
cis-Chlordane in mg/kg		0.0027 U	0.0026 U		0.32 U	0.0027 U	0.0026 U	0.0028 U	0.43 U	0.0027 U	0.0025 U	0.0027 U	0.0029 U	0.0028 U	0.0028 U	0.0028 U	0.0026 U	
Dieldrin in mg/kg		0.0014 U	0.0014 U		0.17 U	0.0014 U	0.0014 U	0.0015 U	0.22 U	0.0014 U	0.0013 U	0.0014 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0014 U	
trans-Chlordane in mg/kg		0.0027 U	0.0026 U		0.32 U	0.0027 U	0.0026 U	0.0028 U	0.43 U	0.0027 U	0.0025 U	0.0027 U	0.0029 U	0.0028 U	0.0028 U	0.0028 U	0.0026 U	
Chlorinated Herbicides																		
Pentachlorophenol in mg/kg	0.1																	
Field Parameters																		
ORP in mVolts																		

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

AVG - Average

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

T - Reported result below associated quantitation limit but above MDL

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	WMUL-01 6/7/12 (10-11 ft.)	WMUL-01 6/7/12 (15-16 ft.)	WMUL-01 6/7/12 (20-21 ft.)	WMUL-01 6/7/12 (24-25 ft.)	WMUL-02 6/12/12 (2 ft.)	WMUL-02 6/12/12 (5 ft.)	WMUL-02 6/12/12 (10 ft.)	WMUL-02 6/12/12 (15 ft.)	WMUL-02 6/12/12 (20 ft.)	WMUL-02 6/12/12 (25 ft.)
Polycyclic Aromatic Hydrocarbons (PAHs)											
Acenaphthene in mg/kg	210,000	0.0031 U	0.0041	0.0031 U	0.0033 U	0.0027 J	0.0029 U	0.0012 J	0.093	0.0034	0.0011 J
Acenaphthylene in mg/kg		0.0031 U	0.0034 U	0.0031 U	0.0033 U	0.0017 J	0.0029 U	0.0031 U	0.0032 U	0.003 U	0.0031 U
Anthracene in mg/kg	1,050,000	0.0031 U	0.0061	0.0031 U	0.0012 J	0.029	0.0029 U	0.00059 J	0.003 J	0.00069 J	0.0031 U
Benzo(g,h,i)perylene in mg/kg											
Benzo(j,k)fluoranthene in mg/kg											
Fluoranthene in mg/kg	140,000	0.0031 U	0.018	0.0031 U	0.0023 J	0.069	0.0029 U	0.003 J	0.007	0.0027 J	0.0031 U
Fluorene in mg/kg	140,000	0.0031 U	0.0085	0.0031 U	0.00093 J	0.0061	0.0029 U	0.0015 J	0.031	0.0013 J	0.0031 U
Phenanthrene in mg/kg		0.0031 U	0.018	0.005	0.0064	0.4	0.0029 U	0.011	0.04	0.0054	0.0017 J
Pyrene in mg/kg	105,000	0.0031 U	0.012	0.0012 J	0.0026 J	0.061	0.0029 U	0.0038	0.0049	0.0022 J	0.0031 U
1-Methylnaphthalene in mg/kg	4,500										
2-Methylnaphthalene in mg/kg	14,000	0.0011 J	0.0065	0.0028 J	0.004	0.2	0.00063 J	0.0051	0.066	0.0073	0.0019 J
Naphthalene in mg/kg	6	0.0035	0.028	0.0032	0.0019 J	0.087	0.0029 U	0.014	1.1	0.36	0.069
Benz(a)anthracene in mg/kg		0.0031 U	0.0047	0.00095 J	0.0018 J	0.076	0.0029 U	0.0033	0.0025 J	0.0012 J	0.0031 U
Benzo(a)pyrene in mg/kg		0.0031 U	0.0015 J	0.0031 U	0.001 J	0.043	0.0029 U	0.0035	0.0012 J	0.003 U	0.0031 U
Benzo(b)fluoranthene in mg/kg		0.0031 U	0.003 J	0.0031 U	0.0014 J	0.1	0.0029 U	0.0054	0.0018 J	0.003 U	0.0031 U
Benzo(k)fluoranthene in mg/kg		0.0031 U	0.0011 J	0.0031 U	0.001 J	0.013	0.0029 U	0.00087 J	0.0032 U	0.003 U	0.0031 U
Chrysene in mg/kg		0.0031 U	0.006	0.0016 J	0.0026 J	0.26	0.0029 U	0.0068	0.0035	0.0017 J	0.0031 U
Dibenzo(a,h)anthracene in mg/kg		0.0031 U	0.0034 U	0.0031 U	0.00087 J	0.034	0.0029 U	0.0027 J	0.0032 U	0.003 U	0.0031 U
Indeno(1,2,3-cd)pyrene in mg/kg		0.0031 U	0.00097 J	0.0031 U	0.00095 J	0.024	0.0029 U	0.0013 J	0.0032 U	0.003 U	0.0031 U
Total cPAHs TEQ (ND = 1/2 RDL) in mg/kg	10	ND	0.0027 J	0.0024 J	0.0016 J	0.07	ND	0.0049 J	0.0021 J	0.0022 J	ND
Other (Non-PAH) Semivolatiles											
1,2,4-Trichlorobenzene in mg/kg											
1,2,4-Trimethylbenzene in mg/kg											
1,2-Dichlorobenzene in mg/kg											
1,3,5-Trimethylbenzene in mg/kg	35,000										
1,3-Dichlorobenzene in mg/kg											
1,4-Dichlorobenzene in mg/kg											
2,4,5-Trichlorophenol in mg/kg											
2,4,6-Trichlorophenol in mg/kg											
2,4-Dichlorophenol in mg/kg											
2,4-Dimethylphenol in mg/kg											
2,4-Dinitrophenol in mg/kg											
2-Chloronaphthalene in mg/kg											
2-Chlorophenol in mg/kg											
2-Methylphenol in mg/kg											
2-Nitroaniline in mg/kg											
2-Nitrophenol in mg/kg											
3,3'-Dichlorobenzidine in mg/kg											
3-Nitroaniline in mg/kg											
4,6-Dinitro-2-methylphenol in mg/kg											
4-Bromophenyl phenyl ether in mg/kg											
4-Chloro-3-methylphenol in mg/kg											
4-Chloroaniline in mg/kg											
4-Chlorophenyl phenyl ether in mg/kg											
4-Methylphenol in mg/kg											
4-Nitroaniline in mg/kg											
4-Nitrophenol in mg/kg											
Benzoic acid in mg/kg											
Benzyl alcohol in mg/kg											
Benzyl butyl phthalate in mg/kg											
Bis(2-chloro-1-methylethyl) ether in mg/kg											
Bis(2-chloroethoxy)methane in mg/kg											
Bis(2-chloroethyl) ether in mg/kg											
Bis(2-ethylhexyl) phthalate in mg/kg	0.03										
Carbazole in mg/kg											
Dibenzofuran in mg/kg	3,500										

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Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	WMUL-01 6/7/12 (10-11 ft.)	WMUL-01 6/7/12 (15-16 ft.)	WMUL-01 6/7/12 (20-21 ft.)	WMUL-01 6/7/12 (24-25 ft.)	WMUL-02 6/12/12 (2 ft.)	WMUL-02 6/12/12 (5 ft.)	WMUL-02 6/12/12 (10 ft.)	WMUL-02 6/12/12 (15 ft.)	WMUL-02 6/12/12 (20 ft.)	WMUL-02 6/12/12 (25 ft.)
Diethyl phthalate in mg/kg	2,800,000										
Dimethyl phthalate in mg/kg											
Di-n-butyl phthalate in mg/kg											
Di-n-octyl phthalate in mg/kg											
Hexachlorobenzene in mg/kg	0.01										
Hexachlorobutadiene in mg/kg	0.01										
Hexachlorocyclopentadiene in mg/kg											
Hexachloroethane in mg/kg											
Isophorone in mg/kg											
Nitrobenzene in mg/kg											
N-Nitroso-di-n-propylamine in mg/kg											
N-Nitrosodiphenylamine in mg/kg											
Pentachlorophenol in mg/kg	0.1										
Phenol in mg/kg	1,050,000										
2,4-Dinitrotoluene in mg/kg											
2,6-Dinitrotoluene in mg/kg											
Polychlorinated Biphenyls (PCBs)											
Aroclor 1016 in mg/kg											
Aroclor 1221 in mg/kg											
Aroclor 1232 in mg/kg											
Aroclor 1242 in mg/kg											
Aroclor 1248 in mg/kg											
Aroclor 1254 in mg/kg											
Aroclor 1260 in mg/kg											
Aroclor 1262 in mg/kg											
Aroclor 1268 in mg/kg											
Total PCBs (Sum of Aroclors) in mg/kg											
PCB 70 in mg/kg											
PCB 77 in mg/kg											
PCB 81 in mg/kg											
PCB 99 in mg/kg											
PCB 105 in mg/kg											
PCB 114 in mg/kg											
PCB 118 in mg/kg											
PCB 123 in mg/kg											
PCB 126 in mg/kg											
PCB 156 in mg/kg											
PCB 167 in mg/kg											
PCB 169 in mg/kg											
PCB 170 in mg/kg											
PCB 180 in mg/kg											
PCB 183 in mg/kg											
PCB 187 in mg/kg											
PCB 189 in mg/kg											
Dioxins/Furans											
Tetrachlorodibenzofurans (TCDF), Total in mg/kg											
Total HpCDD in mg/kg											
Total HpCDF in mg/kg											
Total HxCDD in mg/kg											
Total HxCDF in mg/kg											
Total PeCDD in mg/kg											
Total PeCDF in mg/kg											
Total TCDD in mg/kg											
2,3,7,8-TCDD in mg/kg											
1,2,3,7,8-PeCDD in mg/kg											
1,2,3,4,7,8-HxCDD in mg/kg											
1,2,3,6,7,8-HxCDD in mg/kg											

Table B-16 - 2000-2013 Pre-RI Soil Data

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Soil Potential Cleanup Level (mg/kg)	WMUL-01 6/7/12 (10-11 ft.)	WMUL-01 6/7/12 (15-16 ft.)	WMUL-01 6/7/12 (20-21 ft.)	WMUL-01 6/7/12 (24-25 ft.)	WMUL-02 6/12/12 (2 ft.)	WMUL-02 6/12/12 (5 ft.)	WMUL-02 6/12/12 (10 ft.)	WMUL-02 6/12/12 (15 ft.)	WMUL-02 6/12/12 (20 ft.)	WMUL-02 6/12/12 (25 ft.)
1,2,3,7,8,9-HxCDD in mg/kg											
1,2,3,4,6,7,8-HpCDD in mg/kg											
OCDD in mg/kg											
2,3,7,8-TCDF in mg/kg											
1,2,3,7,8-PeCDF in mg/kg											
2,3,4,7,8-PeCDF in mg/kg											
1,2,3,4,7,8-HxCDF in mg/kg											
1,2,3,6,7,8-HxCDF in mg/kg											
1,2,3,7,8,9-HxCDF in mg/kg											
2,3,4,6,7,8-HxCDF in mg/kg											
1,2,3,4,6,7,8-HpCDF in mg/kg											
1,2,3,4,7,8,9-HpCDF in mg/kg											
OCDF in mg/kg											
Pesticides											
4,4'-DDD in mg/kg											
4,4'-DDE in mg/kg											
4,4'-DDT in mg/kg											
Aldrin in mg/kg											
cis-Chlordane in mg/kg											
Dieldrin in mg/kg											
trans-Chlordane in mg/kg											
Chlorinated Herbicides											
Pentachlorophenol in mg/kg	0.1										
Field Parameters											
ORP in mVolts											

Notes

Concentrations in shaded cells indicate value exceeds Soil Potential Cleanup Level (mg/kg)

AVG - Average

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

T - Reported result below associated quantitation limit but above MDL

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-17 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	28-15 3/23/04	29-14 3/23/04	30-15 3/17/04	48-15 3/16/04	48-15 8/10/12	49-15 3/16/04	49-15 8/11/12	50-15 3/16/04	50-15 8/11/12	51-15 3/17/04	52-15 8/24/12	95-15 8/25/12	709-MW-01-15 3/9/04	709-MW-02-15 3/9/04	709-MW-02-15 7/21/12	709-MW-03-15 3/9/04	709-MW-04-15 3/9/04
Extractable Petroleum Hydrocarbons																		
Aliphatics C12-C16 (EPH) in ug/L		50 UJ	50 UJ	50 UJ	50 UJ		50 UJ		50 UJ		50 UJ			50 UJ	50 UJ		50 UJ	50 UJ
Aliphatics C16-C21 (EPH) in ug/L		50 UJ	50 UJ	50 U	50 UJ		50 UJ		50 UJ		50 U			50 UJ	50 UJ		50 UJ	50 UJ
Aliphatics C21-C34 (EPH) in ug/L		50 UJ	50 UJ	50 U	50 UJ		50 UJ		50 UJ		50 U			50 UJ	50 UJ		100 U	50 UJ
Aromatics C12-C16 (EPH) in ug/L			50 U	50 U	50 UJ		50 UJ		50 UJ		50 U			54 J	50 UJ		50 UJ	50 UJ
Aromatics C16-C21 (EPH) in ug/L			50 U	50 U	50 U		50 U		50 U		50 U			95 J	50 UJ		50 UJ	50 UJ
Aromatics C21-C34 (EPH) in ug/L			50 U	50 U	50 U		50 U		50 U		50 U			50 UJ	50 UJ		50 UJ	50 UJ
Volatile Petroleum Hydrocarbons																		
Aromatics C10-C12 (VPH) in ug/L		50 UJ	50 UJ	50 UJ	50 UJ		50 UJ		50 UJ		50 UJ			110 J	50 UJ		50 UJ	50 UJ
Aromatics C12-C13 (VPH) in ug/L		50 UJ	50 UJ	50 UJ	50 UJ		50 UJ		50 UJ		50 UJ			50 UJ	50 UJ		50 UJ	50 UJ
Aromatics C8-C10 (VPH) in ug/L		50 UJ	50 UJ	50 U	50 U		50 U		50 U		50 U			50 U	50 U		50 U	50 U
TCLP Metals																		
Dissolved Mercury in ug/L																		
Total Mercury in ug/L																		
Conventional Chemistry Parameters																		
Alkalinity (Total) in mg/L		128	178	158	19,800	2,670	69.8	204	176	557	124	177	596	260	49.8	1,420	2,140	2 U
Bicarbonate in mg/L						90 U		204		143		177	596 J			9 U		
Bromide in mg/L						0.2 U		6.65		0.2 U		0.2 U	0.38					0.09 J
Chloride in mg/L						60.2		2,120		26.8		1.69	200					52.4
Dissolved Organic Carbon in mg/L																		
pH in pH Units																		
Sulfate in mg/L						18.3		190		15.2		10.5	3.63					21.6
Total Boron in mg/L						0.154		0.483		0.0748		0.0255 J	0.233					0.165
Total Dissolved Solids in mg/L						4,470		4,070		660		255	924					2,470
Total Sodium in mg/L						1,150		1,090		231		6.18	312					696
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene in ug/L	90					0.02 U		0.019 U		0.019 U		0.019 U	0.42 J					0.02 U
Acenaphthylene in ug/L						0.02 U		0.019 U		0.019 U		0.019 U	0.076 UJ					0.02 U
Anthracene in ug/L	400					0.0038 J		0.0066 J		0.012 J		0.052	0.022 J					0.02 J
Benzo(g,h,i)perylene in ug/L																		
Benzo(a)fluoranthene in ug/L																		
Fluoranthene in ug/L	20					0.02 U		0.019 U		0.019 U		0.019 U	0.019 UJ					0.02 U
Fluorene in ug/L	70					0.02 U		0.019 U		0.019 U		0.011 J	0.52 J					0.02 U
Phenanthrene in ug/L						0.0093 J		0.019 U		0.019 U		0.019 U	0.05 J					0.02 U
Pyrene in ug/L	30					0.02 U		0.019 U		0.019 U		0.0039 J	0.019 UJ					0.02 U
1-Methylnaphthalene in ug/L																		
2-Methylnaphthalene in ug/L						0.01 J		0.0025 J		0.0039 J		0.019 U	3.5 J					0.003 J
Naphthalene in ug/L	90					0.1		0.044		0.064		0.0035 J	3 J					0.096
Benzo(a)anthracene in ug/L	0.02					0.02 U		0.0029 J		0.019 U		0.019 U	0.019 UJ					0.02 U
Benzo(a)pyrene in ug/L	0.02					0.02 U		0.019 U		0.019 U		0.019 U	0.019 UJ					0.02 U
Benzo(b)fluoranthene in ug/L	0.02					0.02 U		0.019 U		0.019 U		0.019 U	0.019 UJ					0.02 U
Benzo(k)fluoranthene in ug/L	0.02					0.02 U		0.019 U		0.019 U		0.019 U	0.019 UJ					0.02 U
Chrysene in ug/L	0.03					0.02 U		0.019 U		0.019 U		0.019 U	0.019 UJ					0.02 U
Dibenzo(a,h)anthracene in ug/L	0.02					0.02 U		0.019 U		0.019 U		0.019 U	0.019 UJ					0.02 U
Indeno(1,2,3-cd)pyrene in ug/L	0.02					0.02 U		0.019 U		0.019 U		0.019 U	0.019 UJ					0.02 U
Total cPAHs TEQ (ND = 1/2 RDL) in ug/L	0.02					ND		0.014 J		ND		ND	ND					ND
Other (Non-PAH) Semivolatiles																		
1,2,4-Trichlorobenzene in ug/L																		
1,2,4-Trimethylbenzene in ug/L	63																	
1,2-Dichlorobenzene in ug/L																		
1,3,5-Trimethylbenzene in ug/L																		
1,3-Dichlorobenzene in ug/L																		
1,4-Dichlorobenzene in ug/L																		
2,4,5-Trichlorophenol in ug/L																		
2,4,6-Trichlorophenol in ug/L																		
2,4-Dichlorophenol in ug/L																		
2,4-Dimethylphenol in ug/L																		

Table B-17

Aspect Consulting

2/26/2016

\\seastore2.aspect.local\projects\Port of Tacoma\Alexander Avenue Petroleum Tank Facilities\Draft Reports\RIFS\Appendices\Appendix B - Data Tables\B-16 to B-19 Pre-RI Data 2000-2013 other analyses.xlsx

RI

Table B-17 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	28-15 3/23/04	29-14 3/23/04	30-15 3/17/04	48-15 3/16/04	48-15 8/10/12	49-15 3/16/04	49-15 8/11/12	50-15 3/16/04	50-15 8/11/12	51-15 3/17/04	52-15 8/24/12	95-15 8/25/12	709-MW-01-15 3/9/04	709-MW-02-15 3/9/04	709-MW-02-15 7/21/12	709-MW-03-15 3/9/04	709-MW-04-15 3/9/04
2,4-Dinitrophenol in ug/L																		
2-Chloronaphthalene in ug/L																		
2-Chlorophenol in ug/L																		
2-Methylphenol in ug/L																		
2-Nitroaniline in ug/L																		
2-Nitrophenol in ug/L																		
3,3'-Dichlorobenzidine in ug/L																		
3-Nitroaniline in ug/L																		
4,6-Dinitro-2-methylphenol in ug/L																		
4-Bromophenyl phenyl ether in ug/L																		
4-Chloro-3-methylphenol in ug/L																		
4-Chloroaniline in ug/L																		
4-Chlorophenyl phenyl ether in ug/L																		
4-Methylphenol in ug/L																		
4-Nitroaniline in ug/L																		
4-Nitrophenol in ug/L																		
Benzoic acid in ug/L																		
Benzyl alcohol in ug/L																		
Benzyl butyl phthalate in ug/L																		
Bis(2-chloro-1-methylethyl) ether in ug/L																		
Bis(2-chloroethoxy)methane in ug/L																		
Bis(2-chloroethyl) ether in ug/L																		
Bis(2-ethylhexyl) phthalate in ug/L	1																	
Carbazole in ug/L																		
Dibenzofuran in ug/L																		
Diethyl phthalate in ug/L	600																	
Dimethyl phthalate in ug/L	2,000																	
Di-n-butyl phthalate in ug/L																		
Di-n-octyl phthalate in ug/L																		
Hexachlorobenzene in ug/L	0.2																	
Hexachlorobutadiene in ug/L	0.2																	
Hexachlorocyclopentadiene in ug/L																		
Hexachloroethane in ug/L																		
Isophorone in ug/L																		
Nitrobenzene in ug/L																		
N-Nitroso-di-n-propylamine in ug/L																		
N-Nitrosodiphenylamine in ug/L																		
Pentachlorophenol in ug/L	1																	
Phenol in ug/L	300,000																	
2,4-Dinitrotoluene in ug/L																		
2,6-Dinitrotoluene in ug/L																		
Polychlorinated Biphenyls (PCBs)																		
Aroclor 1016 in ug/L						0.005 U		0.005 U		0.005 U		0.0051 U	0.005 U			0.005 U		
Aroclor 1221 in ug/L						0.0099 U		0.02 U		0.0099 U		0.034 U	0.0099 U			0.01 U		
Aroclor 1232 in ug/L						0.005 U		0.014 U		0.005 U		0.012 U	0.005 U			0.005 U		
Aroclor 1242 in ug/L						0.005 U		0.014 U		0.005 U		0.0087 U	0.005 U			0.005 U		
Aroclor 1248 in ug/L						0.005 U		0.0056 U		0.005 U		0.0051 U	0.005 U			0.005 U		
Aroclor 1254 in ug/L						0.005 U		0.005 U		0.005 U		0.005 U	0.005 U			0.005 U		
Aroclor 1260 in ug/L						0.005 U		0.005 U		0.005 U		0.0051 U	0.005 U			0.005 U		
Total PCBs (Sum of Aroclors) in ug/L						0.0099 U		0.02 U		0.0099 U		0.034 U	0.0099 U			0.01 U		
PCB 70 in ug/L																		
PCB 77 in ug/L																		
PCB 81 in ug/L																		
PCB 105 in ug/L																		
PCB 114 in ug/L																		
PCB 118 in ug/L																		
PCB 123 in ug/L																		

Table B-17 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	28-15 3/23/04	29-14 3/23/04	30-15 3/17/04	48-15 3/16/04	48-15 8/10/12	49-15 3/16/04	49-15 8/11/12	50-15 3/16/04	50-15 8/11/12	51-15 3/17/04	52-15 8/24/12	95-15 8/25/12	709-MW-01-15 3/9/04	709-MW-02-15 3/9/04	709-MW-02-15 7/21/12	709-MW-03-15 3/9/04	709-MW-04-15 3/9/04
PCB 126 in ug/L																		
PCB 156 in ug/L																		
PCB 167 in ug/L																		
PCB 169 in ug/L																		
PCB 170 in ug/L																		
PCB 180 in ug/L																		
PCB 183 in ug/L																		
PCB 187 in ug/L																		
PCB 189 in ug/L																		
Dioxins/Furans																		
Tetrachlorodibenzofurans (TCDF), Total in ug/L																		
Total HpCDD in ug/L																		
Total HpCDF in ug/L																		
Total HxCDD in ug/L																		
Total HxCDF in ug/L																		
Total PeCDD in ug/L																		
Total PeCDF in ug/L																		
Total TCDD in ug/L																		
2,3,7,8-TCDD in ug/L																		
1,2,3,7,8-PeCDD in ug/L																		
1,2,3,4,7,8-HxCDD in ug/L																		
1,2,3,6,7,8-HxCDD in ug/L																		
1,2,3,7,8,9-HxCDD in ug/L																		
1,2,3,4,6,7,8-HpCDD in ug/L																		
OCDD in ug/L																		
2,3,7,8-TCDF in ug/L																		
1,2,3,7,8-PeCDF in ug/L																		
2,3,4,7,8-PeCDF in ug/L																		
1,2,3,4,7,8-HxCDF in ug/L																		
1,2,3,6,7,8-HxCDF in ug/L																		
1,2,3,7,8,9-HxCDF in ug/L																		
2,3,4,6,7,8-HxCDF in ug/L																		
1,2,3,4,6,7,8-HpCDF in ug/L																		
1,2,3,4,7,8,9-HpCDF in ug/L																		
OCDF in ug/L																		
Pesticides																		
4,4'-DDD in ug/L																		
4,4'-DDE in ug/L																		
4,4'-DDT in ug/L																		
Aldrin in ug/L																		
cis-Chlordane in ug/L																		
Dieldrin in ug/L																		
trans-Chlordane in ug/L																		

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

D - The spiked compound was not detected due to sample extract dilution.

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-17 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	709-MW-04-15 7/22/12	709-MW-05-15 3/9/04	709-MW-05-15 7/22/12	709-MW-06-15 3/10/04	709-MW-06-15 8/9/12	709-MW-07-15 3/10/04	709-MW-07-15 7/28/12	709-MW-08-15 8/9/12	709-MW-09-15 3/10/04	709-MW-09-15 8/14/12	709-MW-11-15 3/10/04	709-MW-11-15 7/29/12	709-MW-13-15 3/10/04	709-MW-14-15 3/10/04	709-MW-15-15 3/10/04	709-MW-15-15 8/15/12	709-MW-16-15 3/11/04
Extractable Petroleum Hydrocarbons																		
Aliphatics C12-C16 (EPH) in ug/L			50 UJ		50 UJ		50 UJ			50 UJ		50 UJ		130 J	50 UJ	50 UJ		50 UJ
Aliphatics C16-C21 (EPH) in ug/L			50 UJ		51 J		50 UJ			50 UJ		50 UJ		150 J	50 UJ	50 UJ		95 J
Aliphatics C21-C34 (EPH) in ug/L			50 UJ		190 U		59 U			170 U		50 UJ		50 UJ	50 UJ	50 UJ		200 U
Aromatics C12-C16 (EPH) in ug/L			50 UJ		50 UJ		50 UJ			50 UJ		50 UJ		52 J	50 UJ	50 UJ		50 UJ
Aromatics C16-C21 (EPH) in ug/L			50 UJ		50 UJ		50 UJ			76 J		50 UJ		89 J	100 J	50 UJ		50 UJ
Aromatics C21-C34 (EPH) in ug/L			50 UJ		50 UJ		50 UJ			50 UJ		50 UJ		50 UJ	350 J	50 UJ		50 UJ
Volatile Petroleum Hydrocarbons																		
Aromatics C10-C12 (VPH) in ug/L			50 UJ		50 UJ		50 UJ			500 UJ		500 UJ		50 UJ	500 UJ	50 UJ		50 UJ
Aromatics C12-C13 (VPH) in ug/L			50 UJ		50 UJ		50 UJ			1,250 UJ		500 UJ		50 UJ	500 UJ	50 UJ		50 UJ
Aromatics C8-C10 (VPH) in ug/L			50 U		50 U		50 U			1,250 U		500 U		50 U	500 U	50 U		50 UJ
TCLP Metals																		
Dissolved Mercury in ug/L																		
Total Mercury in ug/L																		
Conventional Chemistry Parameters																		
Alkalinity (Total) in mg/L		50.5	170	157	131	311	281	101	837	324	424	304	212	790	385	65.1	218	210
Bicarbonate in mg/L		50.5		157		124		101	90 U		424		212					218
Bromide in mg/L		0.11 J		39		0.19 J		0.2 U	0.03 J		0.2 U		0.02 J					0.01 J
Chloride in mg/L		36.8		10,600		75.1		1.08	26.5		2.25		1.7					14.7
Dissolved Organic Carbon in mg/L																		
pH in pH Units																		
Sulfate in mg/L		32.3		1,490		27.1 J		5.36	16.9 J		2.48		1.88					6.11
Total Boron in mg/L		0.0566		1.82		0.144		0.0211 J	0.114		0.12		0.0618					0.05 U
Total Dissolved Solids in mg/L		211		19,800		637		136	1,360		471		301					342
Total Sodium in mg/L		64.4		5,510		184		9.21	323		9.62		10.3					36.8
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene in ug/L	90	0.02 U		0.02 U		0.02 U		0.025	0.019 J		1.4		0.45					0.02 U
Acenaphthylene in ug/L		0.02 U		0.02 U		0.02 U		0.02 U	0.02 U		0.27 U		0.028 U					0.02 U
Anthracene in ug/L	400	0.005 J		0.02 U		0.0077 J		0.02 U	0.0074 J		0.14		0.12 U					0.0095 J
Benzo(g,h,i)perylene in ug/L																		
Benzo(a)fluoranthene in ug/L																		
Fluoranthene in ug/L	20	0.02 U		0.02 U		0.02 U		0.02 U	0.02 U		0.026 J		0.021					0.02 U
Fluorene in ug/L	70	0.02 U		0.02 U		0.02 U		0.17	0.015 J		2.1		0.078					0.02 U
Phenanthrene in ug/L		0.02 U		0.02 U		0.02 U		0.02 U	0.01 J		1.8		0.057 U					0.02 U
Pyrene in ug/L	30	0.02 U		0.02 U		0.02 U		0.02 U	0.02 U		0.02 J		0.073					0.02 U
1-Methylnaphthalene in ug/L																		
2-Methylnaphthalene in ug/L		0.02 U		0.02 U		0.0025 J		0.012 J	0.32		12		0.036					0.0031 J
Naphthalene in ug/L	90	0.049		0.12		0.039		0.071	0.34		79		0.53 U					0.0059 J
Benz(a)anthracene in ug/L	0.02	0.02 U		0.02 U		0.02 U		0.02 U	0.02 U		0.095 U		0.02 U					0.02 U
Benzo(a)pyrene in ug/L	0.02	0.02 U		0.02 U		0.02 U		0.02 U	0.02 U		0.095 U		0.02 U					0.02 U
Benzo(b)fluoranthene in ug/L	0.02	0.02 U		0.02 U		0.02 U		0.02 U	0.02 U		0.095 U		0.02 U					0.02 U
Benzo(k)fluoranthene in ug/L	0.02	0.02 U		0.02 U		0.02 U		0.02 U	0.02 U		0.095 U		0.02 U					0.02 U
Chrysene in ug/L	0.03	0.02 U		0.02 U		0.02 U		0.02 U	0.02 U		0.095 U		0.02 U					0.02 U
Dibenzo(a,h)anthracene in ug/L	0.02	0.02 U		0.02 U		0.02 U		0.02 U	0.02 U		0.095 U		0.02 U					0.02 U
Indeno(1,2,3-cd)pyrene in ug/L	0.02	0.02 U		0.02 U		0.02 U		0.02 U	0.02 U		0.095 U		0.02 U					0.02 U
Total cPAHs TEQ (ND = 1/2 RDL) in ug/L	0.02	ND		ND		ND		ND	ND		ND		ND					ND
Other (Non-PAH) Semivolatiles																		
1,2,4-Trichlorobenzene in ug/L																		
1,2,4-Trimethylbenzene in ug/L	63																	
1,2-Dichlorobenzene in ug/L																		
1,3,5-Trimethylbenzene in ug/L																		
1,3-Dichlorobenzene in ug/L																		
1,4-Dichlorobenzene in ug/L																		
2,4,5-Trichlorophenol in ug/L																		
2,4,6-Trichlorophenol in ug/L																		
2,4-Dichlorophenol in ug/L																		
2,4-Dimethylphenol in ug/L																		

Table B-17

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\\seastore2.aspect.local\projects\Port of Tacoma\Alexander Avenue Petroleum Tank Facilities\Draft Reports\RIFS\Appendices\Appendix B - Data Tables\B-16 to B-19 Pre-RI Data 2000-2013 other analyses.xlsx

RI

Table B-17 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	709-MW-04-15 7/22/12	709-MW-05-15 3/9/04	709-MW-05-15 7/22/12	709-MW-06-15 3/10/04	709-MW-06-15 8/9/12	709-MW-07-15 3/10/04	709-MW-07-15 7/28/12	709-MW-08-15 8/9/12	709-MW-09-15 3/10/04	709-MW-09-15 8/14/12	709-MW-11-15 3/10/04	709-MW-11-15 7/29/12	709-MW-13-15 3/10/04	709-MW-14-15 3/10/04	709-MW-15-15 3/10/04	709-MW-15-15 8/15/12	709-MW-16-15 3/11/04
2,4-Dinitrophenol in ug/L																		
2-Chloronaphthalene in ug/L																		
2-Chlorophenol in ug/L																		
2-Methylphenol in ug/L																		
2-Nitroaniline in ug/L																		
2-Nitrophenol in ug/L																		
3,3'-Dichlorobenzidine in ug/L																		
3-Nitroaniline in ug/L																		
4,6-Dinitro-2-methylphenol in ug/L																		
4-Bromophenyl phenyl ether in ug/L																		
4-Chloro-3-methylphenol in ug/L																		
4-Chloroaniline in ug/L																		
4-Chlorophenyl phenyl ether in ug/L																		
4-Methylphenol in ug/L																		
4-Nitroaniline in ug/L																		
4-Nitrophenol in ug/L																		
Benzoic acid in ug/L																		
Benzyl alcohol in ug/L																		
Benzyl butyl phthalate in ug/L																		
Bis(2-chloro-1-methylethyl) ether in ug/L																		
Bis(2-chloroethoxy)methane in ug/L																		
Bis(2-chloroethyl) ether in ug/L																		
Bis(2-ethylhexyl) phthalate in ug/L	1																	
Carbazole in ug/L																		
Dibenzofuran in ug/L																		
Diethyl phthalate in ug/L	600																	
Dimethyl phthalate in ug/L	2,000																	
Di-n-butyl phthalate in ug/L																		
Di-n-octyl phthalate in ug/L																		
Hexachlorobenzene in ug/L	0.2																	
Hexachlorobutadiene in ug/L	0.2																	
Hexachlorocyclopentadiene in ug/L																		
Hexachloroethane in ug/L																		
Isophorone in ug/L																		
Nitrobenzene in ug/L																		
N-Nitroso-di-n-propylamine in ug/L																		
N-Nitrosodiphenylamine in ug/L																		
Pentachlorophenol in ug/L	1																	
Phenol in ug/L	300,000																	
2,4-Dinitrotoluene in ug/L																		
2,6-Dinitrotoluene in ug/L																		
Polychlorinated Biphenyls (PCBs)																		
Aroclor 1016 in ug/L		0.0049 U		0.19 U		0.005 U		0.005 U	0.005 UJ		0.2 U		0.045 U				0.005 U	
Aroclor 1221 in ug/L		0.032 U		0.35 U		0.01 U		0.011 U	0.0099 UJ		0.39 U		0.15 U				0.0099 U	
Aroclor 1232 in ug/L		0.0049 U		0.12 U		0.005 U		0.005 U	0.005 UJ		0.2 U		0.1 U				0.005 U	
Aroclor 1242 in ug/L		0.0049 U		0.06 U		0.005 U		0.005 U	0.005 UJ		0.2 U		0.043 U				0.005 U	
Aroclor 1248 in ug/L		0.0049 U		0.18 U		0.005 U		0.005 U	0.005 UJ		0.2 U		0.027 U				0.005 U	
Aroclor 1254 in ug/L		0.0049 U		0.061 U		0.005 U		0.005 U	0.005 UJ		0.2 U		0.026 U				0.005 U	
Aroclor 1260 in ug/L		0.0049 U		0.041 U		0.005 U		0.005 U	0.005 UJ		0.2 U		0.005 U				0.005 U	
Total PCBs (Sum of Aroclors) in ug/L		0.032 U		0.35 U		0.01 U		0.011 U	0.0099 UJ		0.39 U		0.15 U				0.0099 U	
PCB 70 in ug/L																		
PCB 77 in ug/L																		
PCB 81 in ug/L																		
PCB 105 in ug/L																		
PCB 114 in ug/L																		
PCB 118 in ug/L																		
PCB 123 in ug/L																		

Table B-17 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	709-MW-04-15 7/22/12	709-MW-05-15 3/9/04	709-MW-05-15 7/22/12	709-MW-06-15 3/10/04	709-MW-06-15 8/9/12	709-MW-07-15 3/10/04	709-MW-07-15 7/28/12	709-MW-08-15 8/9/12	709-MW-09-15 3/10/04	709-MW-09-15 8/14/12	709-MW-11-15 3/10/04	709-MW-11-15 7/29/12	709-MW-13-15 3/10/04	709-MW-14-15 3/10/04	709-MW-15-15 3/10/04	709-MW-15-15 8/15/12	709-MW-16-15 3/11/04
PCB 126 in ug/L																		
PCB 156 in ug/L																		
PCB 167 in ug/L																		
PCB 169 in ug/L																		
PCB 170 in ug/L																		
PCB 180 in ug/L																		
PCB 183 in ug/L																		
PCB 187 in ug/L																		
PCB 189 in ug/L																		
Dioxins/Furans																		
Tetrachlorodibenzofurans (TCDF), Total in ug/L																		
Total HpCDD in ug/L																		
Total HpCDF in ug/L																		
Total HxCDD in ug/L																		
Total HxCDF in ug/L																		
Total PeCDD in ug/L																		
Total PeCDF in ug/L																		
Total TCDD in ug/L																		
2,3,7,8-TCDD in ug/L																		
1,2,3,7,8-PeCDD in ug/L																		
1,2,3,4,7,8-HxCDD in ug/L																		
1,2,3,6,7,8-HxCDD in ug/L																		
1,2,3,7,8,9-HxCDD in ug/L																		
1,2,3,4,6,7,8-HpCDD in ug/L																		
OCDD in ug/L																		
2,3,7,8-TCDF in ug/L																		
1,2,3,7,8-PeCDF in ug/L																		
2,3,4,7,8-PeCDF in ug/L																		
1,2,3,4,7,8-HxCDF in ug/L																		
1,2,3,6,7,8-HxCDF in ug/L																		
1,2,3,7,8,9-HxCDF in ug/L																		
2,3,4,6,7,8-HxCDF in ug/L																		
1,2,3,4,6,7,8-HpCDF in ug/L																		
1,2,3,4,7,8,9-HpCDF in ug/L																		
OCDF in ug/L																		
Pesticides																		
4,4'-DDD in ug/L																		
4,4'-DDE in ug/L																		
4,4'-DDT in ug/L																		
Aldrin in ug/L																		
cis-Chlordane in ug/L																		
Dieldrin in ug/L																		
trans-Chlordane in ug/L																		

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

D - The spiked compound was not detected due to sample extract dilution.

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-17 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	709-MW-16-15 7/27/12	709-MW-17-15 3/11/04	709-MW-17-15 7/21/12	709-MW-18-15 3/11/04	709-MW-18-15 7/26/12	709-MW-19-15 3/11/04	709-MW-19-15 7/28/12	709-MW20-15 8/21/12	709-MW21-15 7/27/12	721-MW2 2/16/08	721-MW3 2/17/08	721-MW5-15 7/19/04	721-MW5-15 8/25/12	721-MW6-15 7/19/04	721-MW6-15 7/25/12	721-MW7-15 7/19/04	721-MW7-15 8/9/12
Extractable Petroleum Hydrocarbons																		
Aliphatics C12-C16 (EPH) in ug/L			50 UJ		50 UJ		50 UJ											
Aliphatics C16-C21 (EPH) in ug/L			50 UJ		50 UJ		50 UJ											
Aliphatics C21-C34 (EPH) in ug/L			50 UJ		50 UJ		50 UJ											
Aromatics C12-C16 (EPH) in ug/L			50 UJ		50 UJ		50 UJ											
Aromatics C16-C21 (EPH) in ug/L			50 UJ		50 UJ		50 UJ											
Aromatics C21-C34 (EPH) in ug/L			50 UJ		50 UJ		50 UJ											
Volatile Petroleum Hydrocarbons																		
Aromatics C10-C12 (VPH) in ug/L			500 UJ		50 UJ		50 UJ											
Aromatics C12-C13 (VPH) in ug/L			500 UJ		50 UJ		50 UJ											
Aromatics C8-C10 (VPH) in ug/L			500 U		50 U		50 U											
TCLP Metals																		
Dissolved Mercury in ug/L																		
Total Mercury in ug/L																		
Conventional Chemistry Parameters																		
Alkalinity (Total) in mg/L		217	374	375	240	203	239	346	250	308				658		408		414
Bicarbonate in mg/L		217		375		203		346	250	308				658 J		408		252
Bromide in mg/L		0.2 U		0.01 J		0.2 U		0.01 J	7.64	0.02 J				0.09 J		0.08 J		0.03 J
Chloride in mg/L		1.92		1.6		2.12		5.82	2,310	1.6				54.2		20.8		23.8
Dissolved Organic Carbon in mg/L																		
pH in pH Units													7.64		6.29		8.57	
Sulfate in mg/L		11.5		1.28		19.6		17	310	0.54				4.04		0.81		17.3 J
Total Boron in mg/L		0.0369 J		0.0572		0.0411 J		0.0856	0.418	0.063				0.209		0.193		0.16
Total Dissolved Solids in mg/L		246		451		268		374	4,670	335				811		504		579
Total Sodium in mg/L		12.2		11.2		7.63		106	1,140	14.6				298		28.2		198
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene in ug/L	90	0.47		1.6		0.02 U		0.02 U	0.019 U	1.7	2.5	0.2	1 U	0.42	1	1.7	1 U	0.31
Acenaphthylene in ug/L		0.051 U		0.21 U		0.02 U		0.02 U	0.019 U	0.27 U	0.36 Y	0.1 U	1 U	0.052 U	1 U	0.31 U	1 U	0.068 U
Anthracene in ug/L	400	0.02 U		0.09		0.029		0.0085 J	0.0065 J	0.051	0.1 U	0.1 U	1 U	0.033	1 U	0.02 U	1 U	0.011 J
Benzo(g,h,i)perylene in ug/L											0.1 U	0.1 U	1 U		1 U		1 U	
Benzo(a)fluoranthene in ug/L											0.1 U	0.1 U						
Fluoranthene in ug/L	20	0.02 U		0.02 U		0.02 U		0.02 U	0.019 U	0.02 U	0.1 U	0.1 U	1 U	0.019 U	1 U	0.02 U	1 U	0.02 U
Fluorene in ug/L	70	0.28		1.9		0.02 U		0.02 U	0.019 U	1.5	2.8	0.21	1 U	0.42	1 U	1.8	1 U	0.57
Phenanthrene in ug/L		0.02 U		0.24		0.02 U		0.02 U	0.019 U	0.67	2.6	0.1 U	1 U	0.031	1 U	0.21	1 U	0.11
Pyrene in ug/L	30	0.049		0.02 U		0.02 U		0.02 U	0.019 U	0.02 U	0.1 U	0.1 U	1 U	0.019 U	1 U	0.02 U	1 U	0.0044 J
1-Methylnaphthalene in ug/L											100 D	4.2						
2-Methylnaphthalene in ug/L		0.017 J		0.55		0.0032 J		0.004 J	0.003 J	42	110 D	0.85	1 U	0.1	40	63	1 U	0.31
Naphthalene in ug/L	90	0.35		0.47 U		0.052		0.011 J	0.0073 J	2.5	3	0.39	1 U	2.9	8	2.3	1.8	1.1
Benz(a)anthracene in ug/L	0.02	0.02 U		0.02 U		0.02 U		0.02 U	0.019 U	0.02 U	0.1 U	0.1 U	1 U	0.019 U	1 U	0.02 U	1 U	0.02 U
Benzo(a)pyrene in ug/L	0.02	0.02 U		0.02 U		0.02 U		0.02 U	0.019 U	0.02 U	0.1 U	0.1 U	1 U	0.019 U	1 U	0.02 U	1 U	0.02 U
Benzo(b)fluoranthene in ug/L	0.02	0.02 U		0.02 U		0.02 U		0.02 U	0.019 U	0.02 U	0.1 U	0.1 U	1 U	0.019 U	1 U	0.02 U	1 U	0.02 U
Benzo(k)fluoranthene in ug/L	0.02	0.02 U		0.02 U		0.02 U		0.02 U	0.019 U	0.02 U	0.1 U	0.1 U	1 U	0.019 U	1 U	0.02 U	1 U	0.02 U
Chrysene in ug/L	0.03	0.02 U		0.02 U		0.02 U		0.02 U	0.019 U	0.02 U	0.1 U	0.1 U	1 U	0.019 U	1 U	0.02 U	1 U	0.02 U
Dibenzo(a,h)anthracene in ug/L	0.02	0.02 U		0.02 U		0.02 U		0.02 U	0.019 U	0.02 U	0.1 U	0.1 U	1 U	0.019 U	1 U	0.0027 J	1 U	0.02 U
Indeno(1,2,3-cd)pyrene in ug/L	0.02	0.02 U		0.02 U		0.02 U		0.02 U	0.019 U	0.02 U	0.1 U	0.1 U	1 U	0.019 U	1 U	0.0036 J	1 U	0.02 U
Total cPAHs TEQ (ND = 1/2 RDL) in ug/L	0.02	ND		ND		ND		ND	ND	ND	ND	ND	ND	ND	ND	0.014 J	ND	ND
Other (Non-PAH) Semivolatiles																		
1,2,4-Trichlorobenzene in ug/L													1 U		1 U		1 U	
1,2,4-Trimethylbenzene in ug/L	63												1		54		3.5	
1,2-Dichlorobenzene in ug/L													1 U		1 U		1 U	
1,3,5-Trimethylbenzene in ug/L													1.3		9		1 U	
1,3-Dichlorobenzene in ug/L													1 U		1 U		1 U	
1,4-Dichlorobenzene in ug/L													1 U		1 U		1 U	
2,4,5-Trichlorophenol in ug/L													5 U		5 U		5 U	
2,4,6-Trichlorophenol in ug/L													5 U		5 U		5 U	
2,4-Dichlorophenol in ug/L													3 U		3 U		3 U	
2,4-Dimethylphenol in ug/L													3 U		3 U		3 U	

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Table B-17 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	709-MW-16-15 7/27/12	709-MW-17-15 3/11/04	709-MW-17-15 7/21/12	709-MW-18-15 3/11/04	709-MW-18-15 7/26/12	709-MW-19-15 3/11/04	709-MW-19-15 7/28/12	709-MW20-15 8/21/12	709-MW21-15 7/27/12	721-MW2 2/16/08	721-MW3 2/17/08	721-MW5-15 7/19/04	721-MW5-15 8/25/12	721-MW6-15 7/19/04	721-MW6-15 7/25/12	721-MW7-15 7/19/04	721-MW7-15 8/9/12
2,4-Dinitrophenol in ug/L													25 U		25 U		25 U	
2-Chloronaphthalene in ug/L													1 U		1 U		1 U	
2-Chlorophenol in ug/L													1 U		1 U		1 U	
2-Methylphenol in ug/L													1 U		1 U		1 U	
2-Nitroaniline in ug/L													5 U		5 U		5 U	
2-Nitrophenol in ug/L													5 U		5 U		5 U	
3,3'-Dichlorobenzidine in ug/L													5 U		5 U		5 U	
3-Nitroaniline in ug/L													6 U		6 U		6 U	
4,6-Dinitro-2-methylphenol in ug/L													15 U		15 U		15 U	
4-Bromophenyl phenyl ether in ug/L													1 U		1 U		1 U	
4-Chloro-3-methylphenol in ug/L													2 U		2 U		2 U	
4-Chloroaniline in ug/L													3 U		3 U		3 U	
4-Chlorophenyl phenyl ether in ug/L													1 U		1 U		1 U	
4-Methylphenol in ug/L													1 U		1 U		1 U	
4-Nitroaniline in ug/L													5 U		5 U		5 U	
4-Nitrophenol in ug/L													5 U		5 U		5 U	
Benzoic acid in ug/L													10 U		10 U		10 U	
Benzyl alcohol in ug/L													5 U		5 U		5 U	
Benzyl butyl phthalate in ug/L													1 U		1 U		1 U	
Bis(2-chloro-1-methylethyl) ether in ug/L													1 U		1 U		1 U	
Bis(2-chloroethoxy)methane in ug/L													1 U		1 U		1 U	
Bis(2-chloroethyl) ether in ug/L													2 U		2 U		2 U	
Bis(2-ethylhexyl) phthalate in ug/L	1												1 U		1 U		1.1	
Carbazole in ug/L													1 U		1.1		1 U	
Dibenzofuran in ug/L											1.2	0.1 U	1 U		1 U		1 U	
Diethyl phthalate in ug/L	600												1 U		1 U		1 U	
Dimethyl phthalate in ug/L	2,000												1 U		1 U		1 U	
Di-n-butyl phthalate in ug/L													1 U		1 U		1 U	
Di-n-octyl phthalate in ug/L													1 U		1 U		1 U	
Hexachlorobenzene in ug/L	0.2												1 U		1 U		1 U	
Hexachlorobutadiene in ug/L	0.2												2 U		2 U		2 U	
Hexachlorocyclopentadiene in ug/L													5 U		5 U		5 U	
Hexachloroethane in ug/L													2 U		2 U		2 U	
Isophorone in ug/L													1 U		1 U		1 U	
Nitrobenzene in ug/L													1 U		1 U		1 U	
N-Nitroso-di-n-propylamine in ug/L													2 U		2 U		2 U	
N-Nitrosodiphenylamine in ug/L													1 U		1 U		1 U	
Pentachlorophenol in ug/L	1												5 U		5 U		5 U	
Phenol in ug/L	300,000												2 U		21		2 U	
2,4-Dinitrotoluene in ug/L													5 U		5 U		5 U	
2,6-Dinitrotoluene in ug/L													5 U		5 U		5 U	
Polychlorinated Biphenyls (PCBs)																		
Aroclor 1016 in ug/L		0.0051 U		0.017 U		0.0049 U		0.0051 U	0.0077 U	0.0089 U				0.005 U		0.017 UJ		0.005 U
Aroclor 1221 in ug/L		0.092 U		0.041 U		0.0098 U		0.056 U	0.021 U	0.023 U				0.01 U		0.046 UJ		0.01 U
Aroclor 1232 in ug/L		0.0051 U		0.025 U		0.0049 U		0.021 U	0.015 U	0.013 U				0.005 U		0.017 UJ		0.005 U
Aroclor 1242 in ug/L		0.0051 U		0.016 U		0.0049 U		0.008 U	0.014 U	0.011 U				0.005 U		0.011 UJ		0.005 U
Aroclor 1248 in ug/L		0.0051 U		0.021 U		0.0049 U		0.0051 U	0.035 U	0.0095 U				0.005 U		0.021 UJ		0.005 U
Aroclor 1254 in ug/L		0.0051 U		0.02 U		0.0049 U		0.0051 U	0.005 U	0.0051 U				0.005 U		0.017 UJ		0.005 U
Aroclor 1260 in ug/L		0.0051 U		0.005 U		0.0049 U		0.0051 U	0.005 U	0.0051 U				0.005 U		0.008 UJ		0.005 U
Total PCBs (Sum of Aroclors) in ug/L		0.092 U		0.041 U		0.0098 U		0.056 U	0.035 U	0.023 U				0.01 U		0.046 UJ		0.01 U
PCB 70 in ug/L																		
PCB 77 in ug/L																		
PCB 81 in ug/L																		
PCB 105 in ug/L																		
PCB 114 in ug/L																		
PCB 118 in ug/L																		
PCB 123 in ug/L																		

Table B-17

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Table B-17 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	709-MW-16-15 7/27/12	709-MW-17-15 3/11/04	709-MW-17-15 7/21/12	709-MW-18-15 3/11/04	709-MW-18-15 7/26/12	709-MW-19-15 3/11/04	709-MW-19-15 7/28/12	709-MW20-15 8/21/12	709-MW21-15 7/27/12	721-MW2 2/16/08	721-MW3 2/17/08	721-MW5-15 7/19/04	721-MW5-15 8/25/12	721-MW6-15 7/19/04	721-MW6-15 7/25/12	721-MW7-15 7/19/04	721-MW7-15 8/9/12	
PCB 126 in ug/L																			
PCB 156 in ug/L																			
PCB 167 in ug/L																			
PCB 169 in ug/L																			
PCB 170 in ug/L																			
PCB 180 in ug/L																			
PCB 183 in ug/L																			
PCB 187 in ug/L																			
PCB 189 in ug/L																			
Dioxins/Furans																			
Tetrachlorodibenzofurans (TCDF), Total in ug/L																			
Total HpCDD in ug/L																			
Total HpCDF in ug/L																			
Total HxCDD in ug/L																			
Total HxCDF in ug/L																			
Total PeCDD in ug/L																			
Total PeCDF in ug/L																			
Total TCDD in ug/L																			
2,3,7,8-TCDD in ug/L																			
1,2,3,7,8-PeCDD in ug/L																			
1,2,3,4,7,8-HxCDD in ug/L																			
1,2,3,6,7,8-HxCDD in ug/L																			
1,2,3,7,8,9-HxCDD in ug/L																			
1,2,3,4,6,7,8-HpCDD in ug/L																			
OCDD in ug/L																			
2,3,7,8-TCDF in ug/L																			
1,2,3,7,8-PeCDF in ug/L																			
2,3,4,7,8-PeCDF in ug/L																			
1,2,3,4,7,8-HxCDF in ug/L																			
1,2,3,6,7,8-HxCDF in ug/L																			
1,2,3,7,8,9-HxCDF in ug/L																			
2,3,4,6,7,8-HxCDF in ug/L																			
1,2,3,4,6,7,8-HpCDF in ug/L																			
1,2,3,4,7,8,9-HpCDF in ug/L																			
OCDF in ug/L																			
Pesticides																			
4,4'-DDD in ug/L																			
4,4'-DDE in ug/L																			
4,4'-DDT in ug/L																			
Aldrin in ug/L																			
cis-Chlordane in ug/L																			
Dieldrin in ug/L																			
trans-Chlordane in ug/L																			

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

D - The spiked compound was not detected due to sample extract dilution.

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-17 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	721-MW8-15 7/20/04	721-MW9-15 7/20/04	721-MW9-15 7/22/12	721-MW10-15 8/8/12	721-MW11-15 7/31/12	721-MW12-15 7/30/12	721-MW13-15 7/31/12	721-MW14-15 8/8/12	721-MW15-15 7/30/12	721-PZ-03 6/4/04 FD	721-PZ-04 8/28/04	721-PZ-05 8/28/04	DOCK2-005 8/1/05	DOCK2-010 9/12/05	DOCK2-014 10/28/05	HC-N11-5 11/9/11	HC-N11-6 11/9/11		
Extractable Petroleum Hydrocarbons																				
Aliphatics C12-C16 (EPH) in ug/L																				
Aliphatics C16-C21 (EPH) in ug/L																				
Aliphatics C21-C34 (EPH) in ug/L																				
Aromatics C12-C16 (EPH) in ug/L																				
Aromatics C16-C21 (EPH) in ug/L																				
Aromatics C21-C34 (EPH) in ug/L																				
Volatile Petroleum Hydrocarbons																				
Aromatics C10-C12 (VPH) in ug/L																				
Aromatics C12-C13 (VPH) in ug/L																				
Aromatics C8-C10 (VPH) in ug/L																				
TCLP Metals																				
Dissolved Mercury in ug/L																		0.066 U	0.5 U	0.5 U
Total Mercury in ug/L																			0.5 U	0.5 U
Conventional Chemistry Parameters																				
Alkalinity (Total) in mg/L				225	393	575	344	157	375	538										
Bicarbonate in mg/L				225	393	575	344	157	375	538										
Bromide in mg/L				0.02 J	17.3	0.43	0.03 J	0.2 U	0.01 J	0.3										
Chloride in mg/L				2.41	4,960	182	4.41	5.39	5.12	41.7										
Dissolved Organic Carbon in mg/L														21.8	16 U	14.3 J				
pH in pH Units		7.44	7.78								8.4	8.2	7.98							
Sulfate in mg/L				5.83	681	1.36	0.59	18.3	0.76	0.9										
Total Boron in mg/L				0.0585	1.11	0.872	0.0803	0.056	0.0342 J	0.136										
Total Dissolved Solids in mg/L				286	10,100 J	929	380	274	437 J	763										
Total Sodium in mg/L				27.3	2,700	187	21.9	11.6	6.84	32.7										
Polycyclic Aromatic Hydrocarbons (PAHs)																				
Acenaphthene in ug/L	90	1 U	1 U	0.4	0.66	0.65	4.6	0.0098 J	3.5	2.1										
Acenaphthylene in ug/L		1 U	1 U	0.036 U	0.2 U	0.22 U	0.67 U	0.019 U	0.54 U	0.33										
Anthracene in ug/L	400	1 U	1 U	0.02 U	0.031	0.019 U	0.12	0.019 U	0.14	0.059										
Benzo(g,h,i)perylene in ug/L		1 U	1 U																	
Benzo(a)fluoranthene in ug/L																				
Fluoranthene in ug/L	20	1 U	1 U	0.02 U	0.015 J	0.019 U	0.019 U	0.019 U	0.0093 J	0.019 U										
Fluorene in ug/L	70	1 U	1 U	0.53	0.36	1.2	4.7	0.004 J	4.1	1.9										
Phenanthrene in ug/L		1 U	1 U	0.02 U	0.029	0.56	3.8	0.019 U	2.9	1										
Pyrene in ug/L	30	1 U	1 U	0.02 U	0.0071 J	0.019 U	0.019 U	0.019 U	0.013 J	0.019 U										
1-Methylnaphthalene in ug/L																				
2-Methylnaphthalene in ug/L		18	1 U	0.011 J	0.077 U	23	98	0.0046 J	180	86										
Naphthalene in ug/L	90	3.5	1 U	0.27 U	0.74	4.6	41	0.066	0.95	2.1										
Benz(a)anthracene in ug/L	0.02	1 U	1 U	0.02 U	0.02 U	0.019 U	0.019 U	0.019 U	0.02 U	0.019 U										
Benzo(a)pyrene in ug/L	0.02	1 U	1 U	0.02 U	0.02 U	0.019 U	0.019 U	0.019 U	0.02 U	0.019 U										
Benzo(b)fluoranthene in ug/L	0.02	1 U	1 U	0.02 U	0.02 U	0.019 U	0.019 U	0.019 U	0.02 U	0.019 U										
Benzo(k)fluoranthene in ug/L	0.02	1 U	1 U	0.02 U	0.02 U	0.019 U	0.019 U	0.019 U	0.02 U	0.019 U										
Chrysene in ug/L	0.03	1 U	1 U	0.02 U	0.02 U	0.019 U	0.019 U	0.019 U	0.02 U	0.019 U										
Dibenzo(a,h)anthracene in ug/L	0.02	1 U	1 U	0.02 U	0.02 U	0.019 U	0.019 U	0.019 U	0.02 U	0.0046 J										
Indeno(1,2,3-cd)pyrene in ug/L	0.02	1 U	1 U	0.02 U	0.02 U	0.019 U	0.019 U	0.019 U	0.02 U	0.0053 J										
Total cPAHs TEQ (ND = 1/2 RDL) in ug/L	0.02	ND	ND	ND	ND	ND	ND	ND	ND	0.013 J										
Other (Non-PAH) Semivolatiles																				
1,2,4-Trichlorobenzene in ug/L		1 U	1 U																	
1,2,4-Trimethylbenzene in ug/L	63	5.3	1 U																	
1,2-Dichlorobenzene in ug/L		1 U	1 U																	
1,3,5-Trimethylbenzene in ug/L		2	1 U																	
1,3-Dichlorobenzene in ug/L		1 U	1 U																	
1,4-Dichlorobenzene in ug/L		1 U	1 U																	
2,4,5-Trichlorophenol in ug/L		5 U	5 U																	
2,4,6-Trichlorophenol in ug/L		5 U	5 U																	
2,4-Dichlorophenol in ug/L		3 U	3 U																	
2,4-Dimethylphenol in ug/L		3 U	3 U																	

Aspect Consulting

2/26/2016

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Table B-17

RI

Table B-17 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	721-MW8-15 7/20/04	721-MW9-15 7/20/04	721-MW9-15 7/22/12	721-MW10-15 8/8/12	721-MW11-15 7/31/12	721-MW12-15 7/30/12	721-MW13-15 7/31/12	721-MW14-15 8/8/12	721-MW15-15 7/30/12	721-PZ-03 6/4/04 FD	721-PZ-04 8/28/04	721-PZ-05 8/28/04	DOCK2-005 8/1/05	DOCK2-010 9/12/05	DOCK2-014 10/28/05	HC-N11-5 11/9/11	HC-N11-6 11/9/11
2,4-Dinitrophenol in ug/L		25 U	25 U															
2-Chloronaphthalene in ug/L		1 U	1 U															
2-Chlorophenol in ug/L		1 U	1 U															
2-Methylphenol in ug/L		1 U	1 U															
2-Nitroaniline in ug/L		5 U	5 U															
2-Nitrophenol in ug/L		5 U	5 U															
3,3'-Dichlorobenzidine in ug/L		5 U	5 U															
3-Nitroaniline in ug/L		6 U	6 U															
4,6-Dinitro-2-methylphenol in ug/L		15 U	15 U															
4-Bromophenyl phenyl ether in ug/L		1 U	1 U															
4-Chloro-3-methylphenol in ug/L		2 U	2 U															
4-Chloroaniline in ug/L		3 U	3 U															
4-Chlorophenyl phenyl ether in ug/L		1 U	1 U															
4-Methylphenol in ug/L		1 U	1 U															
4-Nitroaniline in ug/L		5 U	5 U															
4-Nitrophenol in ug/L		5 U	5 U															
Benzoic acid in ug/L		10 U	10 U															
Benzyl alcohol in ug/L		5 U	5 U															
Benzyl butyl phthalate in ug/L		1 U	1 U															
Bis(2-chloro-1-methylethyl) ether in ug/L		1 U	1 U															
Bis(2-chloroethoxy)methane in ug/L		1 U	1 U															
Bis(2-chloroethyl) ether in ug/L		2 U	2 U															
Bis(2-ethylhexyl) phthalate in ug/L	1	1 U	1 U															
Carbazole in ug/L		1 U	1 U															
Dibenzofuran in ug/L		1 U	1 U															
Diethyl phthalate in ug/L	600	1 U	1.1 U															
Dimethyl phthalate in ug/L	2,000	1 U	1 U															
Di-n-butyl phthalate in ug/L		1 U	1 U															
Di-n-octyl phthalate in ug/L		1 U	1 U															
Hexachlorobenzene in ug/L	0.2	1 U	1 U											0.0316	0.00357 U	0.016 U		
Hexachlorobutadiene in ug/L	0.2	2 U	2 U											0.00244 U	0.00244 U	0.05 U		
Hexachlorocyclopentadiene in ug/L		5 U	5 U															
Hexachloroethane in ug/L		2 U	2 U															
Isophorone in ug/L		1 U	1 U															
Nitrobenzene in ug/L		1 U	1 U															
N-Nitroso-di-n-propylamine in ug/L		2 U	2 U															
N-Nitrosodiphenylamine in ug/L		1 U	1 U															
Pentachlorophenol in ug/L	1	5 U	5 U											0.0237 U	0.0233 U	0.3 U		
Phenol in ug/L	300,000	2 U	2 U															
2,4-Dinitrotoluene in ug/L		5 U	5 U															
2,6-Dinitrotoluene in ug/L		5 U	5 U															
Polychlorinated Biphenyls (PCBs)																		
Aroclor 1016 in ug/L				0.005 U	0.005 U	0.051 UJ	0.045 U	0.0051 U	0.059 U	0.05 UJ								0.0324 U
Aroclor 1221 in ug/L				0.017 U	0.01 U	0.11 UJ	0.15 U	0.011 U	0.37 U	0.1 UJ								0.0324 U
Aroclor 1232 in ug/L				0.005 U	0.005 U	0.051 UJ	0.15 U	0.0051 U	0.14 U	0.05 UJ								0.033 U
Aroclor 1242 in ug/L				0.005 U	0.005 U	0.051 UJ	0.12 U	0.0051 U	0.054 U	0.05 UJ								0.0324 U
Aroclor 1248 in ug/L				0.005 U	0.021 J	0.051 UJ	0.025 U	0.0051 U	0.042 U	0.05 UJ								0.0329 U
Aroclor 1254 in ug/L				0.0051 U	0.005 U	0.051 UJ	0.0051 U	0.0051 U	0.005 U	0.05 UJ								0.0212 U
Aroclor 1260 in ug/L				0.005 U	0.005 U	0.051 UJ	0.0051 U	0.0051 U	0.005 U	0.05 UJ								0.0216 U
Total PCBs (Sum of Aroclors) in ug/L				0.017 U	0.021	0.11 UJ	0.15 U	0.011 U	0.37 U	0.1 UJ								0.0335 U
PCB 70 in ug/L																		
PCB 77 in ug/L																		
PCB 81 in ug/L																		
PCB 105 in ug/L																		
PCB 114 in ug/L																		
PCB 118 in ug/L																		
PCB 123 in ug/L																		

Table B-17 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	721-MW8-15 7/20/04	721-MW9-15 7/20/04	721-MW9-15 7/22/12	721-MW10-15 8/8/12	721-MW11-15 7/31/12	721-MW12-15 7/30/12	721-MW13-15 7/31/12	721-MW14-15 8/8/12	721-MW15-15 7/30/12	721-PZ-03 6/4/04 FD	721-PZ-04 8/28/04	721-PZ-05 8/28/04	DOCK2-005 8/1/05	DOCK2-010 9/12/05	DOCK2-014 10/28/05	HC-N11-5 11/9/11	HC-N11-6 11/9/11
PCB 126 in ug/L																		
PCB 156 in ug/L																		
PCB 167 in ug/L																		
PCB 169 in ug/L																		
PCB 170 in ug/L																		
PCB 180 in ug/L																		
PCB 183 in ug/L																		
PCB 187 in ug/L																		
PCB 189 in ug/L																		
Dioxins/Furans																		
Tetrachlorodibenzofurans (TCDF), Total in ug/L																		
Total HpCDD in ug/L																		
Total HpCDF in ug/L																		
Total HxCDD in ug/L																		
Total HxCDF in ug/L																		
Total PeCDD in ug/L																		
Total PeCDF in ug/L																		
Total TCDD in ug/L																		
2,3,7,8-TCDD in ug/L																		
1,2,3,7,8-PeCDD in ug/L																		
1,2,3,4,7,8-HxCDD in ug/L																		
1,2,3,6,7,8-HxCDD in ug/L																		
1,2,3,7,8,9-HxCDD in ug/L																		
1,2,3,4,6,7,8-HpCDD in ug/L																		
OCDD in ug/L																		
2,3,7,8-TCDF in ug/L																		
1,2,3,7,8-PeCDF in ug/L																		
2,3,4,7,8-PeCDF in ug/L																		
1,2,3,4,7,8-HxCDF in ug/L																		
1,2,3,6,7,8-HxCDF in ug/L																		
1,2,3,7,8,9-HxCDF in ug/L																		
2,3,4,6,7,8-HxCDF in ug/L																		
1,2,3,4,6,7,8-HpCDF in ug/L																		
1,2,3,4,7,8,9-HpCDF in ug/L																		
OCDF in ug/L																		
Pesticides																		
4,4'-DDD in ug/L																		
4,4'-DDE in ug/L																		
4,4'-DDT in ug/L																		
Aldrin in ug/L																		
cis-Chlordane in ug/L																		
Dieldrin in ug/L																		
trans-Chlordane in ug/L																		

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

D - The spiked compound was not detected due to sample extract dilution.

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-17 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	HC-N11-6 8/16/12	HW-4 1/23/07	HYD-008 9/13/05	HYD-009 9/14/05	HYD-010 9/16/05	NL-13 12/20/05	NL-16 5/18/06	NL-16 5/19/06	NL-25 1/18/07	NL-26 1/17/07	NL-28 1/16/07	NL-28 1/17/07	NL-29 1/18/07	NL-30 1/19/07	WMUL-01 6/7/12	WMUL-02 6/12/12
Extractable Petroleum Hydrocarbons																	
Aliphatics C12-C16 (EPH) in ug/L																	
Aliphatics C16-C21 (EPH) in ug/L																	
Aliphatics C21-C34 (EPH) in ug/L																	
Aromatics C12-C16 (EPH) in ug/L																	
Aromatics C16-C21 (EPH) in ug/L																	
Aromatics C21-C34 (EPH) in ug/L																	
Volatile Petroleum Hydrocarbons																	
Aromatics C10-C12 (VPH) in ug/L																	
Aromatics C12-C13 (VPH) in ug/L																	
Aromatics C8-C10 (VPH) in ug/L																	
TCLP Metals																	
Dissolved Mercury in ug/L			0.8 U					0.055 U	0.055 U	0.41 U	11.1 U	0.17 U	1.4 U	0.41 U	1.2 U		
Total Mercury in ug/L																	
Conventional Chemistry Parameters																	
Alkalinity (Total) in mg/L		390															
Bicarbonate in mg/L		390															
Bromide in mg/L		0.2 U															
Chloride in mg/L		2.41															
Dissolved Organic Carbon in mg/L				0.585 U	9.27 U	13.7 U											
pH in pH Units																	
Sulfate in mg/L		0.9															
Total Boron in mg/L		0.0338 J															
Total Dissolved Solids in mg/L		432															
Total Sodium in mg/L		5.78															
Polycyclic Aromatic Hydrocarbons (PAHs)																	
Acenaphthene in ug/L	90	2.4															2.2
Acenaphthylene in ug/L		0.15 U															0.019 U
Anthracene in ug/L	400	0.098															0.052
Benzo(g,h,i)perylene in ug/L																	
Benzo(a)fluoranthene in ug/L																	
Fluoranthene in ug/L	20	0.02 U															0.0075 J
Fluorene in ug/L	70	1.1															1.1
Phenanthrene in ug/L		0.51															0.028
Pyrene in ug/L	30	0.012 J															0.0073 J
1-Methylnaphthalene in ug/L																	
2-Methylnaphthalene in ug/L		39															0.71
Naphthalene in ug/L	90	0.78															42
Benzo(a)anthracene in ug/L	0.02	0.02 U															0.0055 J
Benzo(a)pyrene in ug/L	0.02	0.02 U															0.019 U
Benzo(b)fluoranthene in ug/L	0.02	0.02 U															0.003 J
Benzo(k)fluoranthene in ug/L	0.02	0.02 U															0.019 U
Chrysene in ug/L	0.03	0.02 U															0.0049 J
Dibenzo(a,h)anthracene in ug/L	0.02	0.02 U															0.019 U
Indeno(1,2,3-cd)pyrene in ug/L	0.02	0.02 U															0.019 U
Total cPAHs TEQ (ND = 1/2 RDL) in ug/L	0.02	ND															0.013 J
Other (Non-PAH) Semivolatiles																	
1,2,4-Trichlorobenzene in ug/L																	
1,2,4-Trimethylbenzene in ug/L	63																
1,2-Dichlorobenzene in ug/L																	
1,3,5-Trimethylbenzene in ug/L																	
1,3-Dichlorobenzene in ug/L																	
1,4-Dichlorobenzene in ug/L																	
2,4,5-Trichlorophenol in ug/L																	
2,4,6-Trichlorophenol in ug/L																	
2,4-Dichlorophenol in ug/L																	
2,4-Dimethylphenol in ug/L																	

Table B-17 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	HC-N11-6 8/16/12	HW-4 1/23/07	HYD-008 9/13/05	HYD-009 9/14/05	HYD-010 9/16/05	NL-13 12/20/05	NL-16 5/18/06	NL-16 5/19/06	NL-25 1/18/07	NL-26 1/17/07	NL-28 1/16/07	NL-28 1/17/07	NL-29 1/18/07	NL-30 1/19/07	WMUL-01 6/7/12	WMUL-02 6/12/12
2,4-Dinitrophenol in ug/L																	
2-Chloronaphthalene in ug/L																	
2-Chlorophenol in ug/L																	
2-Methylphenol in ug/L																	
2-Nitroaniline in ug/L																	
2-Nitrophenol in ug/L																	
3,3'-Dichlorobenzidine in ug/L																	
3-Nitroaniline in ug/L																	
4,6-Dinitro-2-methylphenol in ug/L																	
4-Bromophenyl phenyl ether in ug/L																	
4-Chloro-3-methylphenol in ug/L																	
4-Chloroaniline in ug/L																	
4-Chlorophenyl phenyl ether in ug/L																	
4-Methylphenol in ug/L																	
4-Nitroaniline in ug/L																	
4-Nitrophenol in ug/L																	
Benzoic acid in ug/L																	
Benzyl alcohol in ug/L																	
Benzyl butyl phthalate in ug/L																	
Bis(2-chloro-1-methylethyl) ether in ug/L																	
Bis(2-chloroethoxy)methane in ug/L																	
Bis(2-chloroethyl) ether in ug/L																	
Bis(2-ethylhexyl) phthalate in ug/L	1																
Carbazole in ug/L																	
Dibenzofuran in ug/L																	
Diethyl phthalate in ug/L	600																
Dimethyl phthalate in ug/L	2,000																
Di-n-butyl phthalate in ug/L																	
Di-n-octyl phthalate in ug/L																	
Hexachlorobenzene in ug/L	0.2			0.00365 U	0.0122	0.00354 U	0.00361 U			0.016 U	0.016 U	0.016 U	0.08 U	0.016 U	0.016 U		
Hexachlorobutadiene in ug/L	0.2			0.00249 U	0.00243 U	0.00242 U	0.00247 U			0.05 U	0.05 U	0.1 J	0.25 U	0.05 U	0.05 U		
Hexachlorocyclopentadiene in ug/L																	
Hexachloroethane in ug/L																	
Isophorone in ug/L																	
Nitrobenzene in ug/L																	
N-Nitroso-di-n-propylamine in ug/L																	
N-Nitrosodiphenylamine in ug/L																	
Pentachlorophenol in ug/L	1			0.0442 J	0.0234 U	0.0233 U	0.0461 J				0.3 U	0.3 U	1.5 U		0.3 U		
Phenol in ug/L	300,000																
2,4-Dinitrotoluene in ug/L																	
2,6-Dinitrotoluene in ug/L																	
Polychlorinated Biphenyls (PCBs)																	
Aroclor 1016 in ug/L				0.0324 UJ	0.0328 U	0.0326 U	0.0332 U										
Aroclor 1221 in ug/L				0.0335 U	0.0326 U	0.0326 U	0.0332 U										
Aroclor 1232 in ug/L				0.0324 UJ	0.0326 U	0.0326 U	0.0332 U										
Aroclor 1242 in ug/L				0.0324 UJ	0.0326 U	0.0326 U	0.0332 U										
Aroclor 1248 in ug/L				0.0324 UJ	0.0326 U	0.0326 U	0.0332 U										
Aroclor 1254 in ug/L				0.0212 UJ	0.0214 U	0.0213 U	0.0218 U										
Aroclor 1260 in ug/L				0.0212 UJ	0.0215 U	0.0213 U	0.0218 U										
Total PCBs (Sum of Aroclors) in ug/L			0.054	0.0335 U	0.0328 U	0.0326 U	0.0332 UJ			0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U		
PCB 70 in ug/L			3.58E-06 U														
PCB 77 in ug/L			3.71E-06 U														
PCB 81 in ug/L			3.93E-06 U														
PCB 105 in ug/L			2.85E-06 U														
PCB 114 in ug/L			2.63E-06 U														
PCB 118 in ug/L			2.27E-06 U														
PCB 123 in ug/L			2.51E-06 U														

Table B-17 - 2000-2013 Pre-RI Groundwater Data - 15 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (15ft zone) (ug/L)	HC-N11-6 8/16/12	HW-4 1/23/07	HYD-008 9/13/05	HYD-009 9/14/05	HYD-010 9/16/05	NL-13 12/20/05	NL-16 5/18/06	NL-16 5/19/06	NL-25 1/18/07	NL-26 1/17/07	NL-28 1/16/07	NL-28 1/17/07	NL-29 1/18/07	NL-30 1/19/07	WMUL-01 6/7/12	WMUL-02 6/12/12
PCB 126 in ug/L			8.65E-06														
PCB 156 in ug/L			9.58E-06	U													
PCB 167 in ug/L			7.71E-06	U													
PCB 169 in ug/L			4.443E-05														
PCB 170 in ug/L			0.0007055														
PCB 180 in ug/L			0.0061132														
PCB 183 in ug/L			0.0003913														
PCB 187 in ug/L			0.0081637														
PCB 189 in ug/L			8.28E-06	U													
Dioxins/Furans																	
Tetrachlorodibenzofurans (TCDF), Total in ug/L			2.041E-05	U													
Total HpCDD in ug/L			0.000102	U													
Total HpCDF in ug/L			6.641E-06														
Total HxCDD in ug/L			0.000102	U													
Total HxCDF in ug/L			0.000102	U													
Total PeCDD in ug/L			0.000102	U													
Total PeCDF in ug/L			0.000102	U													
Total TCDD in ug/L			2.041E-05	U													
2,3,7,8-TCDD in ug/L			2.041E-05	U													
1,2,3,7,8-PeCDD in ug/L			0.000102	U													
1,2,3,4,7,8-HxCDD in ug/L			0.000102	U													
1,2,3,6,7,8-HxCDD in ug/L			0.000102	U													
1,2,3,7,8,9-HxCDD in ug/L			0.000102	U													
1,2,3,4,6,7,8-HpCDD in ug/L			0.000102	U													
OCDD in ug/L			0.0002041	U													
2,3,7,8-TCDF in ug/L			2.041E-05	U													
1,2,3,7,8-PeCDF in ug/L			0.000102	U													
2,3,4,7,8-PeCDF in ug/L			0.000102	U													
1,2,3,4,7,8-HxCDF in ug/L			4.364E-06	J													
1,2,3,6,7,8-HxCDF in ug/L			0.000102	U													
1,2,3,7,8,9-HxCDF in ug/L			0.000102	U													
2,3,4,6,7,8-HxCDF in ug/L			0.000102	U													
1,2,3,4,6,7,8-HpCDF in ug/L			6.641E-06	J													
1,2,3,4,7,8,9-HpCDF in ug/L			0.000102	U													
OCDF in ug/L			1.79E-05	J													
Pesticides																	
4,4'-DDD in ug/L							0.132	U		0.003	U	0.003	U	0.003	U	0.003	U
4,4'-DDE in ug/L							0.186	U		0.004	U	0.004	U	0.004	U	0.004	U
4,4'-DDT in ug/L							0.204	UJ		0.007	U	0.007	U	0.007	U	0.007	U
Aldrin in ug/L							0.0219	U		0.009	U	0.009	U	0.009	U	0.009	U
cis-Chlordane in ug/L							0.0829	UJ		0.007	U	0.007	U	0.007	U	0.007	U
Dieldrin in ug/L							0.21	U		0.005	U	0.005	U	0.005	U	0.005	U
trans-Chlordane in ug/L							0.344	UJ		0.006	U	0.006	U	0.006	U	0.006	U

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (15ft zone) (ug/L)

D - The spiked compound was not detected due to sample extract dilution.

J - Analyte was positively identified. The reported result is an estimate.

M - Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Y - The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference.

Table B-18 - 2000-2013 Pre-RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	9-25 3/16/04	9-25 4/14/06	9-25 7/15/06	9-25 12/1/11	9-25 8/8/12	93C-25 7/17/12	95C-25 7/19/12	709-MW6-25 8/9/12	709-MW9-25 8/14/12	709-MW11-25 7/29/12	709-MW16-25 7/27/12	709-MW18-25 7/26/12	709-MW20-25 7/21/04	709-MW20-25 7/21/06	709-MW20-25 12/1/11	709-MW20-25 8/23/12	709-MW21-25 7/27/12	721-MW5-25 7/19/04	
Extractable Petroleum Hydrocarbons																				
Aliphatics C12-C16 (EPH) in ug/L		50 UJ																		
Aliphatics C16-C21 (EPH) in ug/L		50 UJ																		
Aliphatics C21-C34 (EPH) in ug/L		50 UJ																		
Aromatics C12-C16 (EPH) in ug/L		50 UJ																		
Aromatics C16-C21 (EPH) in ug/L		50 UJ																		
Aromatics C21-C34 (EPH) in ug/L		50 UJ																		
Volatile Petroleum Hydrocarbons																				
Aromatics C10-C12 (VPH) in ug/L		50 UJ																		
Aromatics C12-C13 (VPH) in ug/L		50 UJ																		
Aromatics C8-C10 (VPH) in ug/L		50 U																		
TCLP Metals																				
Dissolved Mercury in ug/L																				
Conventional Chemistry Parameters																				
Alkalinity (Total) in mg/L		1,120				925	1,200	1,460	11,700	720	536	372	329					183	312	
Bicarbonate in mg/L						90 U	1,200	1,460	900 U	720	536	353	329					183	312	
Bromide in mg/L						0.11 J	0.2 U	28	1.9 J	0.14 J	0.03 J	0.06 J	0.04 J					0.9	1 U	
Carbon, Dissolved Organic (DOC) in mg/L			20																	
Chloride in mg/L						19.3	19.4	7,340	2,680	99.5	3.8	30.1	13.7					1,000	1.42	
Dissolved Chloride in mg/L			130 J	148												3,730				
Dissolved Organic Carbon in mg/L																				
Dissolved Sodium in mg/L			510	483 J												1,340 J				
pH in pH Units																			7.68	
Sulfate in mg/L						1.71	6.64	37	181 J	6.87	4.64	0.79	1.11					9.34	8.41	
Total Boron in mg/L						0.101	0.152	1.65	1.47	0.362	0.206	0.145	0.286					0.14	0.13	
Total Dissolved Solids in mg/L			2,200	2,000		1,550	149	14,600	32,900	927	600	404	388		8,400			2,250	482	
Total Sodium in mg/L						355	14.4	3,460	6,090	237	170	160	96.9					451	161	
Polycyclic Aromatic Hydrocarbons (PAHs)																				
Acenaphthene in ug/L	90						0.02 U	0.02 U	0.028	0.095	0.44	0.02 U	0.02 U					0.0088 J	0.39	1 U
Acenaphthylene in ug/L							0.02 U	0.02 U	0.02 U	0.02 U	0.11 U	0.004 J	0.02 U					0.019 U	0.076 U	1 U
Anthracene in ug/L	400						0.02 U	0.02 U	0.014 J	0.024	0.073	0.02	0.0063 J					0.0079 J	0.041	1 U
Benzo(g,h,i)perylene in ug/L																				1 U
Fluoranthene in ug/L	20						0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.0048 J	0.02 U					0.019 U	0.02 U	1 U
Fluorene in ug/L	70						0.031	0.02 U	0.012 J	0.15	0.57	0.007 J	0.0088 J					0.019 U	0.37	1 U
Phenanthrene in ug/L							0.02 U	0.02 U	0.023	0.089	0.69	0.012 J	0.025					0.019 U	0.27	1 U
Pyrene in ug/L	30						0.02 U	0.02 U	0.0042 J	0.02 U	0.02 U	0.0055 J	0.0059 J					0.019 U	0.02 U	1 U
2-Methylnaphthalene in ug/L							0.022	0.0033 J	0.01 J	3.2	7.2	0.011 J	0.012 J					0.019 U	12	1 U
Naphthalene in ug/L	4,710						0.1	0.03	0.44	4	1.4	0.089	0.093					0.019 U	0.34	5 U
Benz(a)anthracene in ug/L	0.02						0.02 U	0.02 U	0.0036 J	0.02 U	0.02 U	0.0033 J	0.0052 J					0.019 U	0.02 U	1 U
Benzo(a)pyrene in ug/L	0.02						0.02 U	0.02 U	0.02 U	0.02 U	0.097 U	0.02 U	0.02 U					0.019 U	0.097 U	1 U
Benzo(b)fluoranthene in ug/L	0.02						0.02 U	0.02 U	0.02 U	0.02 U	0.021 J	0.02 U	0.02 U					0.019 U	0.097 U	1 U
Benzo(k)fluoranthene in ug/L	0.02						0.02 U	0.02 U	0.02 U	0.02 U	0.017 J	0.02 U	0.02 U					0.019 U	0.097 U	1 U
Chrysene in ug/L	0.03						0.02 U	0.02 U	0.0034 J	0.02 U	0.02 U	0.02 U	0.02 U					0.019 U	0.02 U	1 U
Dibenzo(a,h)anthracene in ug/L	0.02						0.02 U	0.02 U	0.02 U	0.02 U	0.021 J	0.02 U	0.02 U					0.019 U	0.018 J	1 U
Indeno(1,2,3-cd)pyrene in ug/L	0.02						0.02 U	0.02 U	0.02 U	0.02 U	0.033 J	0.02 U	0.02 U					0.019 U	0.02 J	1 U
Total cPAHs TEQ (ND = 1/2 RDL) in ug/L	0.02						ND	ND	0.014 J	ND	0.058 J	0.014 J	0.015 J					ND	0.062 J	ND
Other (Non-PAH) Semivolatiles																				
1,2,4-Trichlorobenzene in ug/L																				5 U
1,2,4-Trimethylbenzene in ug/L																				5.5
1,2-Dichlorobenzene in ug/L																				1 U
1,3,5-Trimethylbenzene in ug/L																				1 U
1,3-Dichlorobenzene in ug/L																				1 U
1,4-Dichlorobenzene in ug/L																				1 U
2,4,5-Trichlorophenol in ug/L																				5 U
2,4,6-Trichlorophenol in ug/L																				5 U
2,4-Dichlorophenol in ug/L																				3 U
2,4-Dimethylphenol in ug/L																				3 U
2,4-Dinitrophenol in ug/L																				25 U
2-Chloronaphthalene in ug/L																				1 U
2-Chlorophenol in ug/L																				1 U

Table B-18

Table B-18 - 2000-2013 Pre-RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	9-25 3/16/04	9-25 4/14/06	9-25 7/15/06	9-25 12/1/11	9-25 8/8/12	93C-25 7/17/12	95C-25 7/19/12	709-MW6-25 8/9/12	709-MW9-25 8/14/12	709-MW11-25 7/29/12	709-MW16-25 7/27/12	709-MW18-25 7/26/12	709-MW20-25 7/21/04	709-MW20-25 7/21/06	709-MW20-25 12/1/11	709-MW20-25 8/23/12	709-MW21-25 7/27/12	721-MW5-25 7/19/04	
2-Methylphenol in ug/L																				1 U
2-Nitroaniline in ug/L																				5 U
2-Nitrophenol in ug/L																				5 U
3,3'-Dichlorobenzidine in ug/L																				5 U
3-Nitroaniline in ug/L																				6 U
4,6-Dinitro-2-methylphenol in ug/L																				15 U
4-Bromophenyl phenyl ether in ug/L																				1 U
4-Chloro-3-methylphenol in ug/L																				2 U
4-Chloroaniline in ug/L																				3 U
4-Chlorophenyl phenyl ether in ug/L																				1 U
4-Methylphenol in ug/L																				14
4-Nitroaniline in ug/L																				5 U
4-Nitrophenol in ug/L																				5 U
Benzoic acid in ug/L																				15
Benzyl alcohol in ug/L																				5 U
Benzyl butyl phthalate in ug/L																				1 U
Bis(2-chloro-1-methylethyl) ether in ug/L																				1 U
Bis(2-chloroethoxy)methane in ug/L																				1 U
Bis(2-chloroethyl) ether in ug/L																				2 U
Bis(2-ethylhexyl) phthalate in ug/L	1																			1.1
Carbazole in ug/L																				1 U
Dibenzofuran in ug/L																				1 U
Diethyl phthalate in ug/L	600																			1 U
Dimethyl phthalate in ug/L	2,000																			1 U
Di-n-butyl phthalate in ug/L																				1 U
Di-n-octyl phthalate in ug/L																				1 U
Hexachlorobenzene in ug/L	0.2																			1 U
Hexachlorobutadiene in ug/L	0.2																			5 U
Hexachlorocyclopentadiene in ug/L																				5 U
Hexachloroethane in ug/L																				2 U
Isophorone in ug/L																				1 U
Nitrobenzene in ug/L																				1 U
N-Nitroso-di-n-propylamine in ug/L																				2 U
N-Nitrosodiphenylamine in ug/L																				1 U
Pentachlorophenol in ug/L	1																			5 U
Phenol in ug/L	300,000																			74
2,4-Dinitrotoluene in ug/L																				5 U
2,6-Dinitrotoluene in ug/L																				5 U
Polychlorinated Biphenyls (PCBs)																				
Aroclor 1016 in ug/L							0.005 U	0.0061 U	0.05 U	0.012 U	0.0084 U	0.005 U	0.005 U					0.0049 U	0.005 U	
Aroclor 1221 in ug/L							0.0099 U	0.042 U	0.1 U	0.039 U	0.041 U	0.01 U	0.14 U					0.0098 U	0.039 U	
Aroclor 1232 in ug/L							0.005 U	0.012 U	0.05 U	0.025 U	0.0098 U	0.005 U	0.005 U					0.0049 U	0.005 U	
Aroclor 1242 in ug/L							0.005 U	0.009 U	0.05 U	0.013 U	0.023 U	0.005 U	0.005 U					0.0049 U	0.005 U	
Aroclor 1248 in ug/L							0.005 U	0.0096 U	0.05 U	0.015 U	0.058 U	0.005 U	0.005 U					0.0049 U	0.005 U	
Aroclor 1254 in ug/L							0.005 U	0.005 U	0.05 U	0.0051 U	0.013 U	0.005 U	0.005 U					0.0049 U	0.005 U	
Aroclor 1260 in ug/L							0.005 U	0.005 U	0.05 U	0.0051 U	0.0052 U	0.005 U	0.005 U					0.0049 U	0.005 U	
Total PCBs (Sum of Aroclors) in ug/L							0.0099 U	0.042 U	0.1 U	0.039 U	0.058 U	0.01 U	0.14 U					0.0098 U	0.039 U	
Dioxins/Furans																				
Tetrachlorodibenzofurans (TCDF), Total in ug/L																				0.000049 U
Total HpCDD in ug/L																				0.0000178 J
Total HpCDF in ug/L																				6.52E-06 J
Total HxCDD in ug/L																				0.0000245 U
Total HxCDF in ug/L																				0.0000245 U
Total PeCDD in ug/L																				0.0000245 U
Total PeCDF in ug/L																				0.0000245 U
Total TCDD in ug/L																				0.0000049 U
2,3,7,8-TCDD in ug/L																				0.0000049 U
1,2,3,7,8-PeCDD in ug/L																				0.0000245 U
1,2,3,4,7,8-HxCDD in ug/L																				0.0000245 U
1,2,3,6,7,8-HxCDD in ug/L																				0.0000245 U

Table B-18

Aspect Consulting

2/26/2016

RI

Table B-18 - 2000-2013 Pre-RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	9-25 3/16/04	9-25 4/14/06	9-25 7/15/06	9-25 12/1/11	9-25 8/8/12	93C-25 7/17/12	95C-25 7/19/12	709-MW6-25 8/9/12	709-MW9-25 8/14/12	709-MW11-25 7/29/12	709-MW16-25 7/27/12	709-MW18-25 7/26/12	709-MW20-25 7/21/04	709-MW20-25 7/21/06	709-MW20-25 12/1/11	709-MW20-25 8/23/12	709-MW21-25 7/27/12	721-MW5-25 7/19/04	
1,2,3,7,8,9-HxCDD in ug/L																				0.0000245 U
1,2,3,4,6,7,8-HpCDD in ug/L																				0.0000245 U
OCDD in ug/L																				0.0000609
2,3,7,8-TCDF in ug/L																				0.0000049 U
1,2,3,7,8-PeCDF in ug/L																				0.0000245 U
2,3,4,7,8-PeCDF in ug/L																				0.0000245 U
1,2,3,4,7,8-HxCDF in ug/L																				0.0000245 U
1,2,3,6,7,8-HxCDF in ug/L																				0.0000245 U
1,2,3,7,8,9-HxCDF in ug/L																				0.0000245 U
2,3,4,6,7,8-HxCDF in ug/L																				0.0000245 U
1,2,3,4,6,7,8-HpCDF in ug/L																				0.0000245 U
1,2,3,4,7,8,9-HpCDF in ug/L																				0.0000245 U
OCDF in ug/L																				0.000049 U
Pesticides																				
4,4'-DDD in ug/L																				
4,4'-DDE in ug/L																				
4,4'-DDT in ug/L																				
Aldrin in ug/L																				
cis-Chlordane in ug/L																				
Dieldrin in ug/L																				
trans-Chlordane in ug/L																				

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-18 - 2000-2013 Pre-RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW5-25 4/20/06	721-MW5-25 7/24/06	721-MW5-25 8/25/12	721-MW6-25 7/19/04	721-MW6-25 4/20/06	721-MW6-25 7/24/06	721-MW6-25 7/25/12	721-MW9-25 7/20/04	721-MW9-25 4/20/06	721-MW9-25 7/24/06	721-MW9-25 7/22/12	721-MW10-25 7/21/04	721-MW10-25 4/19/06	721-MW10-25 7/25/06	721-MW10-25 8/7/12	721-MW11-25 7/31/12	721-MW12-25 7/30/12	721-MW13-25 7/31/12
Extractable Petroleum Hydrocarbons																			
Aliphatics C12-C16 (EPH) in ug/L																			
Aliphatics C16-C21 (EPH) in ug/L																			
Aliphatics C21-C34 (EPH) in ug/L																			
Aromatics C12-C16 (EPH) in ug/L																			
Aromatics C16-C21 (EPH) in ug/L																			
Aromatics C21-C34 (EPH) in ug/L																			
Volatile Petroleum Hydrocarbons																			
Aromatics C10-C12 (VPH) in ug/L																			
Aromatics C12-C13 (VPH) in ug/L																			
Aromatics C8-C10 (VPH) in ug/L																			
TCLP Metals																			
Dissolved Mercury in ug/L																			
Conventional Chemistry Parameters																			
Alkalinity (Total) in mg/L				1,300				974				1,420				632	728	593	238
Bicarbonate in mg/L				298 J				974				1,080				632	728	593	238
Bromide in mg/L				1.32				0.8				3.7 J				0.65	0.71	0.03 J	0.02 J
Carbon, Dissolved Organic (DOC) in mg/L						29								27					
Chloride in mg/L				1,710				224				2,220				180	392	2.41	26.7
Dissolved Chloride in mg/L		1,500	1,300			79 J	129			2,100	2,330			290 J	1,260				
Dissolved Organic Carbon in mg/L		16								49									
Dissolved Sodium in mg/L		860	605 J			87	78.3 J			890	1,120 J			340	577 J				
pH in pH Units					7.57				8.76										
Sulfate in mg/L				8.28				0.81				5 U				0.76	2.94	1.11	4.09
Total Boron in mg/L				0.35				0.439				1.06				0.781	0.318	0.514	0.0745
Total Dissolved Solids in mg/L		11,000	2,300	4,680		950	680	1,170		4,900	4,100	4,750		1,500	2,600	931	1,390	682	338
Total Sodium in mg/L				1,630				131				1,760				243	254	182	11.6
Polycyclic Aromatic Hydrocarbons (PAHs)																			
Acenaphthene in ug/L	90			0.043 J	1 U			0.02 U	1 U			0.028 U			0.02 U	0.084 J	0.11	0.027	
Acenaphthylene in ug/L				0.032 U	1 U			0.027 U	1 U			0.02 U			0.02 U	0.095 U	0.095 U	0.019 U	
Anthracene in ug/L	400			0.04	1 U			0.02 U	1 U			0.02 U			0.02 U	0.019 U	0.019 U	0.019 U	
Benzo(g,h,i)perylene in ug/L					1 U				1 U										
Fluoranthene in ug/L	20			0.013 J	1 U			0.02 U	1 U			0.02 U			0.02 U	0.019 U	0.019 U	0.019 U	
Fluorene in ug/L	70			0.042 J	1 U			0.025 U	1 U			0.02 U			0.095	0.13	0.09 J	0.017 J	
Phenanthrene in ug/L				0.036	1 U			0.02 U	1 U			0.02 U			0.02 U	0.019 U	0.15 U	0.021	
Pyrene in ug/L	30			0.015 J	1 U			0.02 U	1 U			0.02 U			0.02 U	0.019 U	0.019 U	0.019 U	
2-Methylnaphthalene in ug/L				0.29	1 U			0.11	1 U			0.024			0.02 U	3.6	0.46	0.025	
Naphthalene in ug/L	4,710			1.1	1 U			0.13 U	5 U			0.098			0.077	1.9	0.61	0.3	
Benz(a)anthracene in ug/L	0.02			0.019 U	1 U			0.0083 J	1 U			0.02 U			0.02 U	0.019 U	0.019 U	0.019 U	
Benzo(a)pyrene in ug/L	0.02			0.019 U	1 U			0.007 J	1 U			0.02 U			0.02 U	0.019 U	0.019 U	0.019 U	
Benzo(b)fluoranthene in ug/L	0.02			0.019 U	1 U			0.0068 J	1 U			0.0041 J			0.02 U	0.019 U	0.019 U	0.019 U	
Benzo(k)fluoranthene in ug/L	0.02			0.019 U	1 U			0.0071 J	1 U			0.02 U			0.02 U	0.019 U	0.019 U	0.019 U	
Chrysene in ug/L	0.03			0.019 U	1 U			0.0078 J	1 U			0.02 U			0.02 U	0.019 U	0.019 U	0.019 U	
Dibenzo(a,h)anthracene in ug/L	0.02			0.019 U	1 U			0.0062 J	1 U			0.02 U			0.02 U	0.019 U	0.019 U	0.019 U	
Indeno(1,2,3-cd)pyrene in ug/L	0.02			0.019 U	1 U			0.0067 J	1 U			0.02 U			0.02 U	0.019 U	0.019 U	0.019 U	
Total cPAHs TEQ (ND = 1/2 RDL) in ug/L	0.02			ND	ND			0.011 J	ND			0.015 J			ND	ND	ND	ND	
Other (Non-PAH) Semivolatiles																			
1,2,4-Trichlorobenzene in ug/L					1 U				5 U										
1,2,4-Trimethylbenzene in ug/L					1 U				1 U										
1,2-Dichlorobenzene in ug/L					1 U				1 U										
1,3,5-Trimethylbenzene in ug/L					1 U				1 U										
1,3-Dichlorobenzene in ug/L					1 U				1 U										
1,4-Dichlorobenzene in ug/L					1 U				1 U										
2,4,5-Trichlorophenol in ug/L					5 U				5 U										
2,4,6-Trichlorophenol in ug/L					5 U				5 U										
2,4-Dichlorophenol in ug/L					3 U				3 U										
2,4-Dimethylphenol in ug/L					3 U				3 U										
2,4-Dinitrophenol in ug/L					25 U				25 U										
2-Chloronaphthalene in ug/L					1 U				1 U										
2-Chlorophenol in ug/L					1 U				1 U										

Table B-18

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RI

Table B-18 - 2000-2013 Pre-RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW5-25 4/20/06	721-MW5-25 7/24/06	721-MW5-25 8/25/12	721-MW6-25 7/19/04	721-MW6-25 4/20/06	721-MW6-25 7/24/06	721-MW6-25 7/25/12	721-MW9-25 7/20/04	721-MW9-25 4/20/06	721-MW9-25 7/24/06	721-MW9-25 7/22/12	721-MW10-25 7/21/04	721-MW10-25 4/19/06	721-MW10-25 7/25/06	721-MW10-25 8/7/12	721-MW11-25 7/31/12	721-MW12-25 7/30/12	721-MW13-25 7/31/12
2-Methylphenol in ug/L					1 U				1 U										
2-Nitroaniline in ug/L					5 U				5 U										
2-Nitrophenol in ug/L					5 U				5 U										
3,3'-Dichlorobenzidine in ug/L					5 U				5 U										
3-Nitroaniline in ug/L					6 U				6 U										
4,6-Dinitro-2-methylphenol in ug/L					15 U				15 U										
4-Bromophenyl phenyl ether in ug/L					1 U				1 U										
4-Chloro-3-methylphenol in ug/L					2 U				2 U										
4-Chloroaniline in ug/L					3 U				3 U										
4-Chlorophenyl phenyl ether in ug/L					1 U				1 U										
4-Methylphenol in ug/L					1 U				64										
4-Nitroaniline in ug/L					5 U				5 U										
4-Nitrophenol in ug/L					5 U				5 U										
Benzoic acid in ug/L					10 U				73										
Benzyl alcohol in ug/L					5 U				5 U										
Benzyl butyl phthalate in ug/L					1 U				1 U										
Bis(2-chloro-1-methylethyl) ether in ug/L					1 U				1 U										
Bis(2-chloroethoxy)methane in ug/L					1 U				1 U										
Bis(2-chloroethyl) ether in ug/L					2 U				2 U										
Bis(2-ethylhexyl) phthalate in ug/L	1				1 U				1 U										
Carbazole in ug/L					1 U				1 U										
Dibenzofuran in ug/L					1 U				1 U										
Diethyl phthalate in ug/L	600				1 U				1 U										
Dimethyl phthalate in ug/L	2,000				1 U				1 U										
Di-n-butyl phthalate in ug/L					1 U				1 U										
Di-n-octyl phthalate in ug/L					1 U				1 U										
Hexachlorobenzene in ug/L	0.2				1 U				1 U										
Hexachlorobutadiene in ug/L	0.2				2 U				5 U										
Hexachlorocyclopentadiene in ug/L					5 U				5 U										
Hexachloroethane in ug/L					2 U				2 U										
Isophorone in ug/L					1 U				1 U										
Nitrobenzene in ug/L					1 U				1 U										
N-Nitroso-di-n-propylamine in ug/L					2 U				2 U										
N-Nitrosodiphenylamine in ug/L					1 U				1 U										
Pentachlorophenol in ug/L	1				5 U				5 U										
Phenol in ug/L	300,000				2 U				65										
2,4-Dinitrotoluene in ug/L					5 U				5 U										
2,6-Dinitrotoluene in ug/L					5 U				5 U										
Polychlorinated Biphenyls (PCBs)																			
Aroclor 1016 in ug/L				0.49 UJ				0.0063 UJ				0.026 U			0.005 U	0.005 U	0.005 U	0.0051 U	
Aroclor 1221 in ug/L				0.97 UJ				0.051 UJ				0.051 U			0.0099 U	0.0099 U	0.01 U	0.011 U	
Aroclor 1232 in ug/L				0.49 UJ				0.016 UJ				0.026 U			0.005 U	0.005 U	0.005 U	0.0051 U	
Aroclor 1242 in ug/L				0.49 UJ				0.008 UJ				0.026 U			0.005 U	0.005 U	0.005 U	0.0051 U	
Aroclor 1248 in ug/L				0.49 UJ				0.015 UJ				0.026 U			0.094	0.005 U	0.005 U	0.0051 U	
Aroclor 1254 in ug/L				0.49 UJ				0.012 UJ				0.026 U			0.005 U	0.005 U	0.005 U	0.0051 U	
Aroclor 1260 in ug/L				0.49 UJ				0.0057 UJ				0.026 U			0.005 U	0.005 U	0.005 U	0.0051 U	
Total PCBs (Sum of Aroclors) in ug/L				0.97 UJ				0.051 UJ				0.051 U			0.094	0.0099 U	0.01 U	0.011 U	
Dioxins/Furans																			
Tetrachlorodibenzofurans (TCDF), Total in ug/L												0.000049 U							
Total HpCDD in ug/L												0.0000245 U							
Total HpCDF in ug/L												8.69E-06 J							
Total HxCDD in ug/L												0.0000245 U							
Total HxCDF in ug/L												0.0000245 U							
Total PeCDD in ug/L												0.0000245 U							
Total PeCDF in ug/L												0.0000245 U							
Total TCDD in ug/L												0.000049 U							
2,3,7,8-TCDD in ug/L												0.000049 U							
1,2,3,7,8-PeCDD in ug/L												0.0000245 U							
1,2,3,4,7,8-HxCDD in ug/L												0.0000245 U							
1,2,3,6,7,8-HxCDD in ug/L												0.0000245 U							

Table B-18

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RI

Table B-18 - 2000-2013 Pre-RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW5-25 4/20/06	721-MW5-25 7/24/06	721-MW5-25 8/25/12	721-MW6-25 7/19/04	721-MW6-25 4/20/06	721-MW6-25 7/24/06	721-MW6-25 7/25/12	721-MW9-25 7/20/04	721-MW9-25 4/20/06	721-MW9-25 7/24/06	721-MW9-25 7/22/12	721-MW10-25 7/21/04	721-MW10-25 4/19/06	721-MW10-25 7/25/06	721-MW10-25 8/7/12	721-MW11-25 7/31/12	721-MW12-25 7/30/12	721-MW13-25 7/31/12
1,2,3,7,8,9-HxCDD in ug/L												0.0000245 U							
1,2,3,4,6,7,8-HpCDD in ug/L												0.0000245 U							
OCDD in ug/L												0.0000506 J							
2,3,7,8-TCDF in ug/L												0.0000049 U							
1,2,3,7,8-PeCDF in ug/L												0.0000245 U							
2,3,4,7,8-PeCDF in ug/L												0.0000245 U							
1,2,3,4,7,8-HxCDF in ug/L												0.0000245 U							
1,2,3,6,7,8-HxCDF in ug/L												0.0000245 U							
1,2,3,7,8,9-HxCDF in ug/L												0.0000245 U							
2,3,4,6,7,8-HxCDF in ug/L												0.0000245 U							
1,2,3,4,6,7,8-HpCDF in ug/L												0.0000245 U							
1,2,3,4,7,8,9-HpCDF in ug/L												0.0000245 U							
OCDF in ug/L												0.000049 U							
Pesticides																			
4,4'-DDD in ug/L																			
4,4'-DDE in ug/L																			
4,4'-DDT in ug/L																			
Aldrin in ug/L																			
cis-Chlordane in ug/L																			
Dieldrin in ug/L																			
trans-Chlordane in ug/L																			

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-18 - 2000-2013 Pre-RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW14-25 8/9/12	721-MW15-25 7/30/12	DOCK2-005 8/2/05	DOCK2-010 9/13/05	DOCK2-014 10/28/05	HW-4 1/23/07	HYD-008 9/13/05	HYD-009 9/15/05	HYD-010 9/16/05	NL-13 12/21/05	NL-16 5/19/06	NL-25 1/18/07	NL-25 1/19/07	NL-26 1/18/07	NL-28 1/17/07	NL-29 1/18/07	NL-30 1/19/07	
Extractable Petroleum Hydrocarbons																			
Aliphatics C12-C16 (EPH) in ug/L																			
Aliphatics C16-C21 (EPH) in ug/L																			
Aliphatics C21-C34 (EPH) in ug/L																			
Aromatics C12-C16 (EPH) in ug/L																			
Aromatics C16-C21 (EPH) in ug/L																			
Aromatics C21-C34 (EPH) in ug/L																			
Volatile Petroleum Hydrocarbons																			
Aromatics C10-C12 (VPH) in ug/L																			
Aromatics C12-C13 (VPH) in ug/L																			
Aromatics C8-C10 (VPH) in ug/L																			
TCLP Metals																			
Dissolved Mercury in ug/L						0.041 U	0.97 U					0.055 U	0.41 U	0.41 U	2.8 U	1.7 U	0.41 U	0.41 U	
Conventional Chemistry Parameters																			
Alkalinity (Total) in mg/L		556	525																
Bicarbonate in mg/L		556	525																
Bromide in mg/L		0.04 J	0.17 J																
Carbon, Dissolved Organic (DOC) in mg/L																			
Chloride in mg/L		2.07	19.7																
Dissolved Chloride in mg/L																			
Dissolved Organic Carbon in mg/L				4.01	17.8 U	11.2		12.1 U	8.19 U	5.87 U									
Dissolved Sodium in mg/L																			
pH in pH Units																			
Sulfate in mg/L		0.72 J	1.65																
Total Boron in mg/L		0.163	0.105																
Total Dissolved Solids in mg/L		631 J	633																
Total Sodium in mg/L		179	43.2																
Polycyclic Aromatic Hydrocarbons (PAHs)																			
Acenaphthene in ug/L	90	0.048 U	0.5																
Acenaphthylene in ug/L		0.021 U	0.071 U																
Anthracene in ug/L	400	0.03	0.04 U																
Benzo(g,h,i)perylene in ug/L																			
Fluoranthene in ug/L	20	0.021 U	0.019 U																
Fluorene in ug/L	70	0.065	0.29																
Phenanthrene in ug/L		0.076	0.23																
Pyrene in ug/L	30	0.021 U	0.019 U																
2-Methylnaphthalene in ug/L		0.56	19																
Naphthalene in ug/L	4,710	0.076	1.9																
Benz(a)anthracene in ug/L	0.02	0.021 U	0.019 U																
Benzo(a)pyrene in ug/L	0.02	0.021 U	0.019 U																
Benzo(b)fluoranthene in ug/L	0.02	0.021 U	0.019 U																
Benzo(k)fluoranthene in ug/L	0.02	0.021 U	0.019 U																
Chrysene in ug/L	0.03	0.021 U	0.019 U																
Dibenzo(a,h)anthracene in ug/L	0.02	0.021 U	0.019 U																
Indeno(1,2,3-cd)pyrene in ug/L	0.02	0.021 U	0.019 U																
Total cPAHs TEQ (ND = 1/2 RDL) in ug/L	0.02	ND	ND																
Other (Non-PAH) Semivolatiles																			
1,2,4-Trichlorobenzene in ug/L																			
1,2,4-Trimethylbenzene in ug/L																			
1,2-Dichlorobenzene in ug/L																			
1,3,5-Trimethylbenzene in ug/L																			
1,3-Dichlorobenzene in ug/L																			
1,4-Dichlorobenzene in ug/L																			
2,4,5-Trichlorophenol in ug/L																			
2,4,6-Trichlorophenol in ug/L																			
2,4-Dichlorophenol in ug/L																			
2,4-Dimethylphenol in ug/L																			
2,4-Dinitrophenol in ug/L																			
2-Chloronaphthalene in ug/L																			
2-Chlorophenol in ug/L																			

Table B-18 - 2000-2013 Pre-RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW14-25 8/9/12	721-MW15-25 7/30/12	DOCK2-005 8/2/05	DOCK2-010 9/13/05	DOCK2-014 10/28/05	HW-4 1/23/07	HYD-008 9/13/05	HYD-009 9/15/05	HYD-010 9/16/05	NL-13 12/21/05	NL-16 5/19/06	NL-25 1/18/07	NL-25 1/19/07	NL-26 1/18/07	NL-28 1/17/07	NL-29 1/18/07	NL-30 1/19/07	
2-Methylphenol in ug/L																			
2-Nitroaniline in ug/L																			
2-Nitrophenol in ug/L																			
3,3'-Dichlorobenzidine in ug/L																			
3-Nitroaniline in ug/L																			
4,6-Dinitro-2-methylphenol in ug/L																			
4-Bromophenyl phenyl ether in ug/L																			
4-Chloro-3-methylphenol in ug/L																			
4-Chloroaniline in ug/L																			
4-Chlorophenyl phenyl ether in ug/L																			
4-Methylphenol in ug/L																			
4-Nitroaniline in ug/L																			
4-Nitrophenol in ug/L																			
Benzoic acid in ug/L																			
Benzyl alcohol in ug/L																			
Benzyl butyl phthalate in ug/L																			
Bis(2-chloro-1-methylethyl) ether in ug/L																			
Bis(2-chloroethoxy)methane in ug/L																			
Bis(2-chloroethyl) ether in ug/L																			
Bis(2-ethylhexyl) phthalate in ug/L	1																		
Carbazole in ug/L																			
Dibenzofuran in ug/L																			
Diethyl phthalate in ug/L	600																		
Dimethyl phthalate in ug/L	2,000																		
Di-n-butyl phthalate in ug/L																			
Di-n-octyl phthalate in ug/L																			
Hexachlorobenzene in ug/L	0.2			0.00368 U	0.00355 U	0.016 U		0.00355 U	0.0109	0.00355 U	0.00361 U		0.016 U	0.016 U	0.016 U	0.08 U	0.016 U	0.016 U	
Hexachlorobutadiene in ug/L	0.2			0.00252 U	0.00243 U	0.05 U		0.00243 U	0.00242 U	0.00243 U	0.00247 U		0.05 U	0.05 U	0.05 U	0.25 U	0.05 U	0.05 U	
Hexachlorocyclopentadiene in ug/L																			
Hexachloroethane in ug/L																			
Isophorone in ug/L																			
Nitrobenzene in ug/L																			
N-Nitroso-di-n-propylamine in ug/L																			
N-Nitrosodiphenylamine in ug/L																			
Pentachlorophenol in ug/L	1			0.0243 U	0.0234 U	0.3 U		0.0234 U	0.0233 U	0.0234 U	0.13 J				0.3 U	1.5 U		0.3 U	
Phenol in ug/L	300,000																		
2,4-Dinitrotoluene in ug/L																			
2,6-Dinitrotoluene in ug/L																			
Polychlorinated Biphenyls (PCBs)																			
Aroclor 1016 in ug/L		0.005 U	0.019 U	0.0339 U				0.0326 U	0.0326 U	0.0326 U	0.0332 U								
Aroclor 1221 in ug/L		0.01 U	0.075 U	0.0339 U				0.0326 U	0.0326 U	0.0326 U	0.0331 U								
Aroclor 1232 in ug/L		0.005 U	0.023 U	0.0339 U				0.0326 U	0.0326 U	0.0326 U	0.0331 U								
Aroclor 1242 in ug/L		0.005 U	0.02 U	0.0339 U				0.0326 U	0.0326 U	0.0326 U	0.0332 U								
Aroclor 1248 in ug/L		0.005 U	0.005 U	0.0339 U				0.0326 U	0.0326 U	0.0326 U	0.0331 U								
Aroclor 1254 in ug/L		0.005 U	0.005 U	0.0222 U				0.0214 U	0.0213 U	0.0214 U	0.0218 U								
Aroclor 1260 in ug/L		0.005 U	0.005 U	0.0222 U				0.0214 U	0.0213 U	0.0214 U	0.0217 U								
Total PCBs (Sum of Aroclors) in ug/L		0.01 U	0.075 U	0.0339 U				0.0326 U	0.0326 U	0.0326 U	0.0332 U		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dioxins/Furans																			
Tetrachlorodibenzofurans (TCDF), Total in ug/L																			
Total HpCDD in ug/L																			
Total HpCDF in ug/L																			
Total HxCDD in ug/L																			
Total HxCDF in ug/L																			
Total PeCDD in ug/L																			
Total PeCDF in ug/L																			
Total TCDD in ug/L																			
2,3,7,8-TCDD in ug/L																			
1,2,3,7,8-PeCDD in ug/L																			
1,2,3,4,7,8-HxCDD in ug/L																			
1,2,3,6,7,8-HxCDD in ug/L																			

Table B-18 - 2000-2013 Pre-RI Groundwater Data - 25 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW14-25 8/9/12	721-MW15-25 7/30/12	DOCK2-005 8/2/05	DOCK2-010 9/13/05	DOCK2-014 10/28/05	HW-4 1/23/07	HYD-008 9/13/05	HYD-009 9/15/05	HYD-010 9/16/05	NL-13 12/21/05	NL-16 5/19/06	NL-25 1/18/07	NL-25 1/19/07	NL-26 1/18/07	NL-28 1/17/07	NL-29 1/18/07	NL-30 1/19/07	
1,2,3,7,8,9-HxCDD in ug/L																			
1,2,3,4,6,7,8-HpCDD in ug/L																			
OCDD in ug/L																			
2,3,7,8-TCDF in ug/L																			
1,2,3,7,8-PeCDF in ug/L																			
2,3,4,7,8-PeCDF in ug/L																			
1,2,3,4,7,8-HxCDF in ug/L																			
1,2,3,6,7,8-HxCDF in ug/L																			
1,2,3,7,8,9-HxCDF in ug/L																			
2,3,4,6,7,8-HxCDF in ug/L																			
1,2,3,4,6,7,8-HpCDF in ug/L																			
1,2,3,4,7,8,9-HpCDF in ug/L																			
OCDF in ug/L																			
Pesticides																			
4,4'-DDD in ug/L												0.135 U		0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U
4,4'-DDE in ug/L												0.19 UJ		0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U
4,4'-DDT in ug/L												0.208 UJ		0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U
Aldrin in ug/L												0.0223 U		0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U
cis-Chlordane in ug/L												0.0845 UJ		0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	0.007 U
Dieldrin in ug/L												0.214 U		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
trans-Chlordane in ug/L												0.351 UJ		0.006 U	0.006 U	0.006 U	0.006 U	0.006 U	0.006 U

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-19 - 2000-2013 Pre-RI Groundwater Data - 50 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	9-50 3/16/04	93C-50 7/17/12	95C-50 7/19/12	709-MW6-50 8/9/12	709-MW15A-50 8/14/12	709-MW16-50 7/28/12	709-MW18-50 7/26/12	709-MW20-50 8/21/12	709-MW21-50 7/27/12	721-MW5-50 7/19/04	721-MW5-50 8/25/12	721-MW6-50 7/19/04	721-MW6-50 7/25/12	721-MW9-50 7/20/04	721-MW9-50 7/22/12	721-MW10-50 8/6/12	721-MW11-50 8/1/12
Extractable Petroleum Hydrocarbons																		
Aliphatics C12-C16 (EPH) in ug/L		50 UJ																
Aliphatics C16-C21 (EPH) in ug/L		50 UJ																
Aliphatics C21-C34 (EPH) in ug/L		50 UJ																
Aromatics C12-C16 (EPH) in ug/L		50 UJ																
Aromatics C16-C21 (EPH) in ug/L		50 U																
Aromatics C21-C34 (EPH) in ug/L		50 U																
Volatile Petroleum Hydrocarbons																		
Aromatics C10-C12 (VPH) in ug/L		50 UJ																
Aromatics C12-C13 (VPH) in ug/L		50 UJ																
Aromatics C8-C10 (VPH) in ug/L		50 U																
TCLP Metals																		
Dissolved Mercury in ug/L																		
Polycyclic Aromatic Hydrocarbons (PAHs)																		
Acenaphthene in ug/L	90		0.02 U	0.0044 J	0.0086 J	0.019 U	0.0053 J	0.019 U	0.019 U	0.019 U	1 U	0.019 U	1 U	0.0071 J	1 U	0.02 U	0.021 U	0.019 U
Acenaphthylene in ug/L			0.02 U	0.02 U	0.02 U	0.019 U	0.014 J	0.0064 J	0.019 U	0.019 U	1 U	0.019 U	1 U	0.02 U	1 U	0.02 U	0.021 U	0.019 U
Anthracene in ug/L	400		0.02 U	0.02 U	0.02 U	0.019 U	0.0068 J	0.039	0.019 U	0.019 U	1 U	0.019 U	1 U	0.02 U	1 U	0.02 U	0.021 U	0.019 U
Benzo(g,h,i)perylene in ug/L											1 U		1 U		1 U			
Fluoranthene in ug/L	20		0.02 U	0.02 U	0.02 U	0.019 U	0.0048 J	0.019 U	0.019 U	0.019 U	1 U	0.019 U	1 U	0.02 U	1 U	0.02 U	0.021 U	0.019 U
Fluorene in ug/L	70		0.02	0.02 U	0.0073 J	0.019 U	0.027	0.017 J	0.0048 J	0.014 J	1 U	0.019 U	1 U	0.0044 J	1 U	0.02 U	0.021 U	0.019 U
Phenanthrene in ug/L			0.02 U	0.02 U	0.019 J	0.019 U	0.049	0.037	0.014 J	0.029	1 U	0.019 U	1 U	0.02 U	1 U	0.005 J	0.021 U	0.007 J
Pyrene in ug/L	30		0.02 U	0.02 U	0.02 U	0.019 U	0.0058 J	0.0054 J	0.019 U	0.0044 J	1 U	0.019 U	1 U	0.02 U	1 U	0.02 U	0.021 U	0.019 U
2-Methylnaphthalene in ug/L			0.0042 J	0.071	0.0081 J	0.019 U	0.023	0.0096 J	0.006 J	0.059	1 U	0.019 U	1 U	0.068	1 U	0.0064 J	0.0038 J	0.0073 J
Naphthalene in ug/L	4,710		0.036	0.068	0.29	0.019 U	0.47	0.33	0.018 J	0.13	5 U	0.019 U	1 U	0.044 U	1 U	0.034	0.068	0.045
Benz(a)anthracene in ug/L	0.02		0.02 U	0.02 U	0.02 U	0.019 U	0.0047 J	0.0055 J	0.019 U	0.0036 J	1 U	0.0039 J	1 U	0.02 U	1 U	0.02 U	0.021 U	0.019 U
Benzo(a)pyrene in ug/L	0.02		0.02 U	0.02 U	0.02 U	0.019 U	0.02 U	0.019 U	0.019 U	0.019 U	1 U	0.019 U	1 U	0.02 U	1 U	0.02 U	0.021 U	0.019 U
Benzo(b)fluoranthene in ug/L	0.02		0.02 U	0.02 U	0.02 U	0.019 U	0.02 U	0.0028 J	0.019 U	0.019 U	1 U	0.019 U	1 U	0.02 U	1 U	0.02 U	0.021 U	0.019 U
Benzo(k)fluoranthene in ug/L	0.02		0.02 U	0.02 U	0.02 U	0.019 U	0.02 U	0.0026 J	0.019 U	0.019 U	1 U	0.019 U	1 U	0.02 U	1 U	0.02 U	0.021 U	0.019 U
Chrysene in ug/L	0.03		0.02 U	0.02 U	0.02 U	0.019 U	0.0063 J	0.006 J	0.019 U	0.019 U	1 U	0.019 U	1 U	0.02 U	1 U	0.02 U	0.021 U	0.019 U
Dibenzo(a,h)anthracene in ug/L	0.02		0.02 U	0.02 U	0.02 U	0.019 U	0.02 U	0.019 U	0.019 U	0.019 U	1 U	0.019 U	1 U	0.02 U	1 U	0.02 U	0.021 U	0.019 U
Indeno(1,2,3-cd)pyrene in ug/L	0.02		0.02 U	0.02 U	0.02 U	0.019 U	0.02 U	0.0029 J	0.019 U	0.019 U	1 U	0.019 U	1 U	0.02 U	1 U	0.02 U	0.021 U	0.019 U
Total cPAHs TEQ (ND = 1/2 RDL) in ug/L	0.02		ND	ND	ND	ND	0.015 J	0.012 J	ND	0.014 J	ND	0.014 J	ND	ND	ND	ND	ND	ND
Other (Non-PAH) Semivolatiles																		
1,2,4-Trichlorobenzene in ug/L											5 U		1 U		1 U			
1,2,4-Trimethylbenzene in ug/L											1 U		1 U		1 U			
1,2-Dichlorobenzene in ug/L											1 U		1 U		1 U			
1,3,5-Trimethylbenzene in ug/L											1 U		1 U		1 U			
1,3-Dichlorobenzene in ug/L											1 U		1 U		1 U			
1,4-Dichlorobenzene in ug/L											1 U		1 U		1 U			
2,4,5-Trichlorophenol in ug/L											5 U		5 U		5 U			
2,4,6-Trichlorophenol in ug/L											5 U		5 U		5 U			
2,4-Dichlorophenol in ug/L											3 U		3 U		3 U			
2,4-Dimethylphenol in ug/L											3 U		3 U		3 U			
2,4-Dinitrophenol in ug/L											25 U		25 U		25 U			
2-Chloronaphthalene in ug/L											1 U		1 U		1 U			
2-Chlorophenol in ug/L											1 U		1 U		1 U			
2-Methylphenol in ug/L											1 U		1 U		1 U			
2-Nitroaniline in ug/L											5 U		5 U		5 U			
2-Nitrophenol in ug/L											5 U		5 U		5 U			
3,3'-Dichlorobenzidine in ug/L											5 U		5 U		5 U			
3-Nitroaniline in ug/L											6 U		6 U		6 U			
4,6-Dinitro-2-methylphenol in ug/L											15 U		15 U		15 U			
4-Bromophenyl phenyl ether in ug/L											1 U		1 U		1 U			
4-Chloro-3-methylphenol in ug/L											2 U		2 U		2 U			
4-Chloroaniline in ug/L											3 U		3 U		3 U			
4-Chlorophenyl phenyl ether in ug/L											1 U		1 U		1 U			
4-Methylphenol in ug/L											1 U		1 U		1 U			

Table B-19 - 2000-2013 Pre-RI Groundwater Data - 50 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	9-50 3/16/04	93C-50 7/17/12	95C-50 7/19/12	709-MW6-50 8/9/12	709-MW15A-50 8/14/12	709-MW16-50 7/28/12	709-MW18-50 7/26/12	709-MW20-50 8/21/12	709-MW21-50 7/27/12	721-MW5-50 7/19/04	721-MW5-50 8/25/12	721-MW6-50 7/19/04	721-MW6-50 7/25/12	721-MW9-50 7/20/04	721-MW9-50 7/22/12	721-MW10-50 8/6/12	721-MW11-50 8/1/12
4-Nitroaniline in ug/L											5 U		5 U		5 U			
4-Nitrophenol in ug/L											5 U		5 U		5 U			
Benzoic acid in ug/L											10 U		10 U		10 U			
Benzyl alcohol in ug/L											5 U		5 U		5 U			
Benzyl butyl phthalate in ug/L											1 U		1 U		1 U			
Bis(2-chloro-1-methylethyl) ether in ug/L											1 U		1 U		1 U			
Bis(2-chloroethoxy)methane in ug/L											1 U		1 U		1 U			
Bis(2-chloroethyl) ether in ug/L											2 U		2 U		2 U			
Bis(2-ethylhexyl) phthalate in ug/L	1										1 U		1 U		1 U			
Carbazole in ug/L											1 U		1 U		1 U			
Dibenzofuran in ug/L											1 U		1 U		1 U			
Diethyl phthalate in ug/L	600										1 U		1 U		1 U			
Dimethyl phthalate in ug/L	2,000										1 U		1 U		1 U			
Di-n-butyl phthalate in ug/L											1 U		1 U		1 U			
Di-n-octyl phthalate in ug/L											1 U		1 U		1 U			
Hexachlorobenzene in ug/L	0.2										1 U		1 U		1 U			
Hexachlorobutadiene in ug/L	0.2										5 U		2 U		2 U			
Hexachlorocyclopentadiene in ug/L											5 U		5 U		5 U			
Hexachloroethane in ug/L											2 U		2 U		2 U			
Isophorone in ug/L											1 U		1 U		1 U			
Nitrobenzene in ug/L											1 U		1 U		1 U			
N-Nitroso-di-n-propylamine in ug/L											2 U		2 U		2 U			
N-Nitrosodiphenylamine in ug/L											1 U		1 U		1 U			
Pentachlorophenol in ug/L	1										5 U		5 U		5 U			
Phenol in ug/L	300,000										2 U		2 U		2 U			
2,4-Dinitrotoluene in ug/L											5 U		5 U		5 U			
2,6-Dinitrotoluene in ug/L											5 U		5 U		5 U			
Polychlorinated Biphenyls (PCBs)																		
Aroclor 1016 in ug/L			0.005 U	0.005 U	0.0052 U	0.005 U	0.005 U	0.005 U	0.014 U	0.005 U		0.005 U		0.0049 U		0.0067 U	0.005 U	0.02 U
Aroclor 1221 in ug/L			0.01 U	0.01 U	0.011 U	0.0099 U	0.01 U	0.014 U	0.016 U	0.058 U		0.0099 U		0.024 U		0.043 U	0.01 U	0.04 U
Aroclor 1232 in ug/L			0.005 U	0.005 U	0.0052 U	0.005 U	0.005 U	0.0088 U	0.0086 U	0.005 U		0.005 U		0.0063 U		0.019 U	0.005 U	0.02 U
Aroclor 1242 in ug/L			0.005 U	0.005 U	0.0052 U	0.005 U	0.005 U	0.005 U	0.016 U	0.005 U		0.005 U		0.0049 U		0.0067 U	0.005 U	0.02 U
Aroclor 1248 in ug/L			0.005 U	0.005 U	0.0052 U	0.005 U	0.005 U	0.0058 U	0.005 U	0.005 U		0.005 U		0.0049 U		0.005 U	0.005 U	0.02 U
Aroclor 1254 in ug/L			0.005 U	0.005 U	0.0052 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U		0.005 U		0.0049 U		0.005 U	0.005 U	0.02 U
Aroclor 1260 in ug/L			0.005 U	0.005 U	0.0052 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U		0.005 U		0.0049 U		0.005 U	0.005 U	0.02 U
Total PCBs (Sum of Aroclors) in ug/L			0.01 U	0.01 U	0.011 U	0.0099 U	0.01 U	0.014 U	0.016 U	0.058 U		0.0099 U		0.024 U		0.043 U	0.01 U	0.04 U
Dioxins/Furans																		
Tetrachlorodibenzofurans (TCDF), Total in ug/L									4.81E-06 U							0.000049 U		
Total HpCDD in ug/L									0.0000381							0.0000245 U		
Total HpCDF in ug/L									0.000016 J							4.27E-06 J		
Total HxCDD in ug/L									0.000024 U							0.0000245 U		
Total HxCDF in ug/L									0.000024 U							0.0000245 U		
Total PeCDD in ug/L									0.000024 U							0.0000245 U		
Total PeCDF in ug/L									0.000024 U							0.0000245 U		
Total TCDD in ug/L									4.81E-06 U							0.000049 U		
2,3,7,8-TCDD in ug/L									4.81E-06 U							0.000049 U		
1,2,3,7,8-PeCDD in ug/L									0.000024 U							0.0000245 U		
1,2,3,4,7,8-HxCDD in ug/L									0.000024 U							0.0000245 U		
1,2,3,6,7,8-HxCDD in ug/L									0.000024 U							0.0000245 U		
1,2,3,7,8,9-HxCDD in ug/L									0.000024 U							0.0000245 U		
1,2,3,4,6,7,8-HpCDD in ug/L									0.000024 U							0.0000245 U		
OCDD in ug/L									0.00017 J							0.000049 U		
2,3,7,8-TCDF in ug/L									4.81E-06 U							0.000049 U		
1,2,3,7,8-PeCDF in ug/L									0.000024 U							0.0000245 U		
2,3,4,7,8-PeCDF in ug/L									0.000024 U							0.0000245 U		
1,2,3,4,7,8-HxCDF in ug/L									0.000024 U							0.0000245 U		
1,2,3,6,7,8-HxCDF in ug/L									0.000024 U							0.0000245 U		

Table B-19 - 2000-2013 Pre-RI Groundwater Data - 50 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	9-50 3/16/04	93C-50 7/17/12	95C-50 7/19/12	709-MW6-50 8/9/12	709-MW15A-50 8/14/12	709-MW16-50 7/28/12	709-MW18-50 7/26/12	709-MW20-50 8/21/12	709-MW21-50 7/27/12	721-MW5-50 7/19/04	721-MW5-50 8/25/12	721-MW6-50 7/19/04	721-MW6-50 7/25/12	721-MW9-50 7/20/04	721-MW9-50 7/22/12	721-MW10-50 8/6/12	721-MW11-50 8/1/12	
1,2,3,7,8,9-HxCDF in ug/L									0.000024	U								0.0000245	U
2,3,4,6,7,8-HxCDF in ug/L									0.000024	U								0.0000245	U
1,2,3,4,6,7,8-HpCDF in ug/L									0.000024	U								0.0000245	U
1,2,3,4,7,8,9-HpCDF in ug/L									0.000024	U								0.0000245	U
OCDF in ug/L									0.0000481	U								0.000049	U
Pesticides																			
4,4'-DDD in ug/L																			
4,4'-DDE in ug/L																			
4,4'-DDT in ug/L																			
Aldrin in ug/L																			
cis-Chlordane in ug/L																			
Dieldrin in ug/L																			
trans-Chlordane in ug/L																			

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-19 - 2000-2013 Pre-RI Groundwater Data - 50 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW12-50 7/30/12	721-MW13-50 7/31/12	721-MW14-50 8/9/12	721-MW15-50 7/30/12	DOCK2-005 8/2/05	DOCK2-010 9/13/05	DOCK2-014 10/29/05	HYD-008 9/13/05	HYD-008 9/14/05	HYD-009 9/15/05	HYD-010 9/16/05	NL-13 12/21/05
Extractable Petroleum Hydrocarbons													
Aliphatics C12-C16 (EPH) in ug/L													
Aliphatics C16-C21 (EPH) in ug/L													
Aliphatics C21-C34 (EPH) in ug/L													
Aromatics C12-C16 (EPH) in ug/L													
Aromatics C16-C21 (EPH) in ug/L													
Aromatics C21-C34 (EPH) in ug/L													
Volatile Petroleum Hydrocarbons													
Aromatics C10-C12 (VPH) in ug/L													
Aromatics C12-C13 (VPH) in ug/L													
Aromatics C8-C10 (VPH) in ug/L													
TCLP Metals													
Dissolved Mercury in ug/L								0.052 U					
Polycyclic Aromatic Hydrocarbons (PAHs)													
Acenaphthene in ug/L	90	0.0073 J	0.034 U	0.022 U	0.0086 J								
Acenaphthylene in ug/L		0.004 J	0.019 U	0.021 U	0.019 U								
Anthracene in ug/L	400	0.0094 J	0.019 U	0.021 U	0.019 U								
Benzo(g,h,i)perylene in ug/L													
Fluoranthene in ug/L	20	0.019 U	0.019 U	0.021 U	0.019 U								
Fluorene in ug/L	70	0.016 J	0.019 U	0.021 J	0.014 J								
Phenanthrene in ug/L		0.027	0.019 U	0.034	0.026								
Pyrene in ug/L	30	0.0038 J	0.019 U	0.021 U	0.0058 J								
2-Methylnaphthalene in ug/L		0.051	0.021	0.21	0.047								
Naphthalene in ug/L	4,710	0.25	0.12	0.076	0.11								
Benz(a)anthracene in ug/L	0.02	0.019 U	0.019 U	0.0033 J	0.019 U								
Benzo(a)pyrene in ug/L	0.02	0.019 U	0.019 U	0.021 U	0.019 U								
Benzo(b)fluoranthene in ug/L	0.02	0.019 U	0.019 U	0.021 U	0.019 U								
Benzo(k)fluoranthene in ug/L	0.02	0.019 U	0.019 U	0.021 U	0.019 U								
Chrysene in ug/L	0.03	0.019 U	0.019 U	0.021 U	0.019 U								
Dibenzo(a,h)anthracene in ug/L	0.02	0.019 U	0.019 U	0.021 U	0.019 U								
Indeno(1,2,3-cd)pyrene in ug/L	0.02	0.019 U	0.019 U	0.021 U	0.019 U								
Total cPAHs TEQ (ND = 1/2 RDL) in ug/L	0.02	ND	ND	0.014 J	ND								
Other (Non-PAH) Semivolatiles													
1,2,4-Trichlorobenzene in ug/L													
1,2,4-Trimethylbenzene in ug/L													
1,2-Dichlorobenzene in ug/L													
1,3,5-Trimethylbenzene in ug/L													
1,3-Dichlorobenzene in ug/L													
1,4-Dichlorobenzene in ug/L													
2,4,5-Trichlorophenol in ug/L													
2,4,6-Trichlorophenol in ug/L													
2,4-Dichlorophenol in ug/L													
2,4-Dimethylphenol in ug/L													
2,4-Dinitrophenol in ug/L													
2-Chloronaphthalene in ug/L													
2-Chlorophenol in ug/L													
2-Methylphenol in ug/L													
2-Nitroaniline in ug/L													
2-Nitrophenol in ug/L													
3,3'-Dichlorobenzidine in ug/L													
3-Nitroaniline in ug/L													
4,6-Dinitro-2-methylphenol in ug/L													
4-Bromophenyl phenyl ether in ug/L													
4-Chloro-3-methylphenol in ug/L													
4-Chloroaniline in ug/L													
4-Chlorophenyl phenyl ether in ug/L													
4-Methylphenol in ug/L													

Table B-19 - 2000-2013 Pre-RI Groundwater Data - 50 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW12-50 7/30/12	721-MW13-50 7/31/12	721-MW14-50 8/9/12	721-MW15-50 7/30/12	DOCK2-005 8/2/05	DOCK2-010 9/13/05	DOCK2-014 10/29/05	HYD-008 9/13/05	HYD-008 9/14/05	HYD-009 9/15/05	HYD-010 9/16/05	NL-13 12/21/05
4-Nitroaniline in ug/L													
4-Nitrophenol in ug/L													
Benzoic acid in ug/L													
Benzyl alcohol in ug/L													
Benzyl butyl phthalate in ug/L													
Bis(2-chloro-1-methylethyl) ether in ug/L													
Bis(2-chloroethoxy)methane in ug/L													
Bis(2-chloroethyl) ether in ug/L													
Bis(2-ethylhexyl) phthalate in ug/L	1												
Carbazole in ug/L													
Dibenzofuran in ug/L													
Diethyl phthalate in ug/L	600												
Dimethyl phthalate in ug/L	2,000												
Di-n-butyl phthalate in ug/L													
Di-n-octyl phthalate in ug/L													
Hexachlorobenzene in ug/L	0.2					0.00358 U	0.00354 U	0.016 U	0.00356 U	0.00358 U	0.00352 U	0.00363 U	0.00361 U
Hexachlorobutadiene in ug/L	0.2					0.00245 U	0.00242 U	0.05 U	0.00243 U	0.00245 U	0.00241 U	0.00248 U	0.00247 U
Hexachlorocyclopentadiene in ug/L													
Hexachloroethane in ug/L													
Isophorone in ug/L													
Nitrobenzene in ug/L													
N-Nitroso-di-n-propylamine in ug/L													
N-Nitrosodiphenylamine in ug/L													
Pentachlorophenol in ug/L	1					0.0236 U	0.0233 U	0.3 U	0.0234 U	0.0236 U	0.0232 U	0.0239 U	0.0238 U
Phenol in ug/L	300,000												
2,4-Dinitrotoluene in ug/L													
2,6-Dinitrotoluene in ug/L													
Polychlorinated Biphenyls (PCBs)													
Aroclor 1016 in ug/L		0.005 U	0.005 U	0.0073 U	0.05 UJ	0.033 U	0.0326 U		0.0327 U	0.033 U	0.0324 U	0.0334 U	0.0332 U
Aroclor 1221 in ug/L		0.01 U	0.01 U	0.014 U	0.1 UJ	0.033 U	0.0326 U		0.0327 U	0.033 U	0.0324 U	0.0334 U	0.0332 U
Aroclor 1232 in ug/L		0.005 U	0.005 U	0.0089 U	0.05 UJ	0.033 U	0.0326 U		0.0327 U	0.033 U	0.0324 U	0.0334 U	0.0332 U
Aroclor 1242 in ug/L		0.005 U	0.005 U	0.0087 U	0.05 UJ	0.033 U	0.0326 U		0.0327 U	0.033 U	0.0324 U	0.0334 U	0.0332 U
Aroclor 1248 in ug/L		0.005 U	0.005 U	0.0082 U	0.05 UJ	0.033 U	0.0326 U		0.0327 U	0.033 U	0.0324 U	0.0334 U	0.0332 U
Aroclor 1254 in ug/L		0.005 U	0.005 U	0.005 U	0.05 UJ	0.0216 U	0.0214 U		0.0214 U	0.0216 U	0.0212 U	0.0219 U	0.0218 U
Aroclor 1260 in ug/L		0.005 U	0.005 U	0.005 U	0.05 UJ	0.0216 U	0.0214 U		0.0214 U	0.0216 U	0.0212 U	0.0219 U	0.0218 U
Total PCBs (Sum of Aroclors) in ug/L		0.01 U	0.01 U	0.014 U	0.1 UJ	0.033 U	0.0326 U		0.0327 U	0.033 U	0.0324 U	0.0334 U	0.0332 U
Dioxins/Furans													
Tetrachlorodibenzofurans (TCDF), Total in ug/L													
Total HpCDD in ug/L													
Total HpCDF in ug/L													
Total HxCDD in ug/L													
Total HxCDF in ug/L													
Total PeCDD in ug/L													
Total PeCDF in ug/L													
Total TCDD in ug/L													
2,3,7,8-TCDD in ug/L													
1,2,3,7,8-PeCDD in ug/L													
1,2,3,4,7,8-HxCDD in ug/L													
1,2,3,6,7,8-HxCDD in ug/L													
1,2,3,7,8,9-HxCDD in ug/L													
1,2,3,4,6,7,8-HpCDD in ug/L													
OCDD in ug/L													
2,3,7,8-TCDF in ug/L													
1,2,3,7,8-PeCDF in ug/L													
2,3,4,7,8-PeCDF in ug/L													
1,2,3,4,7,8-HxCDF in ug/L													
1,2,3,6,7,8-HxCDF in ug/L													

Table B-19 - 2000-2013 Pre-RI Groundwater Data - 50 Foot Zone

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Chemical Name	Groundwater Potential Cleanup Level (25ft zone) (ug/L)	721-MW12-50 7/30/12	721-MW13-50 7/31/12	721-MW14-50 8/9/12	721-MW15-50 7/30/12	DOCK2-005 8/2/05	DOCK2-010 9/13/05	DOCK2-014 10/29/05	HYD-008 9/13/05	HYD-008 9/14/05	HYD-009 9/15/05	HYD-010 9/16/05	NL-13 12/21/05
1,2,3,7,8,9-HxCDF in ug/L													
2,3,4,6,7,8-HxCDF in ug/L													
1,2,3,4,6,7,8-HpCDF in ug/L													
1,2,3,4,7,8,9-HpCDF in ug/L													
OCDF in ug/L													
Pesticides													
4,4'-DDD in ug/L													0.135 UJ
4,4'-DDE in ug/L													0.19 UJ
4,4'-DDT in ug/L													0.208 UJ
Aldrin in ug/L													0.0223 UJ
cis-Chlordane in ug/L													0.0845 UJ
Dieldrin in ug/L													0.214 UJ
trans-Chlordane in ug/L													0.351 UJ

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Potential Cleanup Level (25ft zone) (ug/L)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

Table B-20 - Water Level Measurements

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Location	Date/Time	TOC Elev (NAVD88)	Depth to Water (ft)	Groundwater Elevation (ft)
29-14	10/17/14 15:00	15.64	8.25	7.39
29-14	12/8/15 14:40	15.64	5.48	10.16
709-MW-03-15	10/17/14 11:20	17.7	10.24	7.46
709-MW-03-15	5/20/15 10:10	17.7	9.48	8.22
709-MW-09-15	10/16/14 12:30	16.7	9.42	7.28
709-MW-09-15	5/20/15 10:35	16.7	8.51	8.19
709-MW-09-15	12/8/15 16:00	16.7	7.3	9.4
709-MW-09-15	12/9/15 14:55	16.7	7.3	9.4
709-MW-11-15	12/8/15 16:25	17.96	8.61	9.35
709-MW-11-15	12/9/15 14:30	17.96	8.61	9.35
709-MW-15-15	10/17/14 11:10	17.83	10.4	7.43
709-MW16-25	10/16/14 12:30	14.46	8.9	5.56
709-MW-17-15	10/17/14 11:15	17.48	10.36	7.12
709-MW-17-15	12/8/15 15:15	17.48	7.86	9.62
709-MW-17-15	12/9/15 14:30	17.48	7.86	9.62
709-MW-18-15	12/9/15 15:00	17.31	8.24	9.07
709-MW18-25	10/17/14 10:15	14.92	9.32	5.6
709-MW20-15	10/17/14 9:25	16.05	8.9	7.15
709-MW20-15	12/8/15 19:20	16.05	6.8	9.25
709-MW20-25	10/17/14 9:30	16.72	13.01	3.71
709-MW21-25	10/17/14 12:45	14.86	9.04	5.82
709-MW21-25	5/20/15 10:55	14.86	8.32	6.54
709-MW9-25	10/16/14 13:55	14.91	9.13	5.78
709-MW9-25	5/20/15 9:50	14.91	8.29	6.62
721-MW10-15	10/15/14 6:10	13.6	6.7	6.9
721-MW10-15	1/26/15 16:15	13.6	5.85	7.75
721-MW10-15	5/18/15 13:50	13.6	6.47	7.13
721-MW10-15	8/27/15 11:50	13.6	7	6.6
721-MW10-25	10/15/14 5:25	13.97	13.11	0.86
721-MW10-25	1/26/15 15:45	13.97	11.7	2.27
721-MW10-25	5/18/15 14:20	13.97	15.51	-1.54
721-MW10-25	8/28/15 10:15	13.97	14.91	-0.94
721-MW10-25	12/9/15 21:00	13.97	12.75	1.22
721-MW11-15	12/9/15 20:05	14.39	4.18	10.21
721-MW11-25	10/14/14 13:50	14.62	7.55	7.07
721-MW12-15	10/16/14 9:30	14.27	6.99	7.28
721-MW12-15	1/27/15 13:45	14.27	5.35	8.92
721-MW12-15	12/9/15 18:20	14.27	5.2	9.07
721-MW12-25	10/16/14 9:15	14.19	8.96	5.23
721-MW13-15	10/17/14 13:55	14.17	7.9	6.27
721-MW13-15	5/19/15 10:20	14.17	5.98	8.19
721-MW13-25	10/17/14 13:10	14.06	8.2	5.86
721-MW13-50	10/17/14 12:35	13.9	7.79	6.11
721-MW13-50	5/19/15 14:55	13.9	10.59	3.31
721-MW14-15	12/9/15 17:45	14.33	5.34	8.99
721-MW15-15	10/17/14 13:10	14.28	8.01	6.27
721-MW15-15	12/9/15 16:10	14.28	5.96	8.32
721-MW15-25	10/17/14 13:45	14.46	8.42	6.04
721-MW15-25	5/19/15 13:20	14.46	9.15	5.31
721-MW2	10/16/14 11:45	14.2	7.27	6.93
721-MW2	12/9/15 17:35	14.2	5.9	8.3
721-MW3	10/16/14 12:40	14.7	7.37	7.33
721-MW3	1/26/15 13:55	14.7	6.01	8.69
721-MW3	5/19/15 14:20	14.7	6.63	8.07
721-MW3	12/9/15 15:45	14.7	6.1	8.6
721-MW5-15	10/15/14 13:00	14.44	7.11	7.33
721-MW6-15	12/9/15 19:10	14.37	5.9	8.47
721-MW8-15	10/15/14 7:25	14	6.96	7.04
721-MW8-15	5/19/15 12:15	14	6.57	7.43
721-MW8-15	12/9/15 19:10	14	6.51	7.49
721-MW9-15	10/16/14 7:25	14.27	7.75	6.52
721-MW9-15	1/27/15 15:40	14.27	6.68	7.59
721-MW9-15	5/19/15 10:40	14.27	7.16	7.11
721-MW9-15	8/28/15 9:15	14.27	7.69	6.58
721-MW9-15	12/9/15 21:05	14.27	6.42	7.85
721-MW9-25	10/16/14 6:20	13.99	11.92	2.07
721-MW9-25	5/19/15 11:45	13.99	13.01	0.98
95-15	10/15/14 2:55	14.07	7	7.07
95-15	1/27/15 16:45	14.07	6.45	7.62
95-15	5/18/15 11:45	14.07	6.92	7.15
95-15	8/28/15 10:00	14.07	7.38	6.69
HC-N11-6	10/15/14 10:15	14.33	7.35	6.98
HC-N11-6	1/27/15 13:10	14.33	6.26	8.07
HC-N11-6	12/8/15 18:00	14.33	6.49	7.84
MW-102-15	10/16/14 6:10	14.43	7.03	7.4
MW-102-15	5/18/15 9:50	14.43	6.86	7.57
MW-102-25	10/16/14 6:55	14.41	11.65	2.76
MW-102-25	1/26/15 14:50	14.41	8.87	5.54
MW-102-25	5/18/15 9:50	14.41	9.42	4.99
MW-102-25	8/27/15 10:05	14.41	12.11	2.3
MW-104-15	10/15/14 6:10	14.43	7.28	7.15
MW-104-15	1/26/15 16:55	14.43	6.54	7.89
MW-104-15	5/18/15 12:45	14.43	7.04	7.39
MW-104-15	8/28/15 11:40	14.43	7.41	7.02
MW-104-15	12/8/15 22:40	14.43	6.17	8.26
MW-104-25	10/15/14 7:25	14.43	12.22	2.21
MW-104-25	1/26/15 15:55	14.43	12.2	2.23
MW-104-25	5/18/15 13:05	14.43	15.8	-1.37
MW-104-25	8/28/15 12:20	14.43	15.32	-0.89
MW-104-25	12/8/15 22:40	14.43	13.23	1.2
MW-105-15	10/17/14 14:55	14.52	6.73	7.79
MW-105-15	5/18/15 15:15	14.52	5.97	8.55
MW-105-25	10/17/14 15:35	14.54	7.77	6.77
MW-105-25	1/26/15 14:00	14.54	7.24	7.3
MW-105-25	5/18/15 15:15	14.54	9.91	4.63
MW-105-25	8/27/15 9:55	14.54	9.07	5.47
MW-105-25	12/8/15 18:20	14.54	6	8.54
MW-106-15	10/16/14 10:45	14.59	6.93	7.66
MW-106-15	5/20/15 11:50	14.59	6.19	8.4
MW-106-15	12/9/15 19:00	14.59	5.5	9.09
MW-109-15	10/16/14 11:00	14.89	7.23	7.66

Aspect Consulting

2/25/2016

\\seastore2.aspect.local\projects\Port of Tacoma\Alexander Avenue Petroleum Tank Facilities\Draft Reports\VRFS\Appendices\Appendix B - Data Tables\B-20 Water Levels.xlsx

Table B-20

RI

Page 1 of 2

Table B-20 - Water Level Measurements

Pr # 130097-01D Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

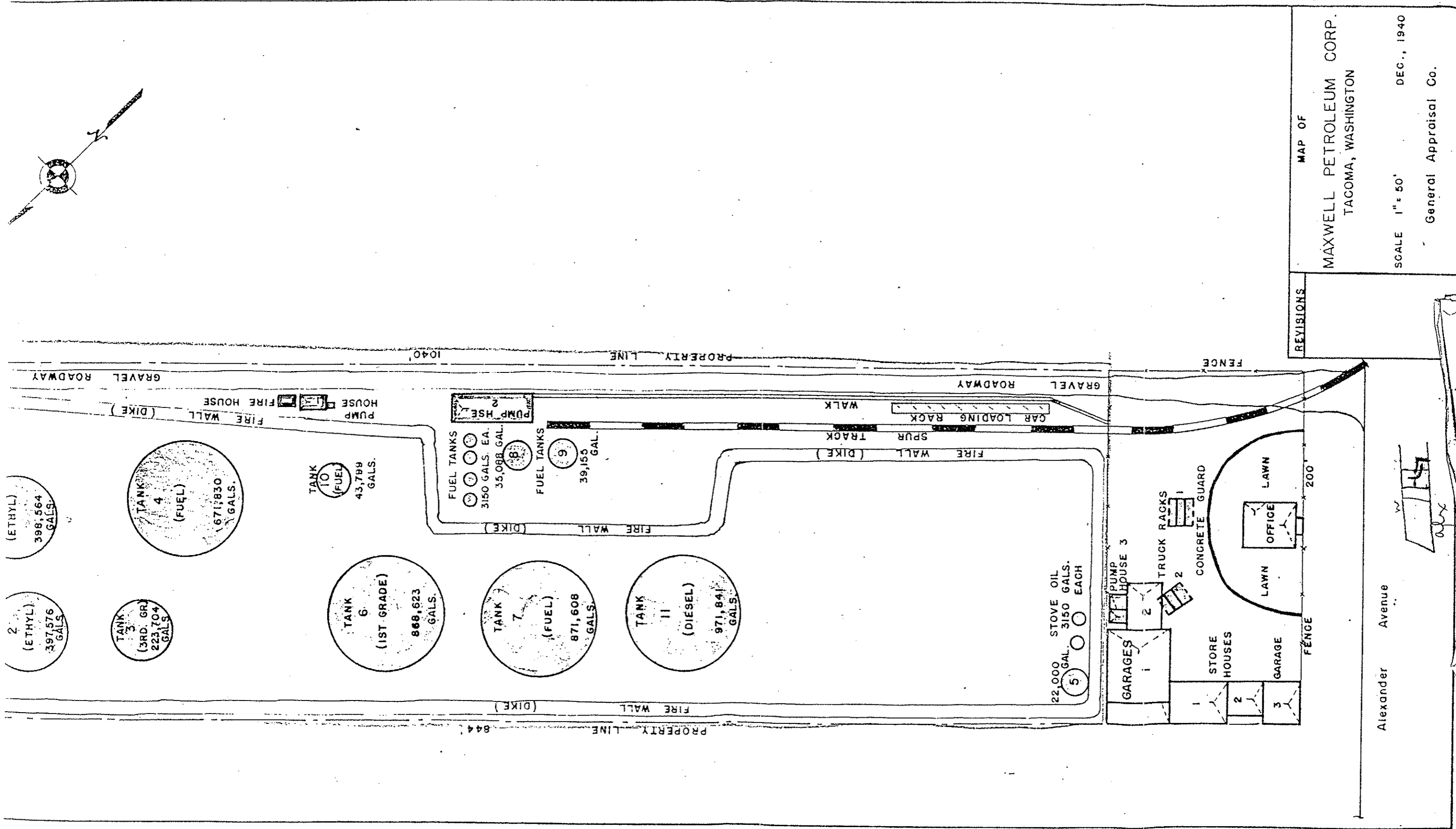
Location	Date/Time	TOC Elev (NAVD88)	Depth to Water (ft)	Groundwater Elevation (ft)
MW-109-15	1/27/15 12:45	14.89	5.91	8.98
MW-109-15	5/19/15 13:10	14.89	6.5	8.39
MW-109-15	12/9/15 18:20	14.89	6.09	8.8
MW-110-15	10/15/14 2:55	14.19	6.84	7.35
MW-110-15	1/26/15 17:20	14.19	5.79	8.4
MW-110-15	5/18/15 10:50	14.19	6.29	7.9
MW-110-15	8/27/15 11:25	14.19	7.05	7.14
MW-110-25	10/15/14 4:20	14.28	12.43	1.85
MW-110-25	1/26/15 17:40	14.28	12.34	1.94
MW-110-25	5/18/15 11:25	14.28	14.72	-0.44
MW-110-25	8/27/15 12:15	14.28	13.65	0.63
MW-110-25	12/8/15 21:40	14.28	12.22	2.06
MW-130-15	10/15/14 9:00	14.6	7.59	7.01
MW-130-15	1/27/15 14:00	14.6	6.7	7.9
MW-130-15	5/19/15 10:15	14.6	7.07	7.53
MW-130-15	8/27/15 9:40	14.6	7.61	6.99
MW-130-15	12/8/15 18:40	14.6	6.89	7.71
MW-137-25	10/15/14 7:20	15.28	13.02	2.26
MW-137-25	1/27/15 15:45	15.28	11.86	3.42
MW-137-25	5/19/15 10:50	15.28	14	1.28
MW-137-25	8/27/15 10:30	15.28	16.24	-0.96
MW-137-25	12/8/15 19:50	15.28	11.56	3.72

APPENDIX C

Selected Historical Documents

Appendix C Contents

1. Maxwell Petroleum "Site Plan", 1940, 2 pages
2. Todd Pacific Shipyards "Plot Plan", 1943, 1 page
3. PRI Oblique Aerial Photographs, 1940 to 1945, 6 pages
4. Port of Tacoma Oblique Aerial Photograph, 1973, 1 page
5. City of Tacoma Sanitary Sewer Figure, 1975, 1 page
6. Port of Tacoma "Demolition of Petroleum Facilities Plan", 1981, 1 page
7. United States Army Corps of Engineers "Topographic Plan – Demolition and Removal", 1983, 1 page
8. United States Army Corps of Engineers "Grading Plan and Details", 1983, 1 page
9. Port of Tacoma "Demolition of Tank Farm at 721 ½ Alexander Avenue", 1983, 1 page

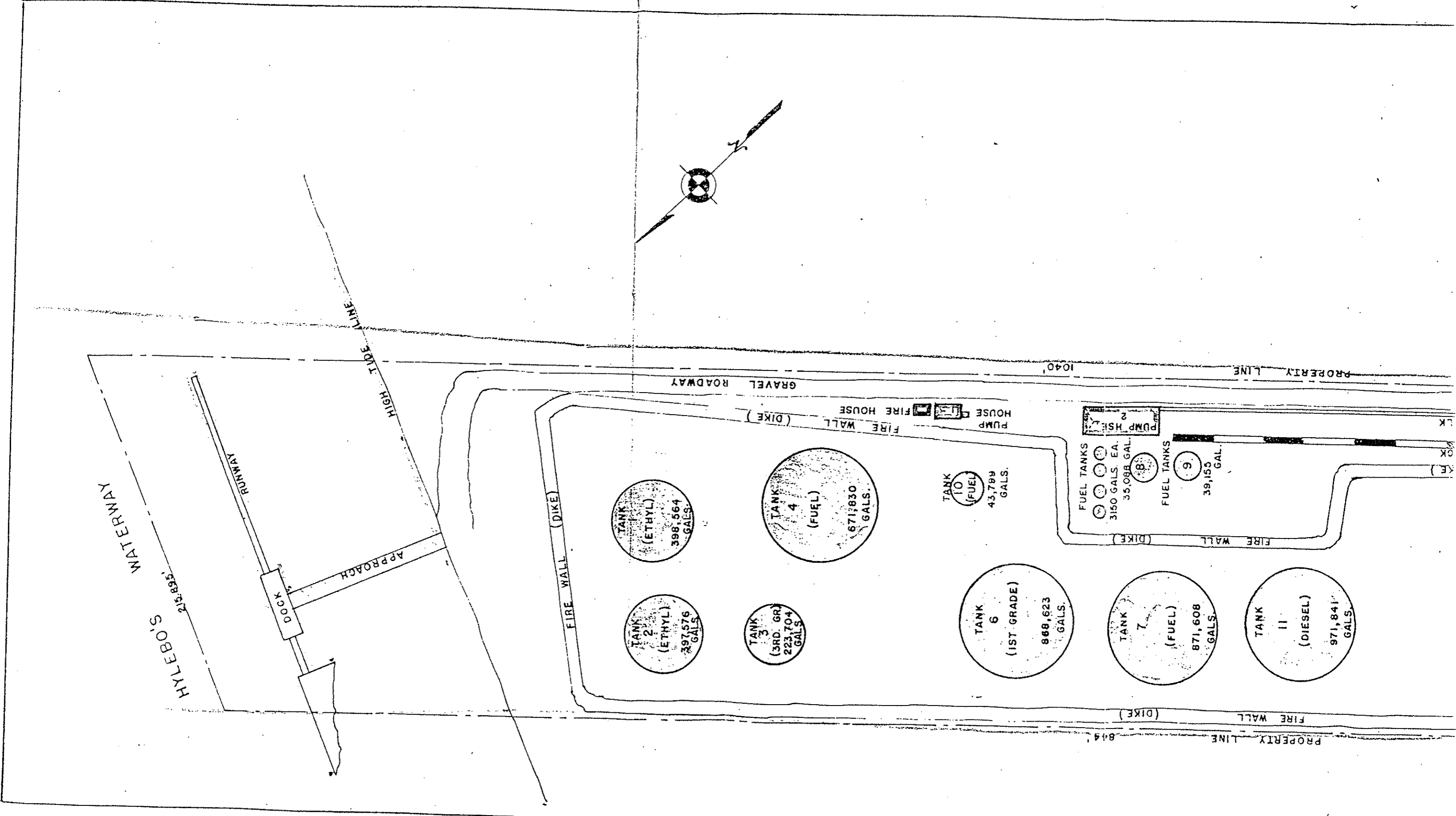


REVISIONS

MAP OF
MAXWELL PETROLEUM CORP.
 TACOMA, WASHINGTON

SCALE 1" = 50'
 DEC., 1940
 General Appraisal Co.

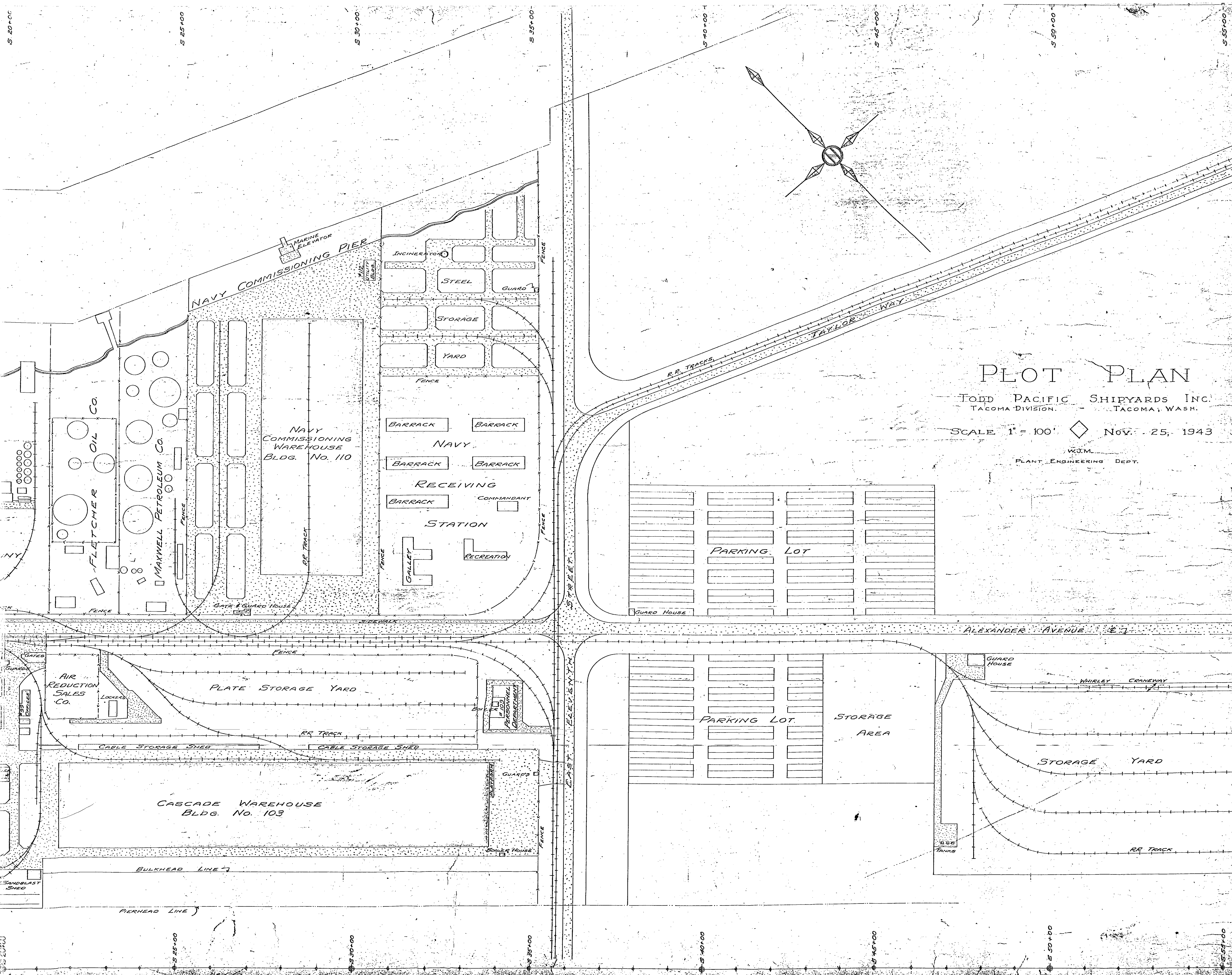
Alexander Avenue



LK
OK
(E)

PROPERTY LINE 844

PROPERTY LINE 1040

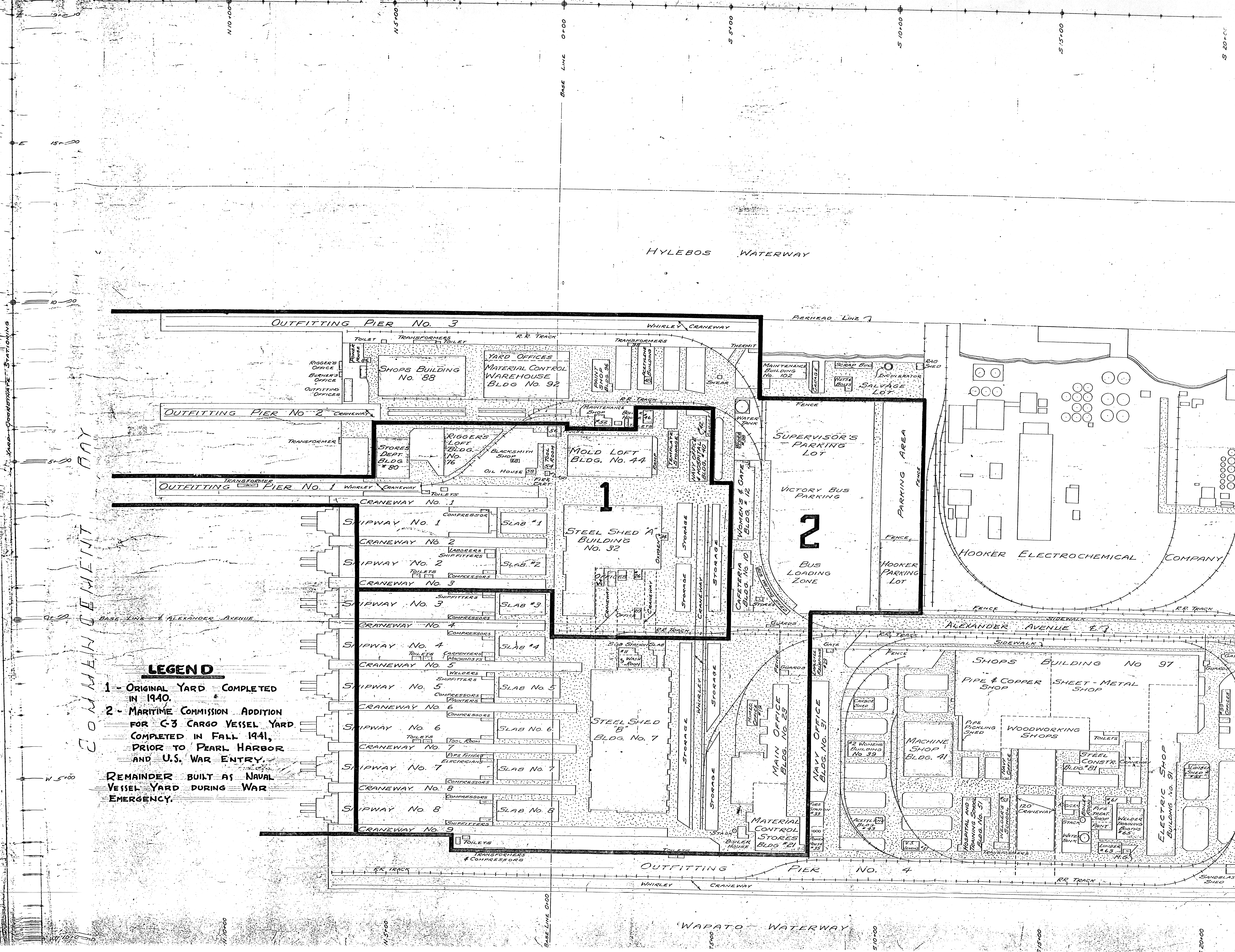


PLOT PLAN

TODD PACIFIC SHIPYARDS INC.
TACOMA DIVISION - TACOMA, WASH.

SCALE 1" = 100' NOV. 25, 1943

W.J.M.
PLANT ENGINEERING DEPT.



LEGEND

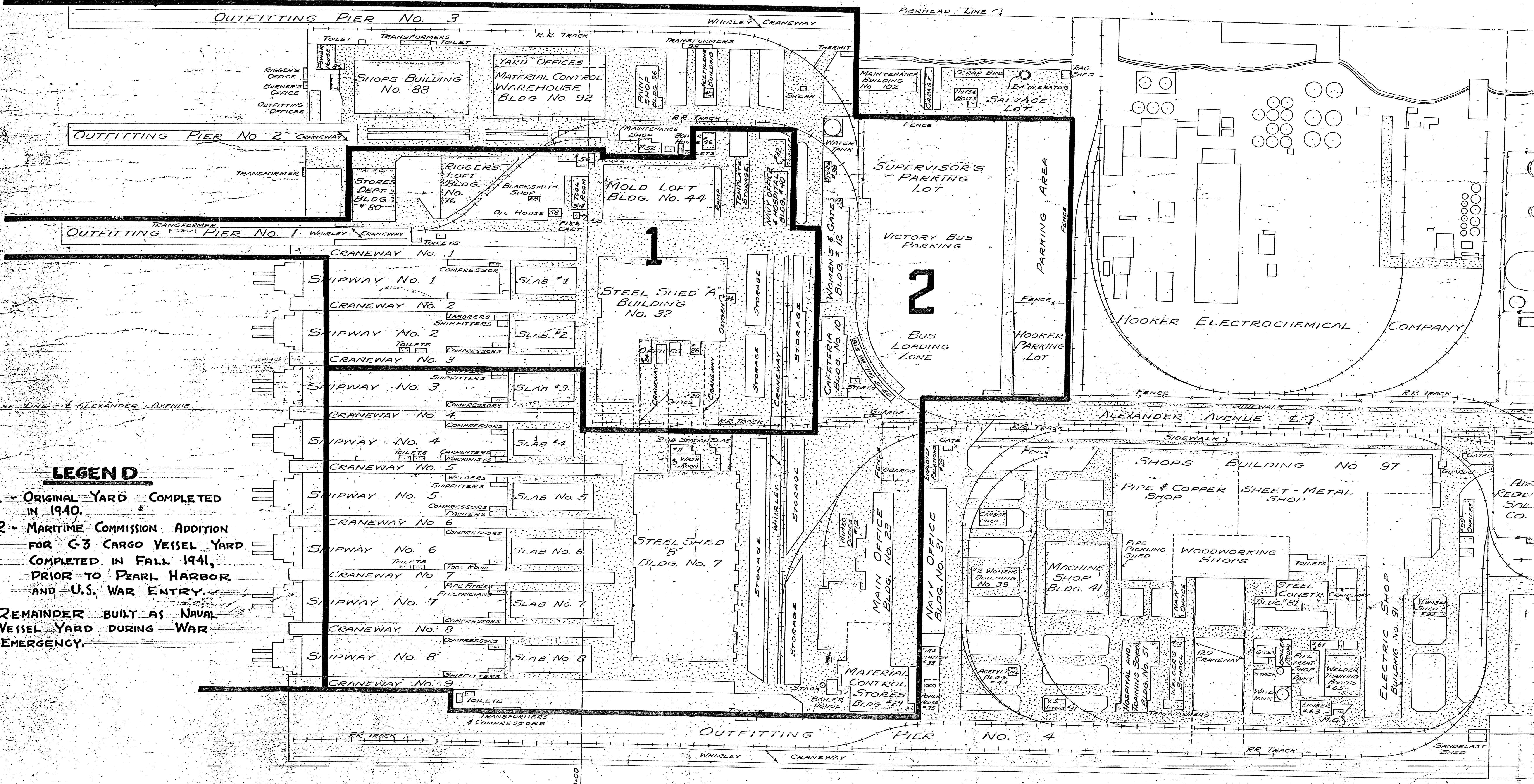
- 1 - ORIGINAL YARD COMPLETED IN 1940.
- 2 - MARITIME COMMISSION ADDITION FOR C-3 CARGO VESSEL YARD COMPLETED IN FALL 1941, PRIOR TO PEARL HARBOR AND U.S. WAR ENTRY.
- REMAINDER BUILT AS NAVAL VESSEL YARD DURING WAR EMERGENCY.

COMMENTS

NAVAL COORDINATE STATIONING

HYLEBOS WATERWAY

WAPATO WATERWAY



HOOVER ELECTROCHEMICAL COMPANY

ARK REDU SAL CO.

120'00

715'00

510'00

350'00

BASE LINE 0'00

115'00

1710'00

W 5'00

01'00

5'00

10'00

15'00

9'00

N 10'00

N 5'00

BASE LINE 0'00

S 5'00

S 10'00

S 15'00

S 20'00



RECEIVED

'95 DEC -1 A9 :00

Associate General Counsel
and Assistant Secretary

BHP Hawaii
S.W. Regional Office

November 29, 1995

Mohsen Kourehdar
Site Engineer
Toxics Cleanup Program
Department of Ecology
Southwest Regional Office
P. O. Box 47775
Olympia, WA 98504-7775

File Name PRI Northwest
Company Pierce
Site TEP
Contact = Mohsen-K

Re: PRI Northwest, Inc.

Dear Mr. Kourehdar:

Enclosed, for your information, are a set of aerial photographs which we found recently and which are being submitted as part of PRI Northwest Inc.'s response to the Hylebos Participation Questionnaire. We are informed that these photos were taken during the period 1940-45. We added the labels noting the current ownership of the respective properties.

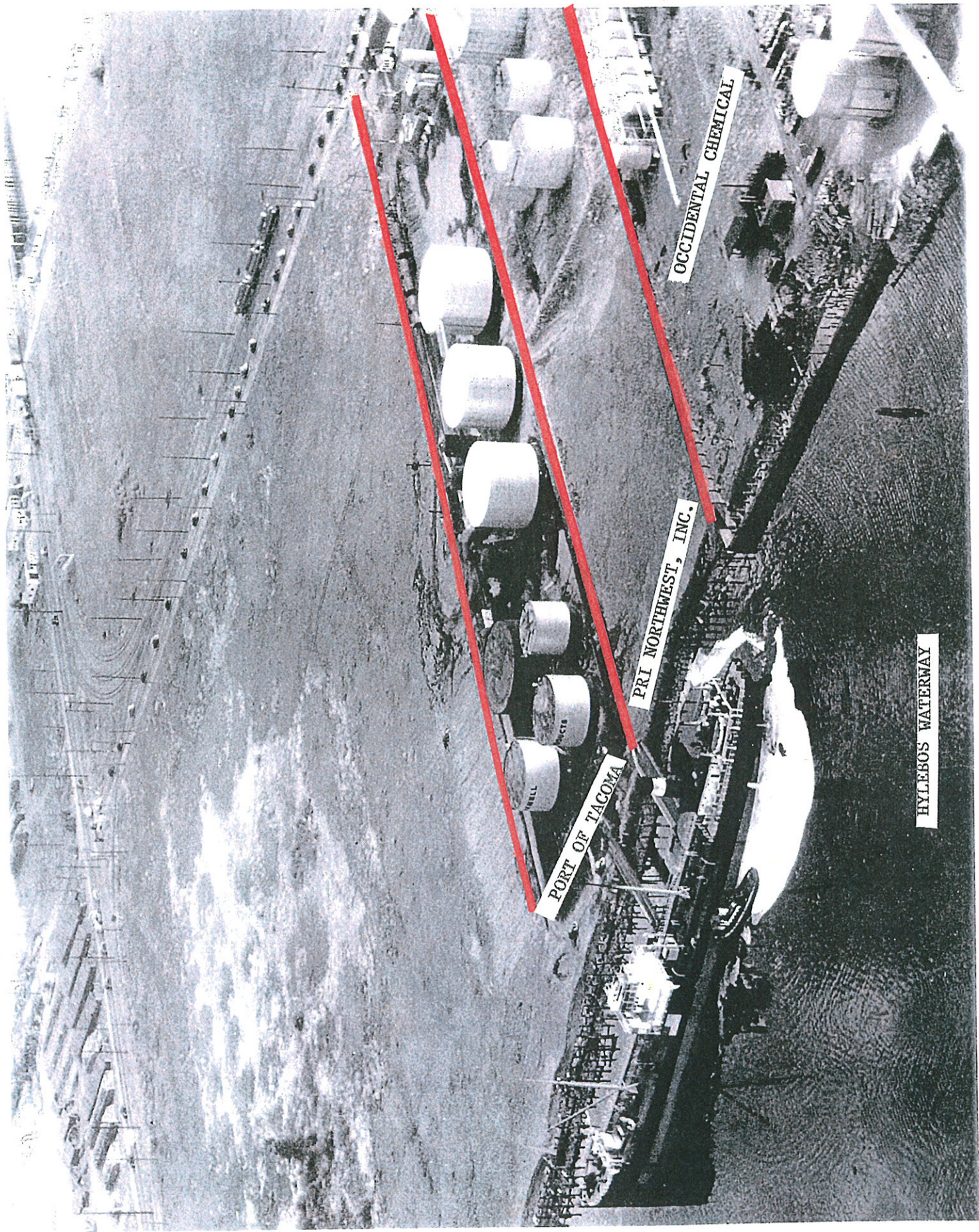
Sincerely,

PRI NORTHWEST, INC.

George T. Aoki
Associate General Counsel

GTA:rtt
Enclosure

cc: Dave Tunison (w/o encl.)
Alison Wachterman, Esq. (w/o encl.)

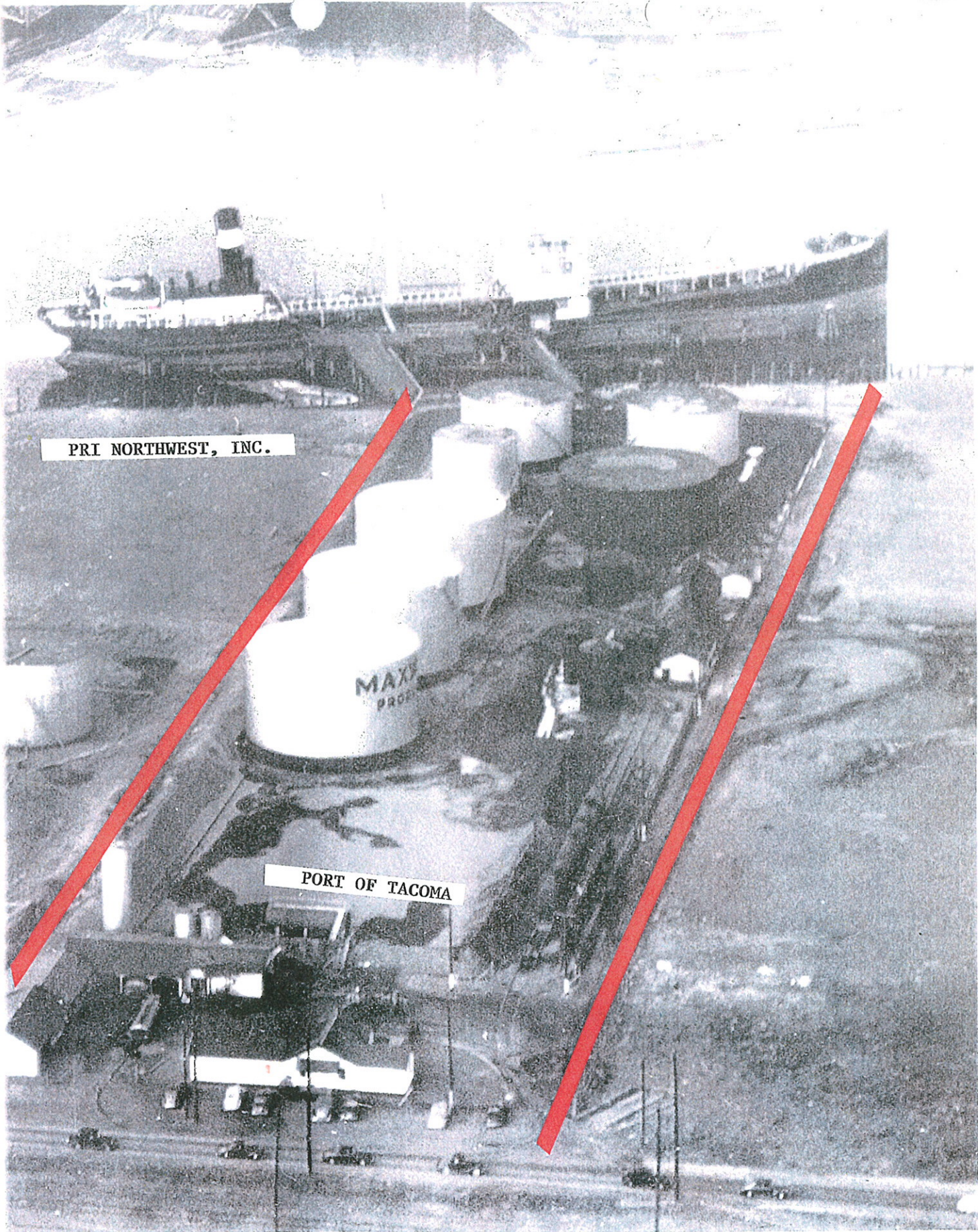


PORT OF TACOMA

PRI NORTHWEST, INC.

OCCIDENTAL CHEMICAL

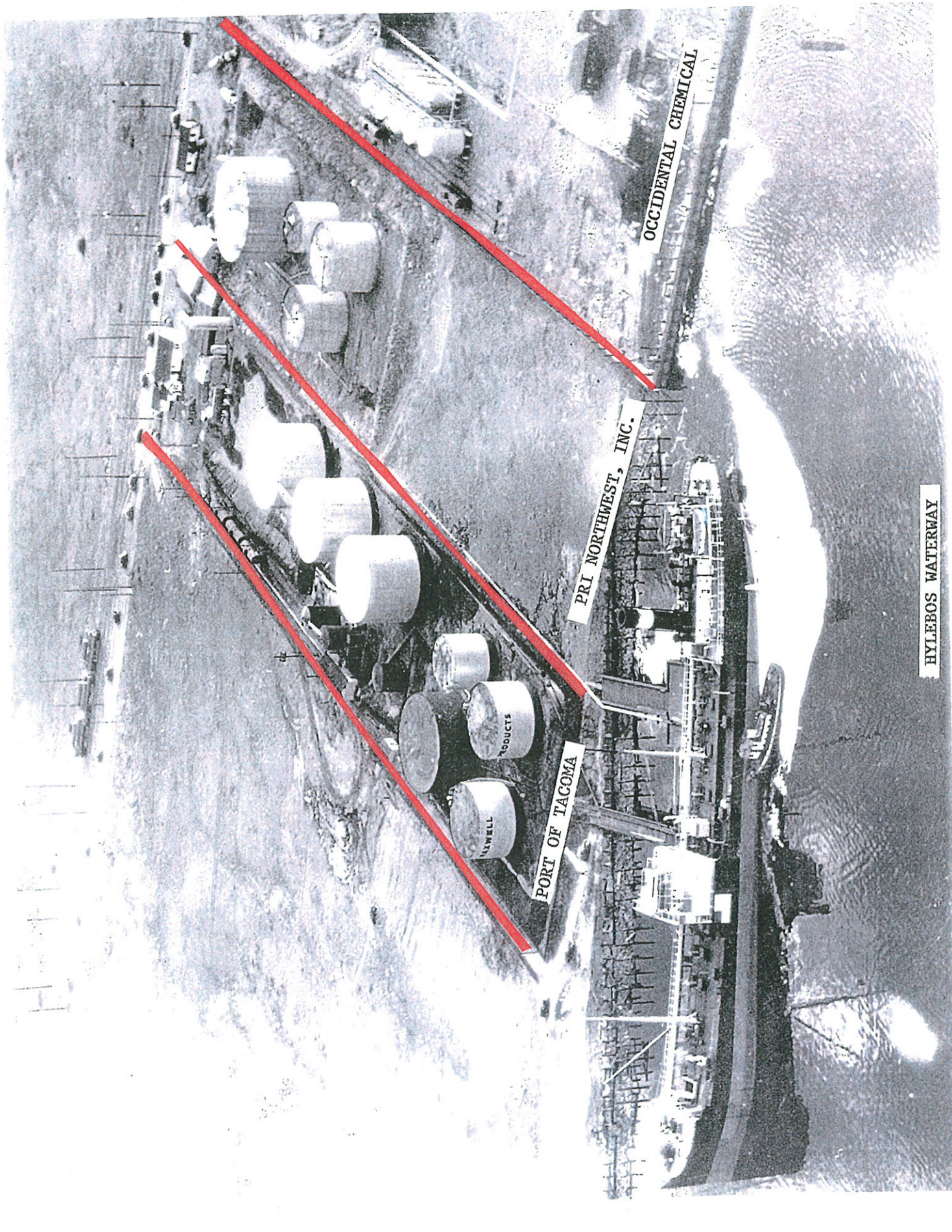
HYLEBOS WATERWAY



PRI NORTHWEST, INC.

PORT OF TACOMA

MAXI
PROP



PORT OF TACOMA

PRI NORTHWEST, INC.

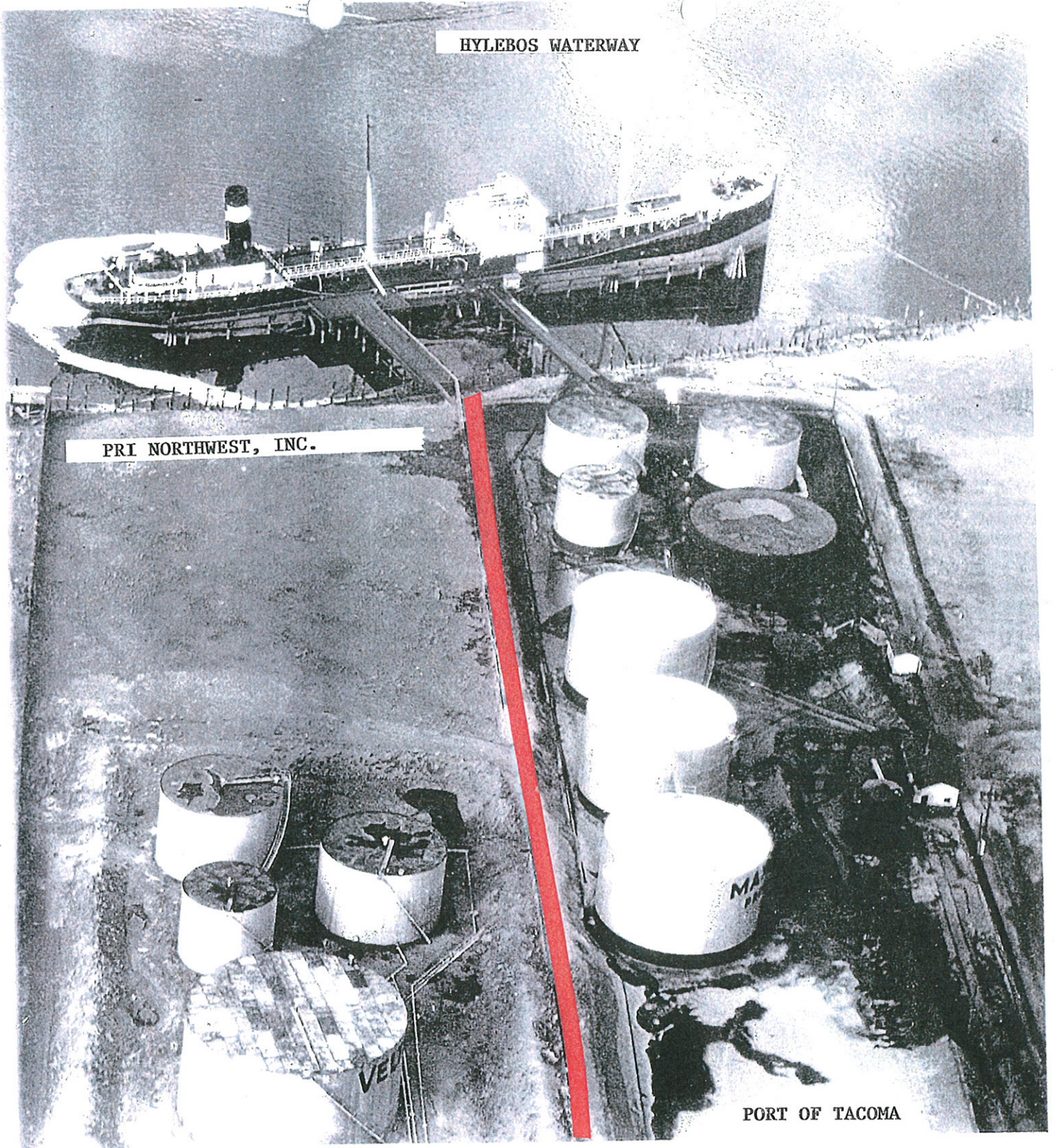
OCCIDENTAL CHEMICAL

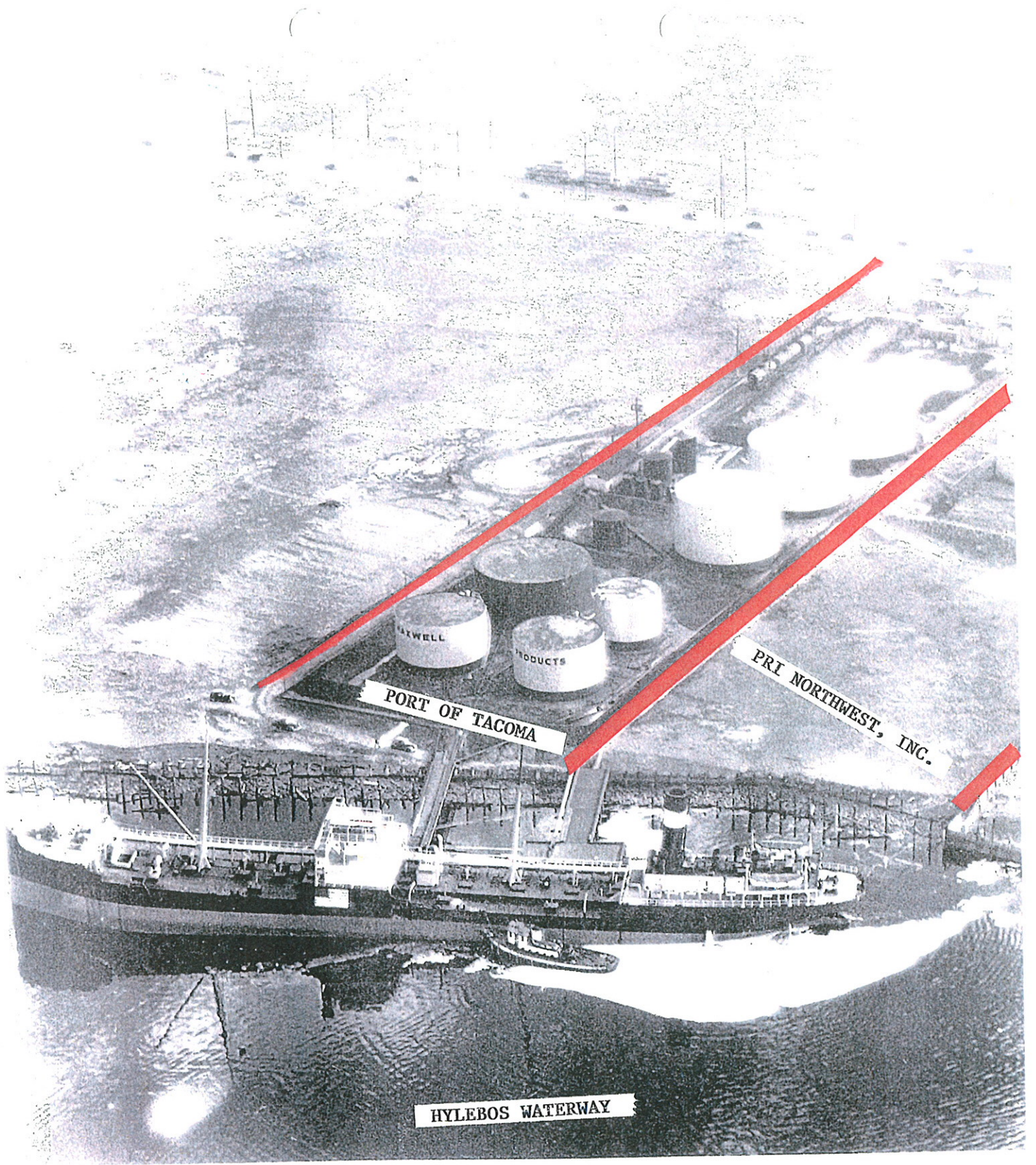
HYLEBOS WATERWAY

HYLEBOS WATERWAY

PRI NORTHWEST, INC.

PORT OF TACOMA



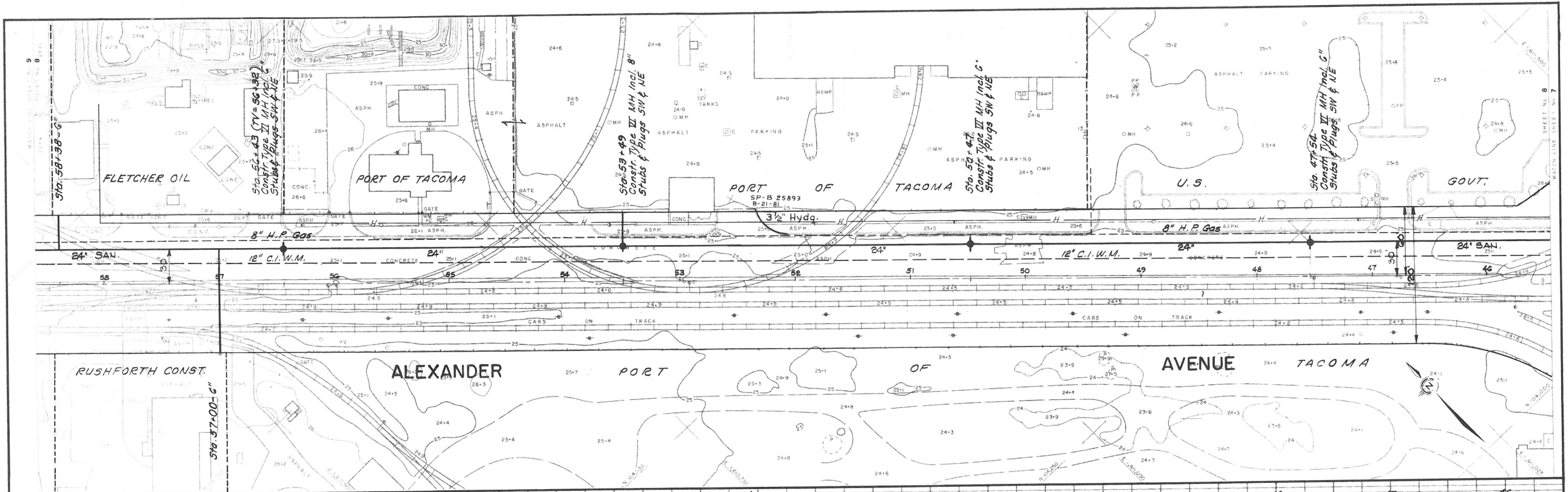


PORT OF TACOMA

PRI NORTHWEST, INC.

HYLEBOS WATERWAY





58	57	56	55	54	53	52	51	50	49	48	47	46
<p>1.E. 12.32 1.E. 17.35 1.E. 16.80</p> <p>6" DIA. PL. CONC. PIPE TR. EXC. & BKF. CL. 'B' PIPE BEDDING MATL. REM. EX. PUMPT. TYPE II, CL. 'A' CR. BALLAST</p> <p>90 L.F. 50 C.Y. 52 S.Y. 25 S.Y. 12 C.Y.</p>		<p>1.E. 16.45 1.E. 16.75</p> <p>24" DIA. PL. CONC. PIPE 24" DIA. REIN. CONC. PIPE, CL. C-76-IV TR. EXC. & BKF. CL. 'B'</p> <p>536 L.F. 60 L.F. 778 C.Y.</p> <p>PIPE BEDDING MATERIAL REM. EX. PUMPT. TYPE II, CL. 'A' CR. BALLAST ASPH. CONC. PUMPT. CL. 'B' (3") ASPH. TREATED BASE CR. SURF. TOP COURSE REM. EX. ASPH. CONC. PUMPT. TYPE II, CL. 'B'</p> <p>86 C.Y. 1200 S.Y. 396 C.Y. 436 T. 135 T. 80 C.Y. 250 S.Y.</p>		<p>1.E. 15.74 1.E. 15.86</p> <p>8" DIA. PL. CONC. PIPE TR. EXC. & BKF. CL. 'B'</p> <p>50 L.F. 25 C.Y.</p> <p>PIPE BEDDING MATL. REM. EX. CONC. SIDEWALK 18 S.Y.</p>		<p>1.E. 15.15</p> <p>24" DIA. PL. CONC. PIPE 24" DIA. REIN. CONC. PIPE, CL. C-76-IV TR. EXC. & BKF. CL. 'B'</p> <p>599 L.F. 20 L.F. 634 C.Y.</p> <p>PIPE BEDDING MATERIAL REM. EX. PUMPT. TYPE II, CL. 'A' REM. EX. PUMPT. TYPE II, CL. 'B' CRUSHED BALLAST ASPH. CONC. PUMPT. CL. 'B' (3") CR. SURF. TOP COURSE ASPH. TREATED BASE</p> <p>88 C.Y. 930 S.Y. 170 S.Y. 339 C.Y. 450 T. 68 C.Y. 141 T.</p>						
0.1%		0.1%		0.1%		0.1%		0.1%		0.1%		0.1%
25 L.F. RCP, CL. C-76-IV		20 L.F. 24" RCP, C-76-IV		20 L.F. 24" RCP, CL. C-76-IV		20 L.F. 24" RCP, CL. C-76-IV		20 L.F. 24" RCP, CL. C-76-IV		20 L.F. 24" RCP, CL. C-76-IV		20 L.F. 24" RCP, CL. C-76-IV

2. Added 6" Side Sewer At Sta. 57+00
1. Pumpt. Repair Notes Deleted

FINAL CONSTRUCTION CHECKED BY ATG DATE 12-75

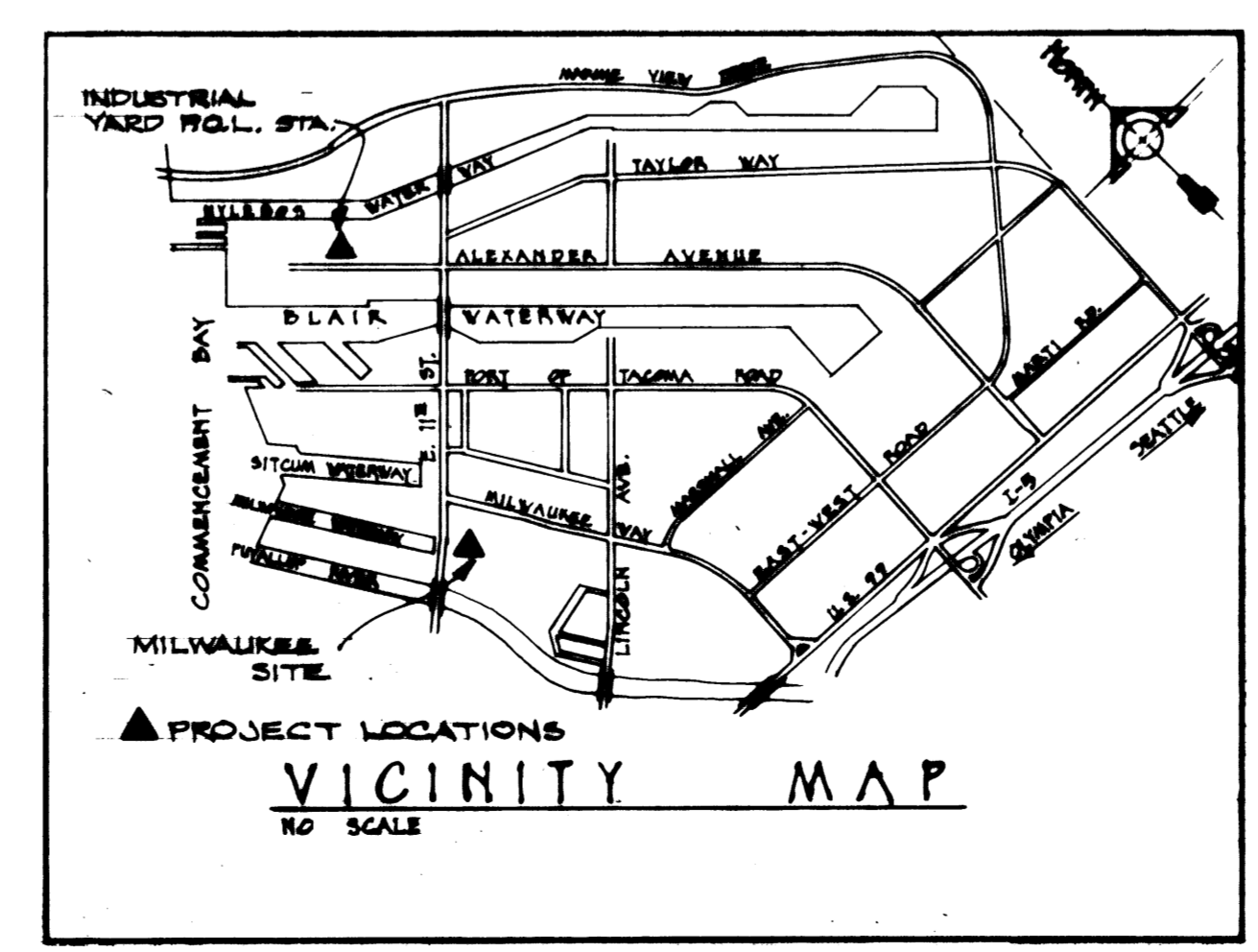
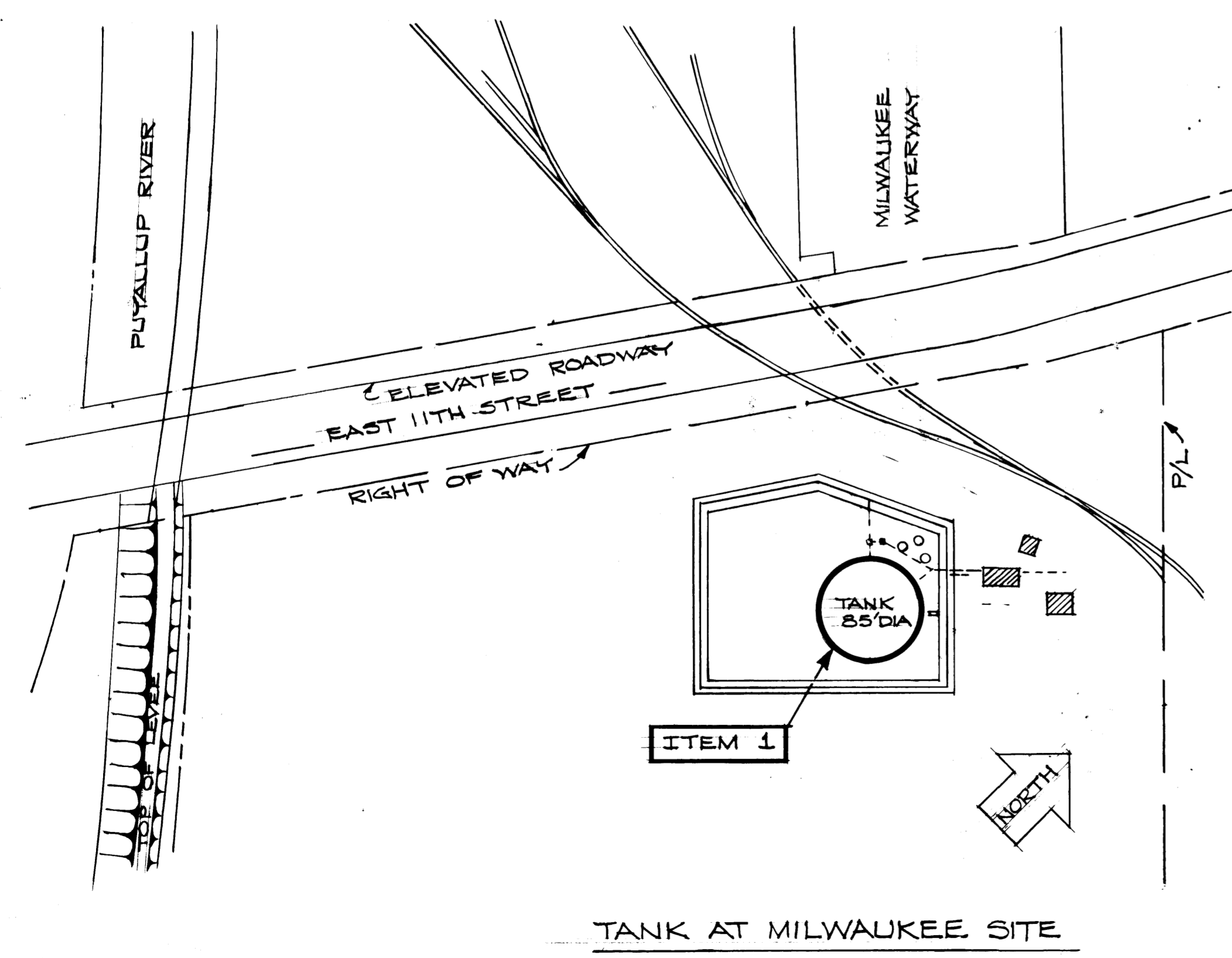
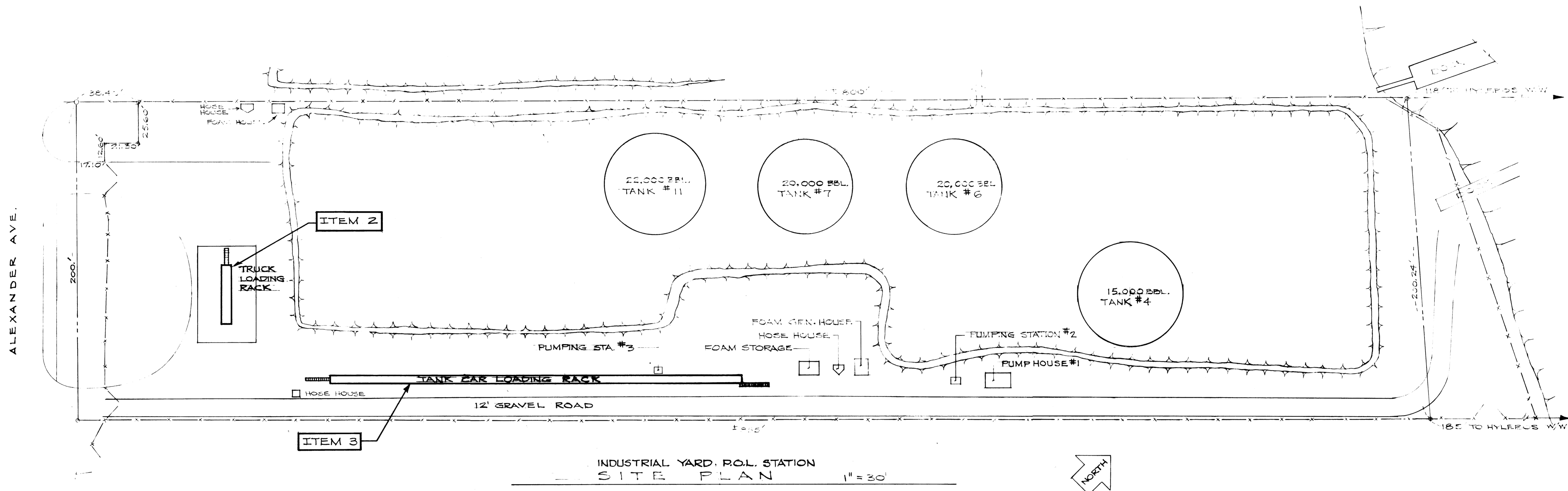
DESIGNED BY CLO

DRAWN BY ATG

RD Hoarling
K. J. Anderson
Albert M. Schuster

CITY OF TACOMA
DEPARTMENT OF PUBLIC WORKS
SANITARY SEWER
ALEXANDER AVE., FROM LINCOLN AVE.
5850' NW & 4700' SE

L.I.D. 3722
UNIT 'D'
SHEET No. 8 OF 26



REF. DWG. EP-3617-12

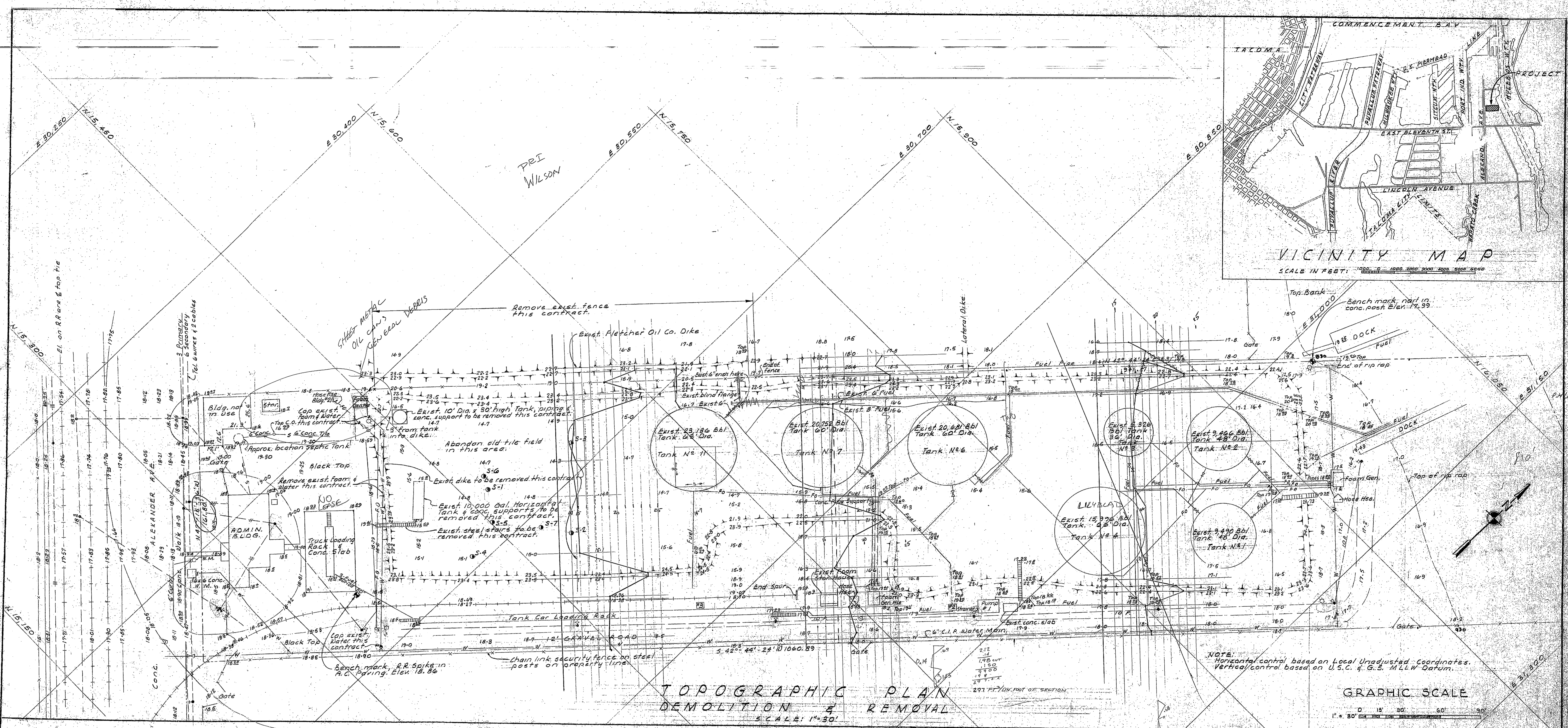
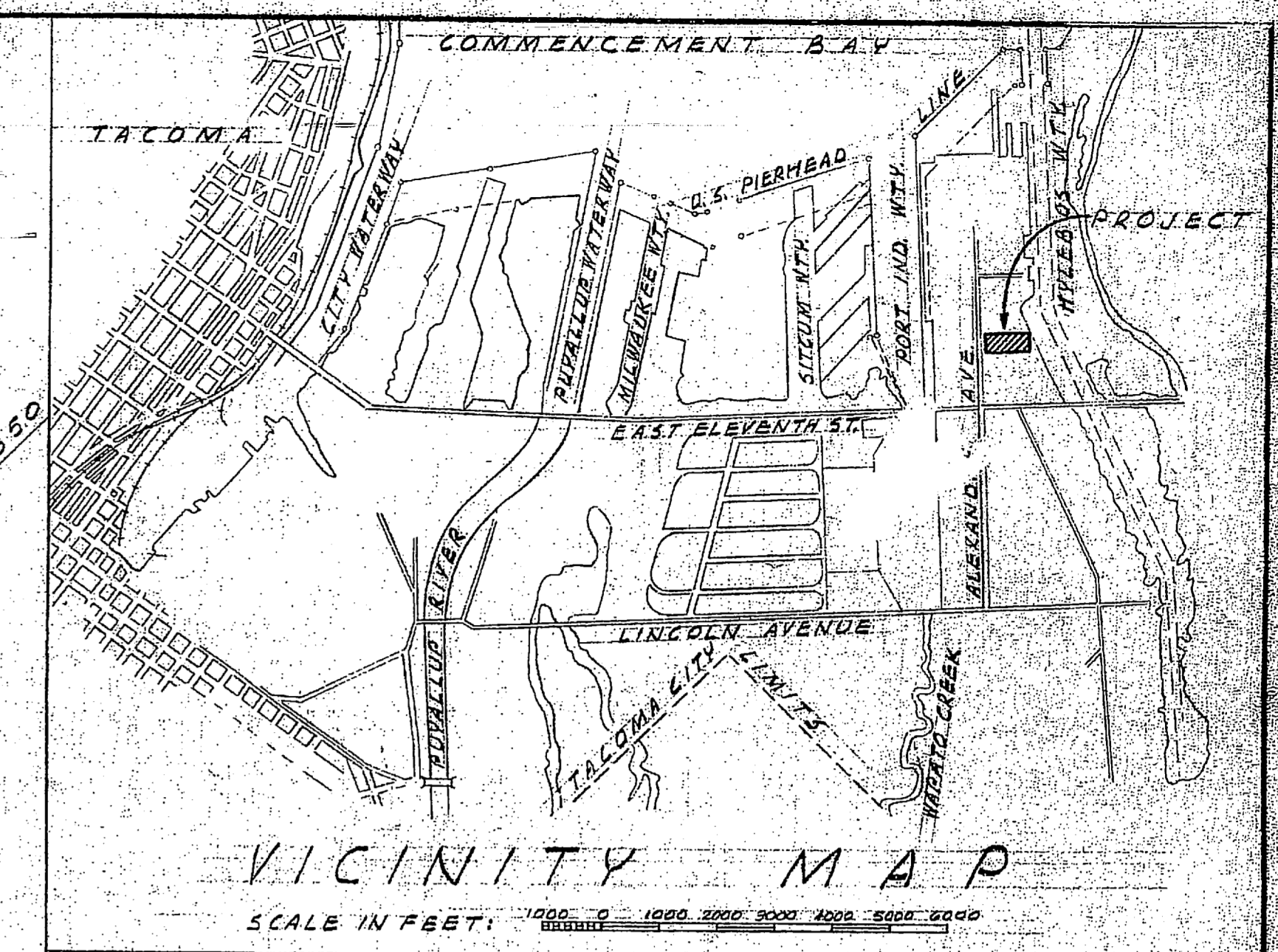
S.W.R.# 251

DRAWN: **ALB**
 DATE: **8-10-81**
 CHECKED: **ALB**
 DATE: **12-3-79**
 CHECKED:
 DATE:
 CONT. NO. **SWR 251**

PORT OF TACOMA
 DEMOLITION OF
 PETROLEUM FACILITIES

FIELD BOOK(S)
 APPROVED: **R.L. MacLeod** DATE: **12-3-79**
 CHIEF ENGINEER
 SCALE: 1" = 30'-0"
 DRAWING NO.: **EP-3730-4**
 SHEET: **1** OF **1**

MARK	REVISION	BY	APP.	DATE
△	REMOVED OFFICE BLDG. AND RECLASSIFIED TANKS	ALB	sel	12-3-79



TACOMA P.O.L. DEPOT, WASHINGTON STORAGE DEPOT AVFUEL

40,700
40,095
94,500
175,095 FT³

6,485 cu yd.
TO BE EXCAVATED

1/2" OF CRUSHED LEVULIN 15' 1/2" BALAST = 1,570 cu yd w/2% compaction

1/2" OF CRUSHED LEVULIN 15' 1/2" BALAST = 1,570 cu yd w/2% compaction

1/2" OF CRUSHED LEVULIN 15' 1/2" BALAST = 1,570 cu yd w/2% compaction

EXPLORATIONS LOG	
DEPTH IN FEET	DESCRIPTION
0	SP Fine, brn. Water
4	SP Fine, blue
8	CL Blue
12	SP Fine
16	SP Fine
20	SP Fine
24	SP Fine
28	SP Fine

EXPLORATION LOG LEGEND

SP - Sand or Gravelly Sand, poorly graded

SM - Silty Sand or Silty Clay

ML - Silty, Sandy Silts, Gravelly Silts or Diatomaceous Silts

CL - Lean Clays, Sandy Clays, or Gravelly Clays

NOTES

- Holes S-1 to S-3 Drilled 8-9 Apr. 1958
- Holes S-4 to S-7 Drilled 11 Jan. 1958

EXISTING		THIS CONTRACT	
	Building		Tank
	Chain link fence		Concrete dike wall
	Dike		Earth dike
	Line of depression		Storm drain & manhole
	Bench mark		Fuel line & valve
	Ground surface elevation		Spring support
	Fuel line & valve		Roller support
	Railroad track		Slop line with collection tunnel
	Property line		Electrical overhead wiring
	Stair over dike		Electrical underground wiring
	Water line & fire hydrant		Ground grid conductor
	Foam line		Ground rod
	Sanitary sewer		Existing pole with new down guy
	Exploration # number		
	Aerial primary line		
	Aerial secondary line		
	Street light		

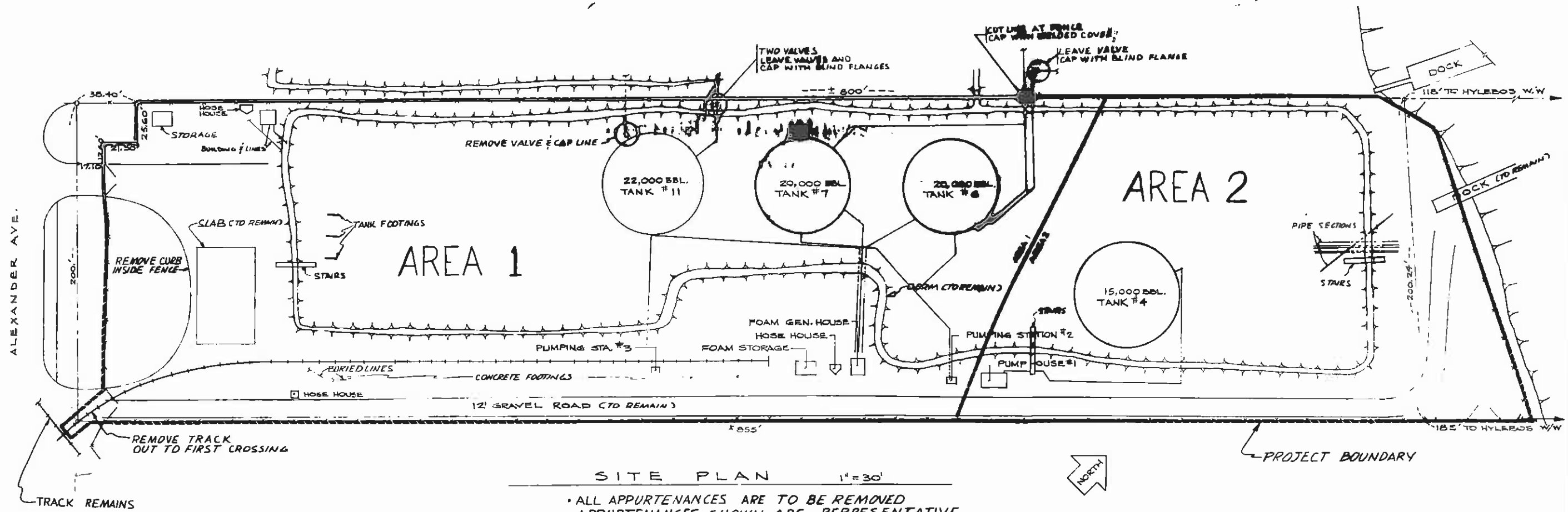
DRAWING INDEX		
DISTRICT FILE NO.	SHEET	TITLE
81.5/78-01-02	1	TOPOGRAPHIC PLAN, DEMOLITION AND REMOVAL
81.5/78-01-02	2	GRADING PLAN AND DETAILS, CIVIL
81.5/78-01-02	3	SITE PLAN AND DETAILS, MECHANICAL AND ELECTRICAL
81.5/78-01-02	4	STORAGE TANK AND DETAILS, MECHANICAL
81.5/78-01-02	5	STORAGE TANK DETAILS, MECHANICAL
81.5/78-01-02	6	DETAILS, MECHANICAL AND ELECTRICAL

SYMBOL	DESCRIPTION	DATE	APPROVAL
REVISIONS			

BOUILLON AND GRIFFITH Professional Engineers	CORPS OF ENGINEERS, U. S. ARMY OFFICE OF THE DISTRICT ENGINEER WASHINGTON
DRAWN BY: [Signature]	TACOMA P.O.L. DEPOT, WASHINGTON STORAGE DEPOT AVFUEL TOPOGRAPHIC PLAN DEMOLITION & REMOVAL
CHECKED BY: [Signature]	COLONEL, CORPS OF ENGINEERS
PREPARED BY: [Signature]	DATE: []
REVIEWED BY: [Signature]	DRAWING NUMBER: 78-01-02
CHIEF DESIGN BRANCH	SCALE: AS SHOWN
CHIEF ENGINEERING DIVISION	SHEET 1 OF 6

LINE ITEM NO. 411-151

District File No. 81.5/78-01-02



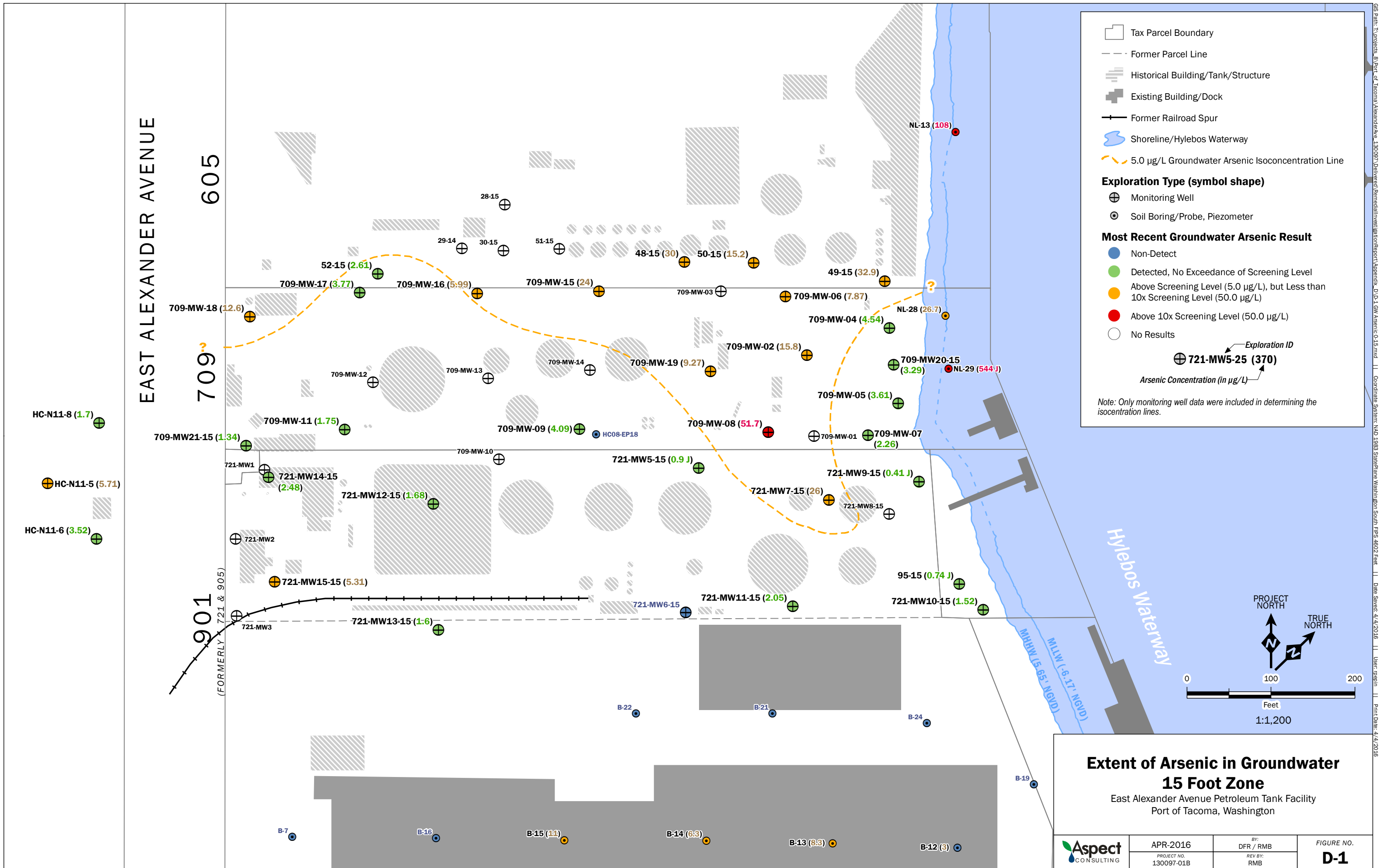
SITE PLAN 1" = 30'

- ALL APPURTENANCES ARE TO BE REMOVED
- APPURTENANCES SHOWN ARE REPRESENTATIVE NOT DETAILED CONDITIONS
- FIRE HYDRANTS TO REMAIN

DRAWN: A.L.B.	DATE: 7-28-79	PORT OF TACOMA DEMOLITION OF TANK FARM AT 721 1/2 ALEXANDER AVE	SCALE: 1" = 30'-0"
CHECKED: D.P.S.	DATE: 5-17-83		DRAWING NO.
CHECKED:	DATE:		EP-3833-12
CHECKED:	DATE:		SHEET: 1 OF 1
CONT. NO. 539	FIELD BOOK (S):		APPROVED:
APPROVED: <i>H. K. ...</i> DATE:		CHIEF ENGINEER	

NO.	REVISION	BY	APP.	DATE

Appendix D - Extent of OCC-related Metals and pH in Groundwater



	APR-2016	BY: DFR / RMB	FIGURE NO. D-1
	PROJECT NO. 130097-01B	REV BY: RMB	

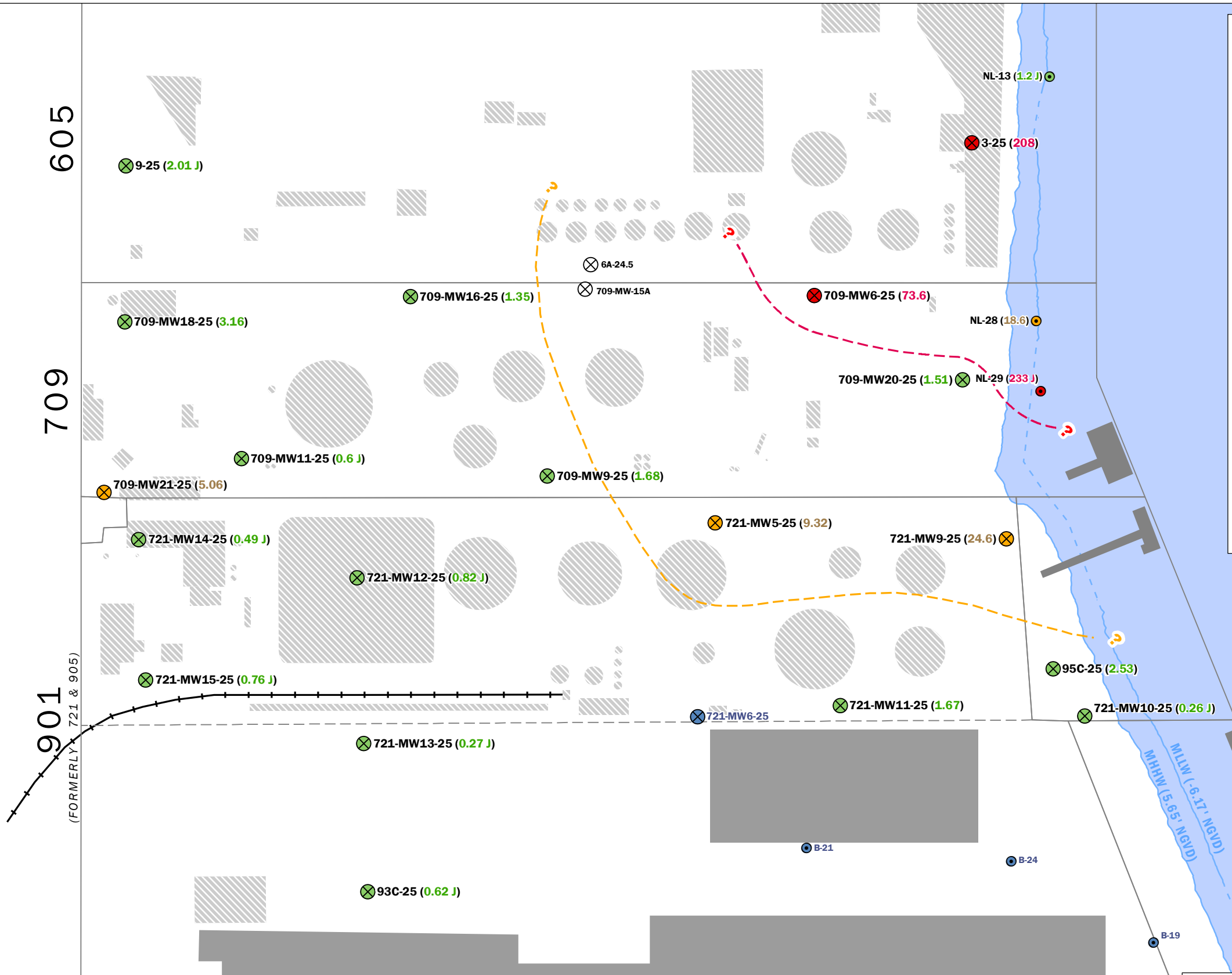
GIS Path: T:\Projects_8\Port of Tacoma\Alexander Ave - 130097\Deliverables\Investigation\Report\Appendix D\1. GW Arsenic 0-15.mxd | Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet | Date Saved: 4/4/2016 | User: rabin | Print Date: 4/4/2016

EAST ALEXANDER AVENUE

605

709

901
(FORMERLY 721 & 905)



⬜ Tax Parcel Boundary
--- Former Parcel Line
▨ Historical Building/Tank/Structure
+ Existing Building/Dock
—+— Former Railroad Spur
🌊 Shoreline/Hylebos Waterway
—○— 5.0 µg/L Groundwater Arsenic Isoconcentration Line
—○— 50 µg/L Groundwater Arsenic Isoconcentration Line

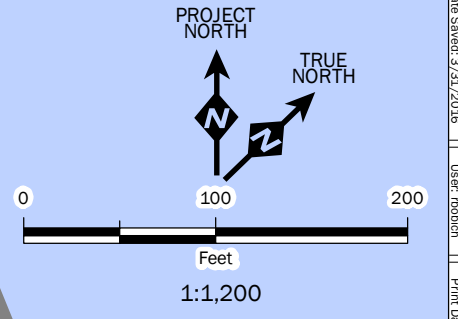
Exploration Type (symbol shape)

⊕ Monitoring Well
⊙ Soil Boring/Probe, Piezometer

Most Recent Groundwater Arsenic Result

● Non-Detect
● Detected, No Exceedance of Screening Level
● Above Screening Level (5.0 µg/L), but Less than 10x Screening Level (50.0 µg/L)
● Above 10x Screening Level (50.0 µg/L)
○ No Results

⊕ **721-MW5-25 (370)** ← Exploration ID
 Arsenic Concentration (in µg/L)



**Extent of Arsenic in Groundwater
25 Foot Zone**
 East Alexander Avenue Petroleum Tank Facility
 Port of Tacoma, Washington

	MAR-2016	BY: DFR / PPW	FIGURE NO. D-2
	PROJECT NO. 130097-01B	REV BY: RMB	

GIS Path: T:\projects_8\Port of Tacoma Alexander Ave_130097\Delivered Remedial Investigation Report\Appendix D-D-2 GW Arsenic 15-50.mxd | Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet | Date Saved: 3/31/2016 | User: rnoblich | Print Date: 3/31/2016

EAST ALEXANDER AVENUE

605

709

901

(FORMERLY 721 & 905)

Legend

- Tax Parcel Boundary
- Former Parcel Line
- Historical Building/Tank/Structure
- Existing Building/Dock
- Former Railroad Spur
- Shoreline/Hylebos Waterway
- 2.4 µg/L Groundwater Copper Isoconcentration Line
- 24 µg/L Groundwater Copper Isoconcentration Line

Exploration Type (symbol shape)

- Monitoring Well
- Soil Boring/Probe, Piezometer

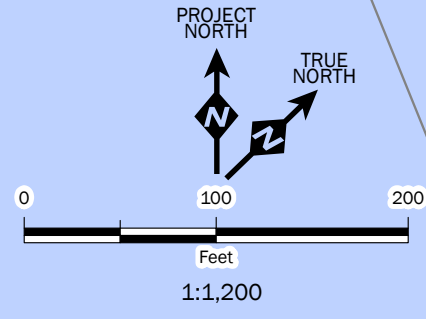
Most Recent Groundwater Copper Result

- Non-Detect
- Detected, No Exceedance of Screening Level
- Above Screening Level (2.4 µg/L), but Less than 10x Screening Level (24.0 µg/L)
- Above 10x Screening Level (24.0 µg/L)
- No Results

Example:

Exploration ID: 721-MW5-25 (370)

Copper Concentration (in µg/L): 370



**Extent of Copper in Groundwater
15 Foot Zone**
East Alexander Avenue Petroleum Tank Facility
Port of Tacoma, Washington

	MAR-2016	BY: DFR / PPW	FIGURE NO. D-3
	PROJECT NO. 130097-01B	REV BY: RMB	

GIS Path: T:\Projects_8\Port of Tacoma\Alexander Ave - 130097\Delivered\RemedialInvestigationReport\Appendix_D\03_GW_Copper_0-15.mxd | Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet | Date Saved: 3/31/2016 | User: rbooth | Print Date: 3/31/2016

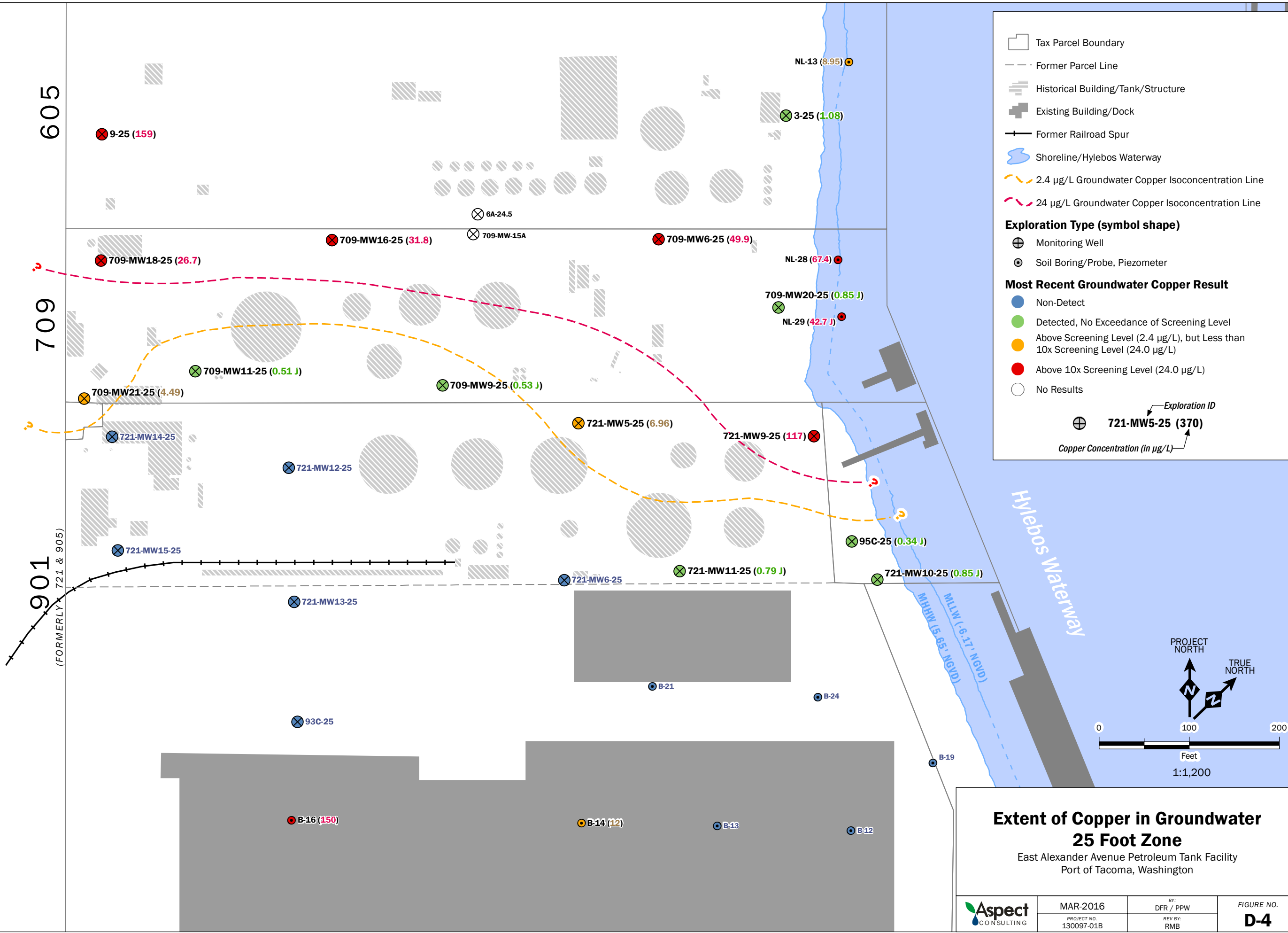
EAST ALEXANDER AVENUE

605

709

901

(FORMERLY 721 & 905)



**Extent of Copper in Groundwater
25 Foot Zone**
East Alexander Avenue Petroleum Tank Facility
Port of Tacoma, Washington

	MAR-2016	BY: DFR / PPW	FIGURE NO. D-4
	PROJECT NO. 130097-01B	REV BY: RMB	

GIS Path: T:\projects_8\Port of Tacoma Alexander Ave - 130097-Delivered Remedial Investigation Report\Appendix D-D-4 GW Copper 15-30.mxd | Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet | Data Source: 3/31/2016 | User: rhollich | Print Date: 3/31/2016

EAST ALEXANDER AVENUE

605

709

901

(FORMERLY 721 & 905)

□ Tax Parcel Boundary
- - - Former Parcel Line
▨ Historical Building/Tank/Structure
■ Existing Building/Dock
+ Former Railroad Spur
~ Shoreline/Hylebos Waterway
—○— 8.2 µg/L Groundwater Nickel Isoconcentration Line

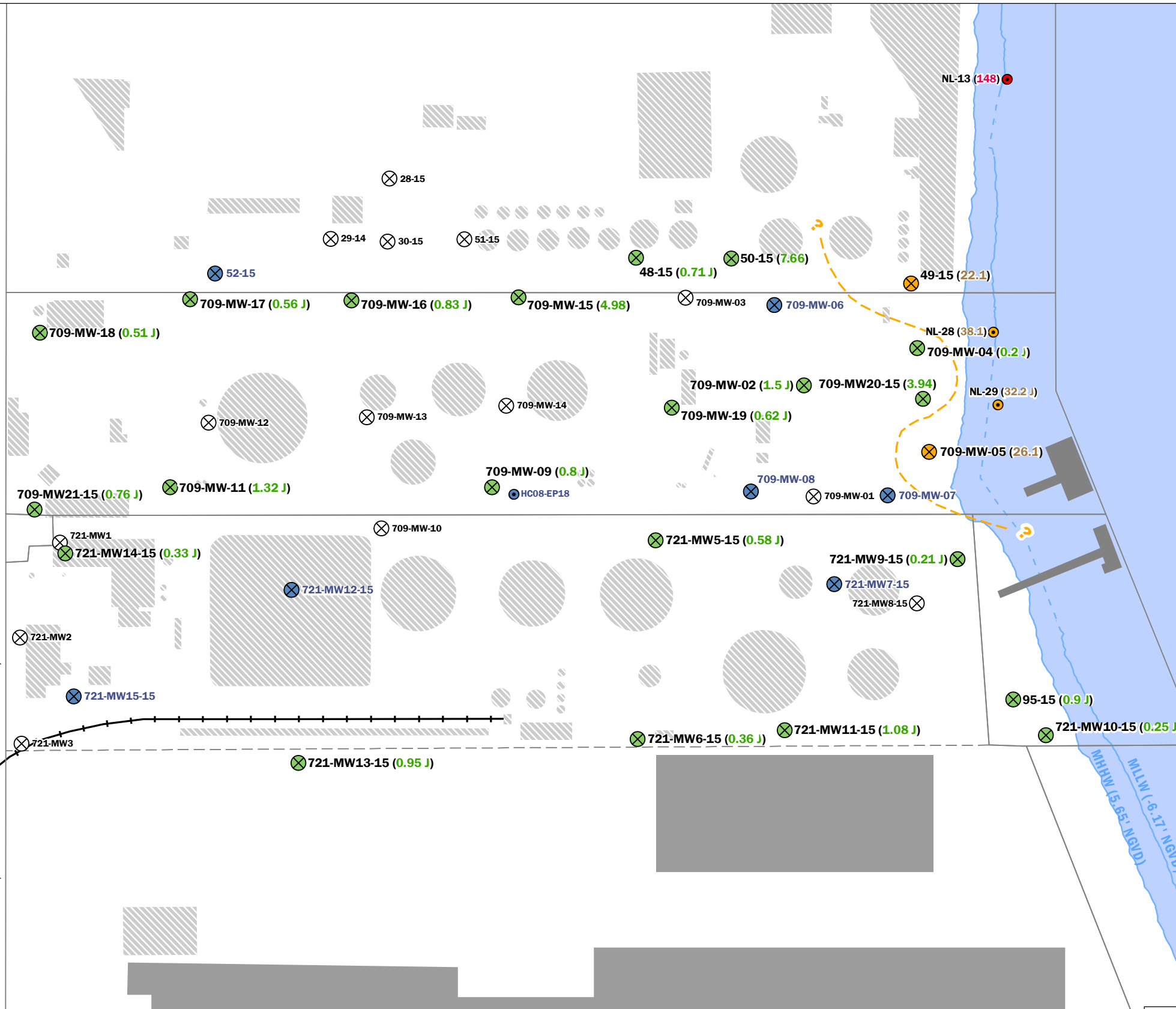
Exploration Type (symbol shape)

- ⊕ Monitoring Well
- ⊙ Soil Boring/Probe, Piezometer

Most Recent Groundwater Nickel Result

- Non-Detect
- Detected, No Exceedance of Screening Level
- Above Screening Level (8.2 µg/L), but Less than 10x Screening Level (82.0 µg/L)
- Above 10x Screening Level (82.0 µg/L)
- No Results

Exploration ID
 Nickel Concentration (in µg/L)



HC-N11-8

HC-N11-5

HC-N11-6

**Extent of Nickel in Groundwater
15 Foot Zone**
East Alexander Avenue Petroleum Tank Facility
Port of Tacoma, Washington

	MAR-2016	BY: DFR / PPW	FIGURE NO. D-5
	PROJECT NO. 130097-01B	REV BY: RMB	

GIS Path: T:\projects_8\Port of Tacoma Alexander Ave - 130097-Delivered Remedial Investigation Report\Appendix D-D-5 GW Nickel Q-15.mxd | Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet | Date Saved: 3/31/2016 | User: rbohlch | Print Date: 3/31/2016

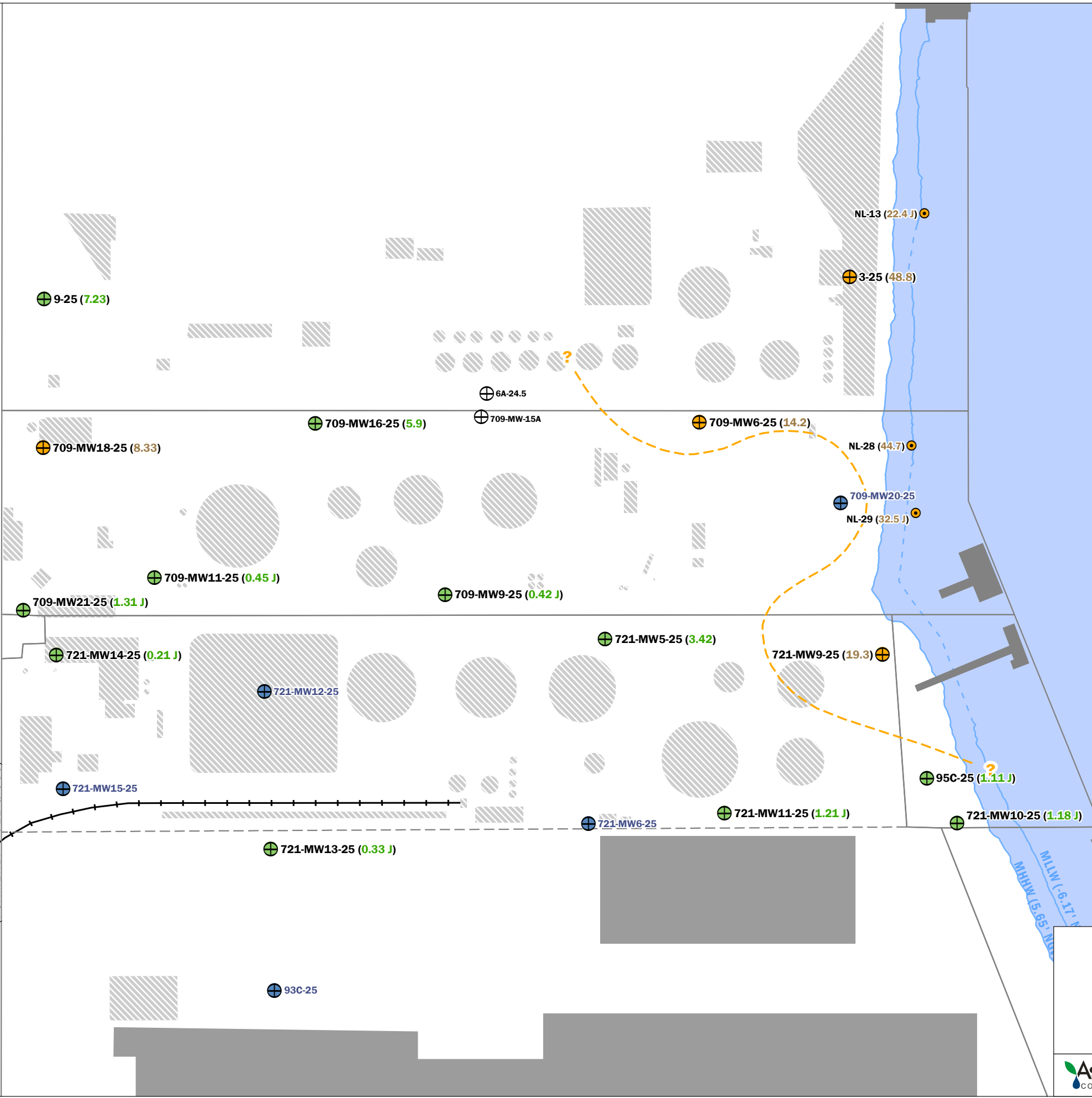
EAST ALEXANDER AVENUE

605

709

901

(FORMERLY 721 & 905)



Legend

- Tax Parcel Boundary
- Former Parcel Line
- Historical Building/Tank/Structure
- Existing Building/Dock
- Former Railroad Spur
- Shoreline/Hylebos Waterway
- 8.2 µg/L Groundwater Nickel Isoconcentration Line

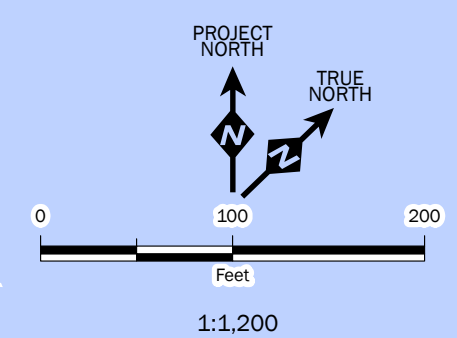
Exploration Type (symbol shape)

- Monitoring Well
- Soil Boring/Probe, Piezometer

Most Recent Groundwater Nickel Result

- Non-Detect
- Detected, No Exceedance of Screening Level
- Above Screening Level (8.2 µg/L), but Less than 10x Screening Level (82 µg/L)
- Above 10x Screening Level (82 µg/L)
- No Results

Exploration ID: 721-MW5-25 (370)
 Nickel Concentration (in µg/L): 370

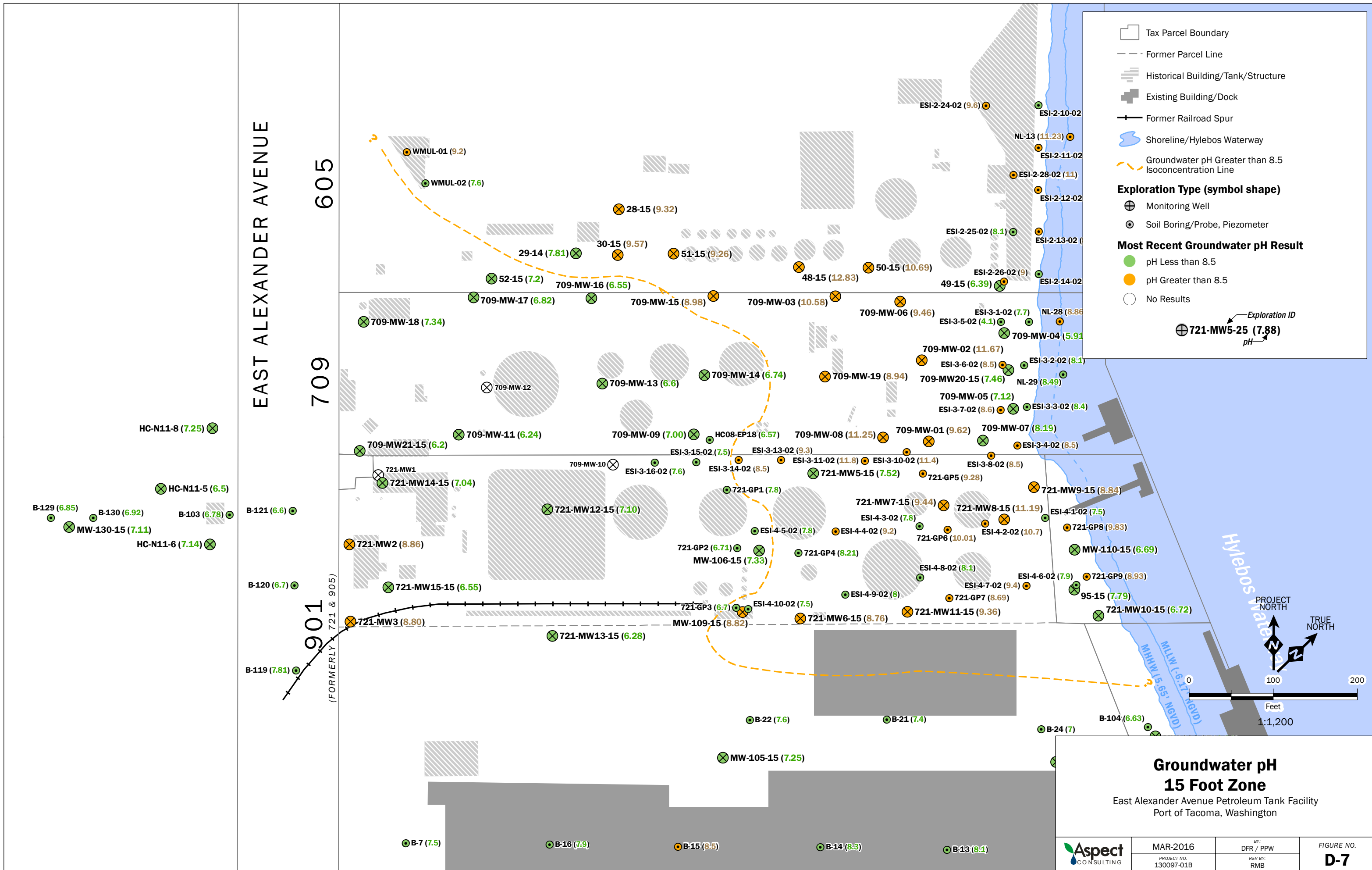


**Extent of Nickel in Groundwater
25 Foot Zone**

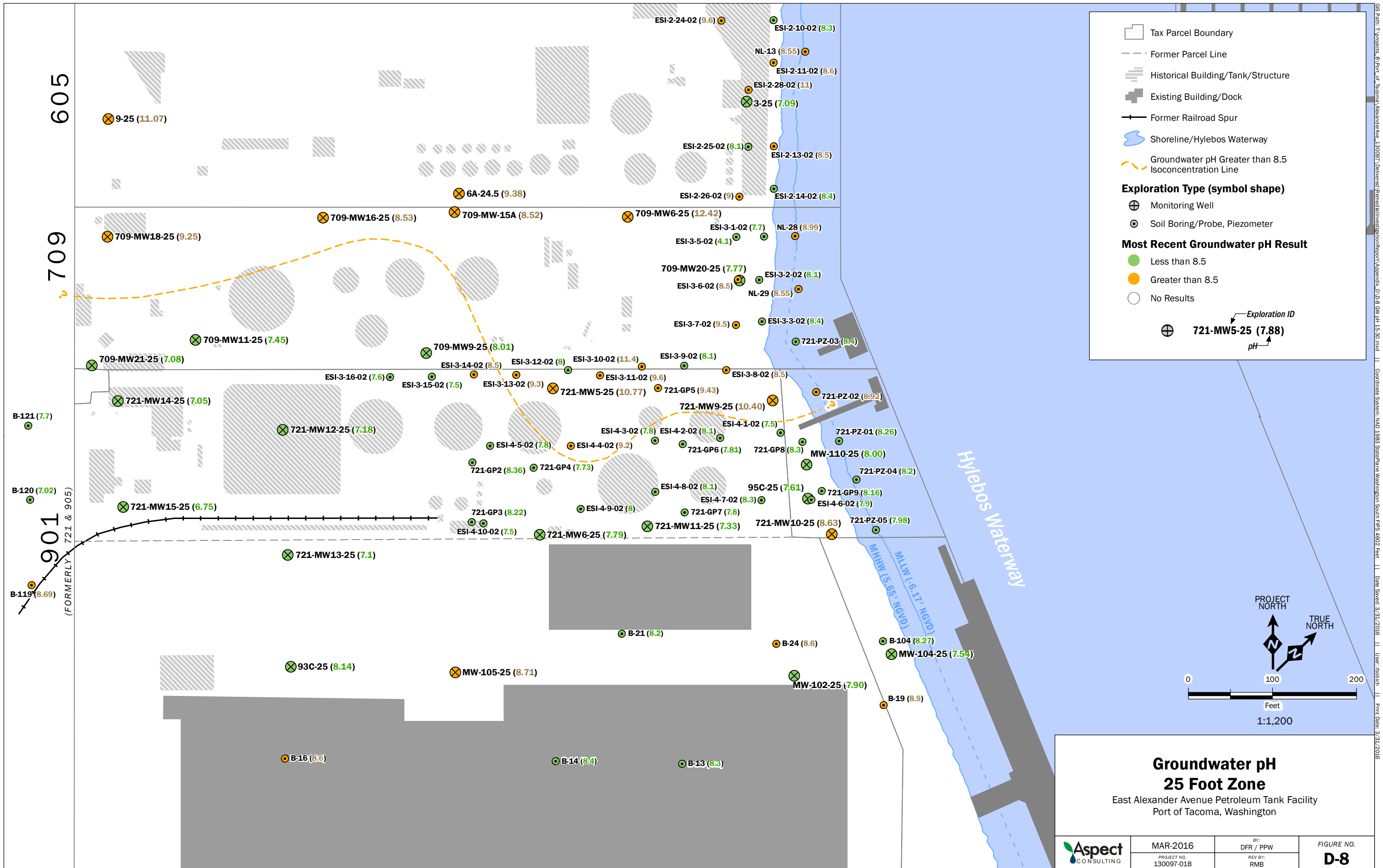
East Alexander Avenue Petroleum Tank Facility
Port of Tacoma, Washington

	MAR-2016	BY: DFR / PPW	FIGURE NO. D-6
	PROJECT NO. 130097-01B	REV BY: RMB	

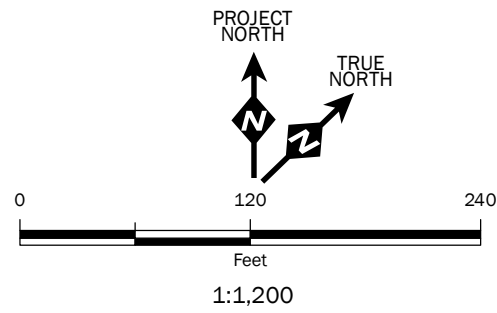
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GIS Path: T:\Projects_8\Port of Tacoma\AlexanderAve_130097\Delivered\RemedialInvestigationReport\Appendix D-D-7_GW pH 0-15.mxd | Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet | Date Saved: 3/31/2016 | User: rmbach | Print Date: 3/31/2016



GIS Path: T:\projects_8\Port of Tacoma\Alexander Ave - 130097\Delivered Remedial Investigation Report\Appendix D\08 GW pH 15-30.mxd | Coordinate System: NAD 1983 StatePlane Washington South FIPS 4902 Feet | Data Source: 3/31/2016 | User: rmb@h | Print Date: 3/31/2016



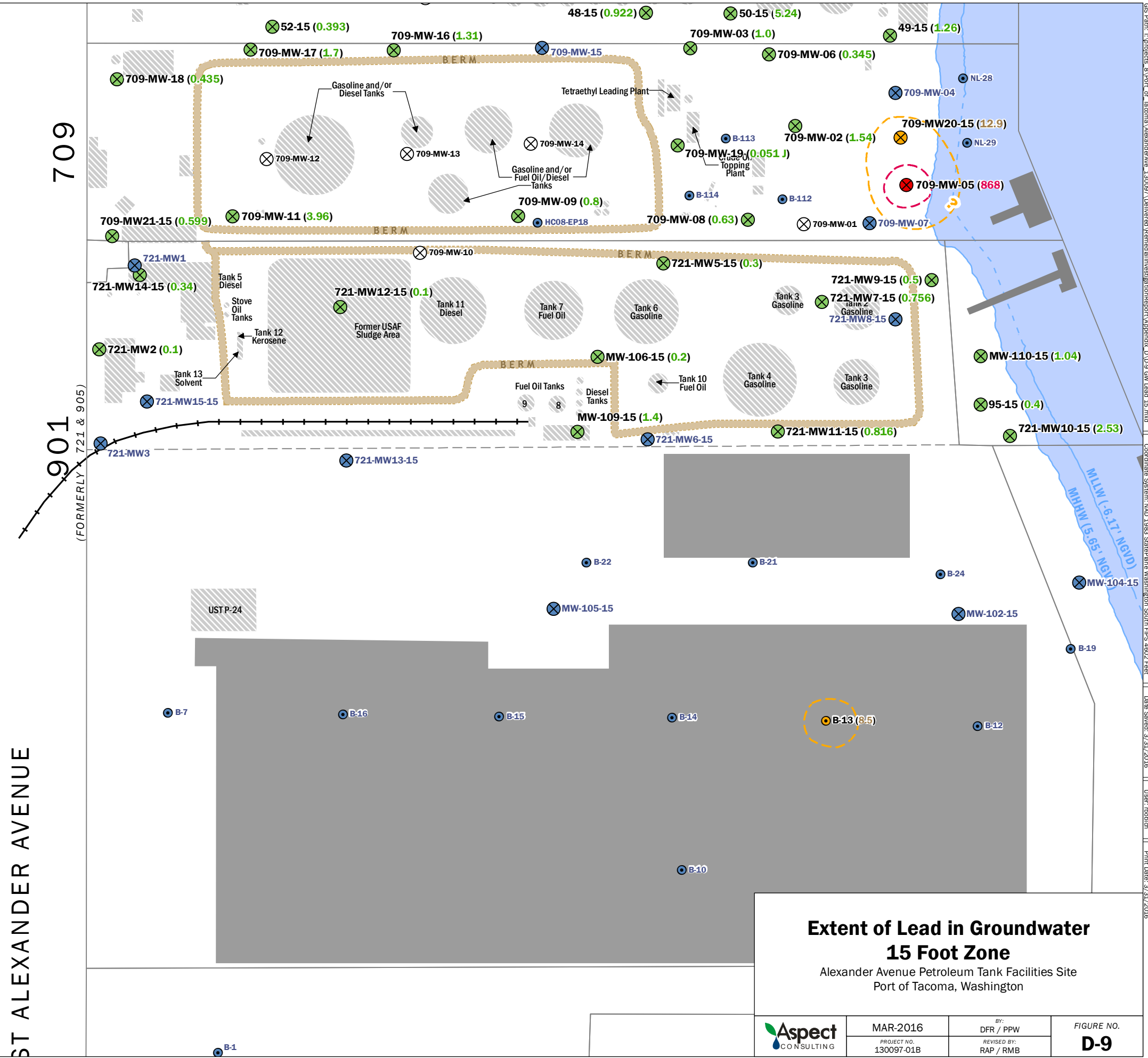
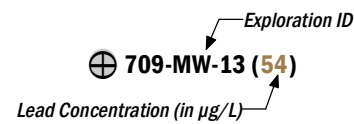
- Tax Parcel Boundary
- Former Parcel Line
- Historical Building/Tank/Structure
- Existing Building/Dock
- Former Railroad Spur
- Shoreline/Hylebos Waterway
- 8.1 µg/L Groundwater Lead Isoconcentration Line
- 81 µg/L Groundwater Lead Isoconcentration Line

Exploration Type (symbol shape)

- Monitoring Well
- Soil Boring/Probe, Piezometer
- Pre-2000 Soil Boring/Probe, Piezometer

Most Recent Groundwater Lead Result

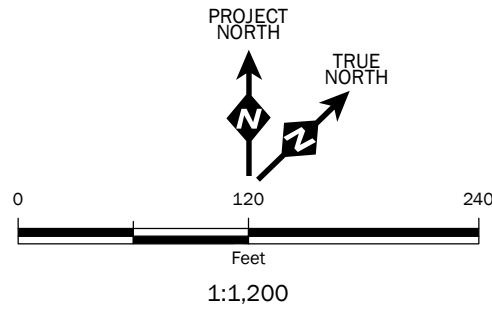
- Non-Detect
- Detected, No Exceedance of Screening Level
- Above Screening Level (8.1 µg/L), but Less than 10x Screening Level (81 µg/L)
- Above 10x Screening Level (81 µg/L)
- No Results



**Extent of Lead in Groundwater
15 Foot Zone**
Alexander Avenue Petroleum Tank Facilities Site
Port of Tacoma, Washington

	MAR-2016	BY: DFR / PPW	FIGURE NO. D-9
	PROJECT NO. 130097-01B	REVISED BY: RAP / RMB	

GIS Path: T:\projects_8\Port of Tacoma Alexander Ave - 130097-Delivered Remedial Investigation Report\Appendix D-D-9 GW Lead 15.mxd | Coordinate System: NAD 1983 StatePlane Washington South FIPS 4802 Feet | Data Source: 3/31/2016 | User: rbohler | Print Date: 3/31/2016



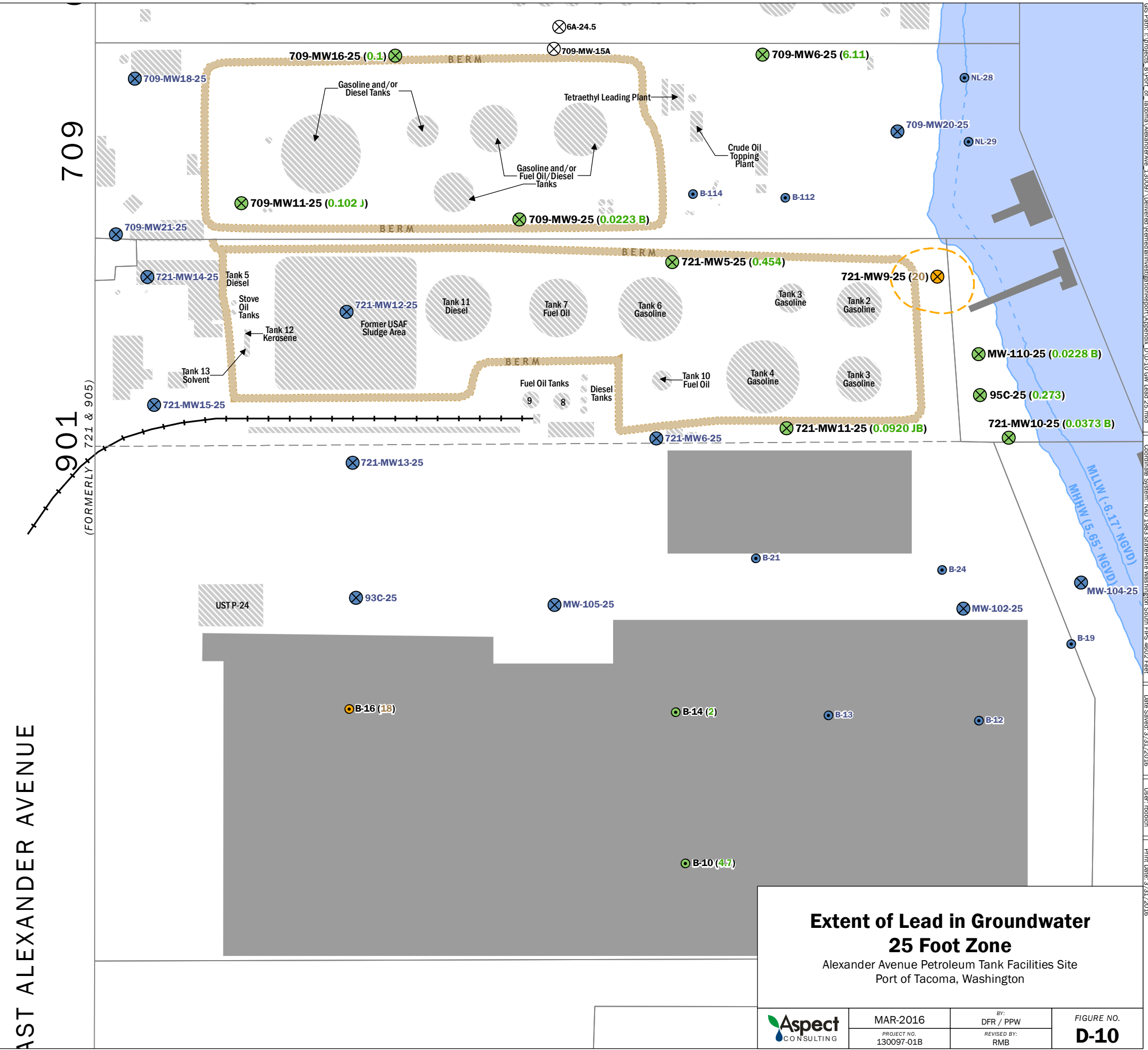
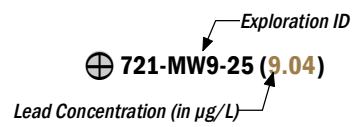
- Tax Parcel Boundary
- Former Parcel Line
- Historical Building/Tank/Structure
- Existing Building/Dock
- Former Railroad Spur
- Shoreline/Hylebos Waterway
- 8.1 µg/L Groundwater Lead Isoconcentration Line

Exploration Type (symbol shape)

- Monitoring Well
- Soil Boring/Probe, Piezometer
- Pre-2000 Soil Boring/Probe, Piezometer

Most Recent Groundwater Lead Result

- Non-Detect
- Detected, No Exceedance of Screening Level
- Above Screening Level (8.1 µg/L), but Less than 10x Screening Level (81 µg/L)
- Above 10x Screening Level (81 µg/L)
- No Results



**Extent of Lead in Groundwater
25 Foot Zone**
Alexander Avenue Petroleum Tank Facilities Site
Port of Tacoma, Washington

	MAR-2016	BY: DFR / PPW	FIGURE NO. D-10
	PROJECT NO. 130097-01B	REVISED BY: RMB	

GIS Path: T:\Projects_8\Port of Tacoma Alexander Ave - 130097 - Delivered Remedial Investigation Report\Appendix D-D-10 GW Lead 25.mxd | Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet | Date Saved: 3/31/2016 | User: jdobbin | Print Date: 3/31/2016

APPENDIX E - Lab and Data Validation Reports**

****Lab data reports are
available on CD in the hard
copy site files at Ecology
Southwest Regional Office**

Data Validation Report

**Port of Tacoma Alexander Avenue Petroleum Tank Facilities Site RI/FS
Tacoma, Washington**

**August & September 2014 Geo-probes
Soil and Groundwater Samples**

Laboratory SDGs:

YY09, YY13, YY14, YZ69, YZ76, ZB08, ZB09

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ACRONYMS

%D	percent difference
%D_f	percent drift
%R	percent recovery
%RSD	percent relative standard deviation
ARI	Analytical Resources, Inc. - Tukwila, Washington
BFB	bromofluorobenzene
CCB	continuing calibration blank
CCV	continuing calibration verification
CF	calibration factor
CLP	U.S. EPA Contract Laboratory Program
COC	chain-of-custody
EPA	U.S. Environmental Protection Agency
GC/FID	gas chromatography/flame ionization detector
GC/MS	gas chromatograph/mass spectrometer
ICAL	initial calibration
ICB	initial calibration blank
ICP/AES	inductively coupled plasma/ atomic emission spectrometer
ICV	initial calibration verification
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MDL	method detection limit
µg/kg	microgram per kilogram
µg/L	microgram per liter
mg/kg	milligram per kilogram
mg/L	milligram per liter
MS	matrix spike
MSD	matrix spike duplicate
NFGs	CLP National Functional Guidelines for Data Review (EPA 2014)
QA/QC	quality assurance/quality control
RF	response factor
RL	reporting limit
RPD	relative percent difference
RRT	relative retention time
SDG	sample delivery group

VOCs volatile organic compounds

INTRODUCTION

This report presents and discusses findings of the data validation performed on analytical data for soil samples collected during August and September 2014 for the referenced project. The laboratory reports validated herein were submitted by Analytical Resources, Inc. (ARI) in Tukwila, Washington.

A level III data validation was performed on this laboratory report. The validation followed the procedures specified in USEPA CLP Functional Guidelines ([NFGs], EPA 2014), with modifications to accommodate project and analytical method requirements. The numerical quality assurance/quality control (QA/QC) criteria applied to the validation were in accordance with those specified in the quality assurance project plans ([QAPPs], Aspect 2014) and the current performance-based control limits established by the laboratory (laboratory control limits). Instrument calibration, frequency of QC analyses, and analytical sequence requirements were evaluated against the respective analytical methods.

Validation findings are discussed in each section pertinent to the QC parameter for each type of analysis. Qualified data with applied data qualifiers are summarized in the **Summary** section at the end of this report.

Samples and the associated analyses validated herein are summarized as follows:

Field Sample ID	Laboratory Sample ID	Sampling Date	Matrix	Analysis			
				VOC	TPH-Gx	TPH-Dx	Lead
B129-6-10-GW	14-17671-YY09A	08/25/14	Water	X			
B129-20-24-GW	14-17672-YY09B	08/25/14	Water	X			
B130-6-10-GW	14-17673-YY09C	08/25/14	Water	X			
B130-20-24-GW	14-17674-YY09D	08/25/14	Water	X			
B120-6.5-7.5	14-17704-YY13A	08/26/14	Soil	X	X	X	
B120-22-24	14-17705-YY13B	08/26/14	Soil	X	X	X	
B121-6-7	14-17706-YY13C	08/26/14	Soil	X	X	X	
B121-22-24	14-17707-YY13D	08/26/14	Soil	X	X	X	
B119-7-9	14-17708-YY13E	08/26/14	Soil	X	X	X	
B119-22-24	14-17709-YY13F	08/26/14	Soil	X	X	X	
B104-2-3.5	14-17710-YY13G	08/25/14	Soil	X	X	X	X
B104-10-12	14-17711-YY13H	08/25/14	Soil	X	X	X	
B104-22-24	14-17712-YY13I	08/25/14	Soil	X	X	X	
B129-3-5	14-17713-YY13J	08/25/14	Soil	X	X	X	
B129-12-14	14-17714-YY13K	08/25/14	Soil	X	X	X	
B129-21-23	14-17715-YY13L	08/25/14	Soil	X	X	X	

Field Sample ID	Laboratory Sample ID	Sampling Date	Matrix	Analysis			
				VOC	TPH-Gx	TPH-Dx	Lead
B120-6-10-GW	14-17716-YY13M	08/26/14	Water	X	X		
B120-20-24-GW	14-17717-YY13N	08/26/14	Water	X	X		
B121-6-10-GW	14-17718-YY13O	08/26/14	Water	X	X		
B121-20-24-GW	14-17719-YY13P	08/26/14	Water	X	X		
B119-6-10-GW	14-17720-YY13Q	08/26/14	Water	X	X		
B119-20-24-GW	14-17721-YY13R	08/26/14	Water	X	X		
B104-6-10-GW	14-17722-YY13S	08/25/14	Water	X	X		
B104-20-24-GW	14-17723-YY13T	08/25/14	Water	X	X		
TRIP BLANK 082514	14-17681-YY13U	08/25/14	Water	X	X		
B130-3-5	14-17728-YY14A	08/25/14	Soil	X	X	X	
B130-8-10	14-17729-YY14B	08/25/14	Soil	X	X	X	
B130-13-15	14-17730-YY14C	08/25/14	Soil	X	X	X	
B130-22-24	14-17731-YY14D	08/25/14	Soil	X	X	X	
B103-3-4	14-17732-YY14E	08/25/14	Soil	X	X	X	
B103-22-24	14-17733-YY14F	08/25/14	Soil	X	X	X	
B103-7-8	14-17734-YY14G	08/25/14	Soil	X	X	X	
B129-6-10-GW	14-17735-YY14H	08/25/14	Water		X		
B129-20-24-GW	14-17736-YY14I	08/25/14	Water		X		
B130-6-10-GW	14-17737-YY14J	08/25/14	Water		X		
B130-20-24-GW	14-17738-YY14K	08/25/14	Water		X		
B103-6-10-GW	14-17739-YY14L	08/25/14	Water	X	X		
B103-20-24-GW	14-17740-YY14M	08/25/14	Water	X	X		
TRIP BLANK 082514	14-17741-YY14N	08/25/14	Water	X	X		
B132-20-24-GW	14-18499-YZ69A	09/10/14	Water	X			
B131-20-24-GW	14-18500-YZ69B	09/10/14	Water	X			
B133-20-24-GW	14-18501-YZ69C	09/10/14	Water	X			
B134-20-24-GW	14-18502-YZ69D	09/10/14	Water	X			
B132-20-21	14-18513-YZ76A	09/10/14	Soil	X	X	X	
B131-20-21	14-18514-YZ76B	09/10/14	Soil	X	X	X	
B133-21-22	14-18515-YZ76C	09/10/14	Soil	X	X	X	
B134-21-22	14-18516-YZ76D	09/10/14	Soil	X	X	X	
B132-20-24-GW	14-18517-YZ76E	09/10/14	Water		X		
B131-20-24-GW	14-18518-YZ76F	09/10/14	Water		X		
B133-20-24-GW	14-18519-YZ76G	09/10/14	Water		X		
B134-20-24-GW	14-18520-YZ76H	09/10/14	Water		X		

Field Sample ID	Laboratory Sample ID	Sampling Date	Matrix	Analysis			
				VOC	TPH-Gx	TPH-Dx	Lead
TripBlanks-091014	14-18521-YZ76I	09/10/14	Water	X	X		
B135-20-24-GW	14-19382-ZB08A	09/19/14	Water	X			
B136-20-24-GW	14-19383-ZB08B	09/19/14	Water	X			
B139-20-24-GW	14-19384-ZB08C	09/19/14	Water	X			
B137-20-24-GW	14-19385-ZB08D	09/19/14	Water	X			
B138-20-24-GW	14-19386-ZB08E	09/19/14	Water	X			
B135-22-24	14-19387-ZB09A	09/19/14	SOIL	X	X	X	
B136-22-24	14-19388-ZB09B	09/19/14	SOIL	X	X	X	
B139-22-24	14-19389-ZB09C	09/19/14	SOIL	X	X	X	
B137-22-24	14-19390-ZB09D	09/19/14	SOIL	X	X	X	
B138-22-24	14-19391-ZB09E	09/19/14	SOIL	X	X	X	
B135-20-24-GW	14-19392-ZB09F	09/19/14	Water		X		
B136-20-24-GW	14-19393-ZB09G	09/19/14	Water		X		
B139-20-24-GW	14-19394-ZB09H	09/19/14	Water		X		
B137-20-24-GW	14-19395-ZB09I	09/19/14	Water		X		
B138-20-24-GW	14-19396-ZB09J	09/19/14	Water		X		
TripBlanks-091914	14-19397-ZB09K	09/19/14	Water	X	X		

Notes:

TPH-Dx - Diesel and motor oil range total petroleum hydrocarbon

TPH-Gx - Gasoline range total petroleum hydrocarbon

VOC - Volatile organic compound

X - The analysis was requested and performed on the sample.

The analytical parameters requested for the samples, the respective analytical methods, and the analytical laboratories are summarized below:

Parameter	Analytical Method	Analytical Laboratory
Volatile Organic Compounds (VOCs)	SW846 Method 8260C	Analytical Resources, Inc. Tukwila, Washington
TPH - Gasoline Range	NWTPH-Gx	
TPH - Diesel & Motor Oil Range	NWTPH-Dx	
Lead	SW846 Method 6010C	

Notes:

1. SW846 - *USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition, December 1996.
2. NWTPH Methods – *Washington State Department of Ecology, Analytical Methods for Petroleum Hydrocarbons*, Publication No. ECY 97-602, June 1997.

DATA VALIDATION FINDINGS

1. VOCs by GC/MS (EPA Method SW8260C)

1.1 Sample Management and Holding Time

Samples were received in the laboratory intact and in consistence with the accompanying chain-of-custody (COC) documentation. No anomalies were identified in relation to sample preservation, handling, and transport.

Soil and water samples should be preserved at the time of collection, and analyzed within 14 days of collection. All samples were preserved as required and analyzed within the required holding times.

1.2 GC/MS Instrument Performance Check

The method require that (1) gas chromatograph/mass spectrometer (GC/MS) tuning analysis be performed, using bromofluorobenzene (BFB), at the beginning of each 12-hour period prior to any analysis, and (2) specific mass ions meet the criteria provided in the method. All instrument performance checks met the requirements.

1.3 Initial Calibration (ICAL)

The ICAL criteria require that (1) if linear average RFs is chosen as the quantitation option, at least five standards at different concentrations should be analyzed and the percent relative standard deviation (%RSD) of response factors (RFs) be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be >0.995 , and (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be >0.99 . ICALs either met the requirements or the outliers had no adverse effects on data usability (*e.g.*, %RSD $>20\%$ for a compound not detected in samples).

An initial calibration verification (ICV) standard (second source standard) was analyzed to verify the calibration curve. Percent difference (%D) values were either within $\pm 30\%$, or the exceedance had no adverse effects on data usability (*e.g.*, biased high ICV recovery for a compound not detected in samples).

1.4 Calibration Verification (CCV)

The CCV criteria requires that (1) continuing calibrations be analyzed at the beginning of each 12-hour analysis period prior to the analysis of method blank and samples, and (2) the %D value be within $\pm 20\%$.

Calibration verifications either met the requirements, or the exceedance had no adverse effects on data usability (e.g., biased high CCV recovery for a compound not detected in samples), except for the following:

SDG	CCV ID	Compound	%D	Bias	Affected Sample	Data Qualifier
YY09	Instrument: NT2 8/28/14, 12:07	Acetone	-22.8%	Low	B129-20-24-GW B129-6-10-GW B130-20-24-GW B130-6-10-GW	J UJ J UJ
YY13	Instrument: NT15 9/4/14, 12:50	Carbon Disulfide	29.2%	High	B104-10-12 B104-22-24 B119-22-24 B119-7-9 B120-22-24 B121-22-24 B129-12-14 B129-21-23	J
YY13	Instrument: NT15 9/4/14, 12:50	1,2,4-Trichlorobenzene Carbon tetrachloride Bromoform 1,2,3-Trichlorobenzene Naphthalene	-22.7% -22.4% -28.0% -22.6% -27.6%	Low	B104-10-12 B104-22-24 B104-2-3.5 B119-22-24 B119-7-9 B120-22-24 B120-6.5-7.5 B121-22-24 B121-6-7 B129-12-14 B129-21-23 B129-3-5	UJ
YY13	Instrument: NT2 8/29/14, 10:48	2-Butanone 1,1,2-Trichloroethane	-25.5% -20.1%	Low	B104-20-24-GW B104-6-10-GW B119-20-24-GW B119-6-10-GW B120-20-24-GW B120-6-10-GW B121-20-24-GW B121-6-10-GW TRIP BLANK 082514	UJ
YY14	Instrument: NT15 9/4/14, 12:50	Carbon Disulfide	29.2%	High	B103-22-24 B130-13-15 B130-22-24 B130-8-10	J
YY14	Instrument: NT15 9/4/14, 12:50	1,2,4-Trichlorobenzene Carbon tetrachloride Bromoform 1,2,3-Trichlorobenzene Naphthalene	-22.7% -22.4% -28.0% -22.6% -27.6%	Low	B103-22-24 B103-3-4 B103-7-8 B130-13-15 B130-22-24 B130-3-5 B130-8-10	UJ
YY14	Instrument: NT2 8/29/14, 10:48	2-Butanone 1,1,2-Trichloroethane	-25.5% -20.1%	Low	B103-20-24-GW B103-20-24-GW B103-6-10-GW TRIP BLANK 082514	UJ

SDG	CCV ID	Compound	%D	Bias	Affected Sample	Data Qualifier
YZ76	Instrument: NT5 9/17/14, 10:55	Carbon Disulfide	24.4%	High	B131-20-21 B132-20-21 B133-21-22	J
ZB09	Instrument: NT5 9/30/14, 12:20	Acrolein Vinyl acetate <i>trans</i> -1,2-Dichloroethene Acetone Methylene chloride	-24.2% -23.0% -21.0% -24.4% -33.1%	Low	B135-22-24 B136-22-24 B139-22-24 B137-22-24 B138-22-24 TripBlanks-091914	UJ

1.5 Blanks

Method Blanks: Method blanks were prepared and analyzed as required. Target compounds were not detected at or above the method detection limits (MDLs) in method blanks, except methylene chloride in two of the method blanks.

Low-level (less than or slightly greater than the reporting limits [RLs]) methylene chloride and acetone were consistently detected in samples. Although not always detected in method blanks at levels greater than the RLs, these compounds are common laboratory contaminants, and sample result might be affected. Methylene chloride and acetone results less than five times (5x) the RLs were considered affected by the potential laboratory artifact and qualified (U) as non-detected at the reported values.

Trip Blanks: Samples TRIP BLANK 082514, TRIP BLANK 082514, TripBlanks-091014, and TripBlanks-091914 were trip blanks. Target compounds were not detected at or above the MDLs in these samples.

1.6 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and LCSD were prepared and analyzed as required by the method. Percent recovery (%R) and relative percent difference (RPD) values either met the project control limits, or the outliers had no adverse effects on data usability (*e.g.*, biased high recovery for a compound not detected in samples).

1.7 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were either within the project control limits, or the outliers had no adverse effects on data quality (*e.g.*, biased high recovery and associated compounds not detected in the sample).

1.8 Matrix Spike (MS) and MS Duplicate (MSD)

MS and MSD analyses were not performed on project samples in these SDGs.

1.9 Internal Standards

The method requires that (1) internal standard retention time be within ± 30 seconds from that of the associated 12-hour calibration standard, and (2) the area counts of all internal standards be within -50% to $+100\%$ of the associated 12-hour calibration standard. All internal standards in the sample and associated QC analyses met the criteria.

1.10 Reporting Limit and Target Compound Quantitation

RLs were supported with adequate initial calibration concentrations. Due to high levels of selected target compounds in a number of samples, the analyses were performed on the methanol-preserved vials or samples were diluted for analysis. As a consequence, RLs were elevated for all compounds in these samples, including those potentially at levels less than the original RLs. The raised RLs were limited to sample matrices; the reported RLs were considered the best-possible quantitation limits for the samples. No further action was required.

1.11 Field Duplicates

Field duplicates were not submitted for VOCs analyses in these SDGs.

1.12 Overall Assessment of VOCs Data Usability

2-Chloroethylvinyl ether is known to break down in acidic water samples. Since all water samples in these SDGs were acid preserved, 2-chloroethylvinyl ether results for all water samples were qualified (R) and rejected.

VOCs data are of known quality and acceptable for use, as qualified.

2. TPH-Gasoline by GC/FID (Method NWTPH-Gx)

2.1 Sample Management and Holding Times

No anomalies were identified in relation to sample preservation, handling, and transport as discussed in Section 1.1.

Soil and water samples should be preserved at the time of collection, and analyzed within 14 days of collection. All samples were preserved as required and analyzed within the required holding times.

2.2 Initial Calibration (ICAL)

The method criteria require that (1) if linear average RFs is chosen as the quantitation option, the %RSD of RFs be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be ≥ 0.995 , (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be ≥ 0.990 , and (4) the back-calculated %D value for each calibration standard be within $\pm 15\%$. Initial calibration met the criteria for all target compounds.

An ICV (second source) standard was analyzed to verify the calibration curve. %D values were within $\pm 20\%$.

2.3 Calibration Verification

Continuing calibration verification (CCV) analyses were performed at the required frequency for all analytical sequences as required by the method. The %D values for all CCVs met the method criterion ($\pm 20\%$).

2.4 Blanks

Method Blanks: Method blanks were prepared and analyzed as required. TPH-Gasoline was not detected at or above the MDLs in the method blanks.

Trip Blanks: Samples TRIP BLANK 082514, TRIP BLANK 082514, TripBlanks-091014, and TripBlanks-091914 were trip blanks. TPH-Gasoline was not detected at or above the MDLs in these samples.

2.5 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were within the project control limits.

2.6 Matrix Spike and Matrix Spike Duplicate

MS/MSD analyses were not performed on project samples in these SDGs.

2.7 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and LCSD analyses were performed as required by the method. All %R and RPD values were within the laboratory control limits.

2.8 Reporting Limits and Target Compound Quantitation

Sample-specific RLs were supported with adequate initial calibration concentrations.

2.9 Field Duplicates

Field duplicates were not submitted for TPH-Gasoline analyses in these SDGs.

2.10 Overall Assessment of TPH-Gasoline Data Usability

TPH-Gasoline data are of known quality and acceptable for use, as qualified.

3. TPH-Diesel & Motor Oil by GC/FID (Method NWTPH-Dx)

3.1 Holding Time

No anomalies were identified in relation to sample preservation, handling, and transport as discussed in Section 1.1.

Soil and acid-preserved water samples should be extracted within 14 days of collection. Extracts should be analyzed within 40 days of extraction. All samples were extracted and analyzed within the recommended holding times.

3.2 Initial Calibration

The method criteria require that (1) if linear average RFs is chosen as the quantitation option, the %RSD of RFs be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be ≥ 0.995 , (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be ≥ 0.990 , and (4) the back-calculated %D value for each calibration standard be within $\pm 15\%$. Initial calibration met the criteria for all target compounds.

An ICV (second source) standard was analyzed to verify the calibration curve. %D values were within $\pm 20\%$.

3.3 Calibration Verification

The method requires that (1) a mid-range check standard be analyzed prior to and after each analytical batch, and (2) the percent drift (%D) value be within $\pm 20\%$ of the true value.

Calibration verification was performed at required frequency. The %D values were either within the $\pm 20\%$ criterion or at levels that had no adverse effects on data quality (e.g., high-bias %D value where the target compound was not detected in associated sample).

3.4 Method Blanks

Method blanks were prepared and analyzed as required. TPH-Diesel and TPH-Motor Oil were not detected at or above the MDLs in the method blanks.

3.5 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were either within the project control limits, or outside the control limits due to matrix interference, or diluted below quantitation limits due to high levels of target or non-target compounds in the samples. No data qualifying actions were taken in these cases.

3.6 Matrix Spike (MS) and MS Duplicate (MSD)

MS and MSD analyses were not performed on project samples in these SDGs.

3.7 Laboratory Control Sample (LCS) and LCSD Duplicate (LCSD)

LCS and LCSD analyses were performed as required by the method. All %R and RPD values were within the laboratory control limits.

3.8 Reporting Limits and Target Compound Quantitation

The reported RLs were supported with adequate ICAL concentrations, and met the project requirements.

3.9 Field Duplicates

Field duplicates were not submitted for TPH-Diesel and TPH-Motor Oil analyses in these SDGs.

3.10 Overall Assessment of TPH-Diesel and Motor Oil Data Usability

TPH-Diesel and TPH-Motor Oil data are of known quality and acceptable for use, as qualified.

4. Lead by ICP/AES (SW846 Method 6010C)

4.1 Sample Management and Holding Times

No anomalies were identified in relation to sample preservation, handling, and transport, as discussed in Section 1.1.

Soil samples should be analyzed within 180 days for lead. The sample was analyzed within the required holding time.

4.2 Initial Calibration (ICAL)

The ICP/AES method requires that (1) a blank and one calibration standard be used in establishing the analytical curve, and (2) the average of replicate exposures be reported for all standards, QC, and sample analyses. The ICAL met the method requirements.

4.3 Calibration Verification (ICV and CCV)

Initial calibration verifications (ICVs) and continuing calibration verifications (CCVs) for ICP/AES and CVAA were analyzed at the required frequency. The %R values either met the control criteria (90 – 110%).

4.4 Blanks

Calibration Blanks: Initial calibration blanks (ICBs) and continuing calibration blanks (CCBs) were not analyzed after calibration verification standards. Target analytes were either not detected at or above the RLs in the ICBs and CCBs, or sample results affected by the ICB/CCB detections were qualified as results of detections in preparation blanks.

Preparation Blanks: Preparation blanks were prepared and analyzed as required. Target analytes were not detected at or above the RLs in the preparation blanks.

4.5 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and/or LCSD analyses were performed as required by the method. The %R and RPD values were within the project control limits.

4.6 Matrix Spike (MS)

MS analysis was not performed on a project sample in this SDG.

4.7 Laboratory Duplicate Analysis

Laboratory duplicate analysis was not performed on a project sample in this SDG.

4.8 Method Reporting Limits and Analyte Quantitation

Sample-specific RLs were supported with adequate initial calibration concentrations.

4.9 Field Duplicates

Field duplicates were not submitted for lead analyses in these SDGs.

4.10 Overall Assessment of Lead Data Usability

Lead data are of known quality and acceptable for use.

SUMMARY

Table I. Data Affected by QC Anomalies:

Laboratory ID	Sample ID	Analyte	Qualifier	Qualified Reason
YY13M	B120-6-10-GW	1,1,2-Trichloroethane	UJ	CCV %D<LCL
YY13N	B120-20-24-GW	1,1,2-Trichloroethane	UJ	CCV %D<LCL
YY13O	B121-6-10-GW	1,1,2-Trichloroethane	UJ	CCV %D<LCL
YY13P	B121-20-24-GW	1,1,2-Trichloroethane	UJ	CCV %D<LCL
YY13Q	B119-6-10-GW	1,1,2-Trichloroethane	UJ	CCV %D<LCL
YY13R	B119-20-24-GW	1,1,2-Trichloroethane	UJ	CCV %D<LCL
YY13S	B104-6-10-GW	1,1,2-Trichloroethane	UJ	CCV %D<LCL
YY13T	B104-20-24-GW	1,1,2-Trichloroethane	UJ	CCV %D<LCL
YY13U	TRIP BLANK 082514	1,1,2-Trichloroethane	UJ	CCV %D<LCL
YY14L	B103-6-10-GW	1,1,2-Trichloroethane	UJ	CCV %D<LCL
YY14M	B103-20-24-GW	1,1,2-Trichloroethane	UJ	CCV %D<LCL
YY14N	TRIP BLANK 082514	1,1,2-Trichloroethane	UJ	CCV %D<LCL
YY13A	B120-6.5-7.5	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY13B	B120-22-24	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY13C	B121-6-7	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY13D	B121-22-24	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY13E	B119-7-9	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY13F	B119-22-24	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY13G	B104-2-3.5	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY13H	B104-10-12	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY13I	B104-22-24	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY13J	B129-3-5	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY13K	B129-12-14	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY13L	B129-21-23	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY14A	B130-3-5	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY14B	B130-8-10	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY14C	B130-13-15	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY14D	B130-22-24	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY14E	B103-3-4	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY14F	B103-22-24	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY14G	B103-7-8	1,2,3-Trichlorobenzene	UJ	CCV %D<LCL
YY13A	B120-6.5-7.5	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL
YY13B	B120-22-24	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL
YY13C	B121-6-7	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL
YY13D	B121-22-24	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL
YY13E	B119-7-9	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL
YY13F	B119-22-24	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL
YY13G	B104-2-3.5	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL
YY13H	B104-10-12	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL
YY13I	B104-22-24	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL
YY13J	B129-3-5	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL
YY13K	B129-12-14	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL
YY13L	B129-21-23	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL
YY14A	B130-3-5	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL
YY14B	B130-8-10	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL
YY14C	B130-13-15	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL
YY14D	B130-22-24	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL
YY14E	B103-3-4	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL

Laboratory ID	Sample ID	Analyte	Qualifier	Qualified Reason
YY14F	B103-22-24	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL
YY14G	B103-7-8	1,2,4-Trichlorobenzene	UJ	CCV %D<LCL
YY13M	B120-6-10-GW	2-Butanone	UJ	CCV %D<LCL
YY13N	B120-20-24-GW	2-Butanone	UJ	CCV %D<LCL
YY13O	B121-6-10-GW	2-Butanone	UJ	CCV %D<LCL
YY13P	B121-20-24-GW	2-Butanone	UJ	CCV %D<LCL
YY13Q	B119-6-10-GW	2-Butanone	UJ	CCV %D<LCL
YY13R	B119-20-24-GW	2-Butanone	UJ	CCV %D<LCL
YY13S	B104-6-10-GW	2-Butanone	UJ	CCV %D<LCL
YY13T	B104-20-24-GW	2-Butanone	UJ	CCV %D<LCL
YY13U	TRIP BLANK 082514	2-Butanone	UJ	CCV %D<LCL
YY14L	B103-6-10-GW	2-Butanone	UJ	CCV %D<LCL
YY14M	B103-20-24-GW	2-Butanone	UJ	CCV %D<LCL
YY14N	TRIP BLANK 082514	2-Butanone	UJ	CCV %D<LCL
ZB09C	B139-22-24	Acetone	UJ	CCV %D<LCL
ZB09D	B137-22-24	Acetone	UJ	CCV %D<LCL
ZB09E	B138-22-24	Acetone	UJ	CCV %D<LCL
ZB09K	TripBlanks-091914	Acetone	UJ	CCV %D<LCL
ZB09A	B135-22-24	Acrolein	UJ	CCV %D<LCL
ZB09B	B136-22-24	Acrolein	UJ	CCV %D<LCL
ZB09C	B139-22-24	Acrolein	UJ	CCV %D<LCL
ZB09D	B137-22-24	Acrolein	UJ	CCV %D<LCL
ZB09E	B138-22-24	Acrolein	UJ	CCV %D<LCL
ZB09K	TripBlanks-091914	Acrolein	UJ	CCV %D<LCL
YY13A	B120-6.5-7.5	Bromoform	UJ	CCV %D<LCL
YY13B	B120-22-24	Bromoform	UJ	CCV %D<LCL
YY13C	B121-6-7	Bromoform	UJ	CCV %D<LCL
YY13D	B121-22-24	Bromoform	UJ	CCV %D<LCL
YY13E	B119-7-9	Bromoform	UJ	CCV %D<LCL
YY13F	B119-22-24	Bromoform	UJ	CCV %D<LCL
YY13G	B104-2-3.5	Bromoform	UJ	CCV %D<LCL
YY13H	B104-10-12	Bromoform	UJ	CCV %D<LCL
YY13I	B104-22-24	Bromoform	UJ	CCV %D<LCL
YY13J	B129-3-5	Bromoform	UJ	CCV %D<LCL
YY13K	B129-12-14	Bromoform	UJ	CCV %D<LCL
YY13L	B129-21-23	Bromoform	UJ	CCV %D<LCL
YY14A	B130-3-5	Bromoform	UJ	CCV %D<LCL
YY14B	B130-8-10	Bromoform	UJ	CCV %D<LCL
YY14C	B130-13-15	Bromoform	UJ	CCV %D<LCL
YY14D	B130-22-24	Bromoform	UJ	CCV %D<LCL
YY14E	B103-3-4	Bromoform	UJ	CCV %D<LCL
YY14F	B103-22-24	Bromoform	UJ	CCV %D<LCL
YY14G	B103-7-8	Bromoform	UJ	CCV %D<LCL
YY13A	B120-6.5-7.5	Carbon tetrachloride	UJ	CCV %D<LCL
YY13B	B120-22-24	Carbon tetrachloride	UJ	CCV %D<LCL
YY13C	B121-6-7	Carbon tetrachloride	UJ	CCV %D<LCL
YY13D	B121-22-24	Carbon tetrachloride	UJ	CCV %D<LCL
YY13E	B119-7-9	Carbon tetrachloride	UJ	CCV %D<LCL
YY13F	B119-22-24	Carbon tetrachloride	UJ	CCV %D<LCL
YY13G	B104-2-3.5	Carbon tetrachloride	UJ	CCV %D<LCL
YY13H	B104-10-12	Carbon tetrachloride	UJ	CCV %D<LCL
YY13I	B104-22-24	Carbon tetrachloride	UJ	CCV %D<LCL

Laboratory ID	Sample ID	Analyte	Qualifier	Qualified Reason
YY13J	B129-3-5	Carbon tetrachloride	UJ	CCV %D<LCL
YY13K	B129-12-14	Carbon tetrachloride	UJ	CCV %D<LCL
YY13L	B129-21-23	Carbon tetrachloride	UJ	CCV %D<LCL
YY14A	B130-3-5	Carbon tetrachloride	UJ	CCV %D<LCL
YY14B	B130-8-10	Carbon tetrachloride	UJ	CCV %D<LCL
YY14C	B130-13-15	Carbon tetrachloride	UJ	CCV %D<LCL
YY14D	B130-22-24	Carbon tetrachloride	UJ	CCV %D<LCL
YY14E	B103-3-4	Carbon tetrachloride	UJ	CCV %D<LCL
YY14F	B103-22-24	Carbon tetrachloride	UJ	CCV %D<LCL
YY14G	B103-7-8	Carbon tetrachloride	UJ	CCV %D<LCL
ZB09K	TripBlanks-091914	Methylene chloride	UJ	CCV %D<LCL
YY13A	B120-6.5-7.5	Naphthalene	UJ	CCV %D<LCL
YY13B	B120-22-24	Naphthalene	UJ	CCV %D<LCL
YY13C	B121-6-7	Naphthalene	UJ	CCV %D<LCL
YY13D	B121-22-24	Naphthalene	UJ	CCV %D<LCL
YY13E	B119-7-9	Naphthalene	UJ	CCV %D<LCL
YY13F	B119-22-24	Naphthalene	UJ	CCV %D<LCL
YY13G	B104-2-3.5	Naphthalene	UJ	CCV %D<LCL
YY13H	B104-10-12	Naphthalene	UJ	CCV %D<LCL
YY13I	B104-22-24	Naphthalene	UJ	CCV %D<LCL
YY13J	B129-3-5	Naphthalene	UJ	CCV %D<LCL
YY13K	B129-12-14	Naphthalene	UJ	CCV %D<LCL
YY13L	B129-21-23	Naphthalene	UJ	CCV %D<LCL
YY14A	B130-3-5	Naphthalene	UJ	CCV %D<LCL
YY14B	B130-8-10	Naphthalene	UJ	CCV %D<LCL
YY14C	B130-13-15	Naphthalene	UJ	CCV %D<LCL
YY14D	B130-22-24	Naphthalene	UJ	CCV %D<LCL
YY14E	B103-3-4	Naphthalene	UJ	CCV %D<LCL
YY14F	B103-22-24	Naphthalene	UJ	CCV %D<LCL
YY14G	B103-7-8	Naphthalene	UJ	CCV %D<LCL
ZB09A	B135-22-24	<i>trans</i> -1,2-Dichloroethene	UJ	CCV %D<LCL
ZB09B	B136-22-24	<i>trans</i> -1,2-Dichloroethene	UJ	CCV %D<LCL
ZB09C	B139-22-24	<i>trans</i> -1,2-Dichloroethene	UJ	CCV %D<LCL
ZB09D	B137-22-24	<i>trans</i> -1,2-Dichloroethene	UJ	CCV %D<LCL
ZB09E	B138-22-24	<i>trans</i> -1,2-Dichloroethene	UJ	CCV %D<LCL
ZB09K	TripBlanks-091914	<i>trans</i> -1,2-Dichloroethene	UJ	CCV %D<LCL
ZB09A	B135-22-24	Vinyl acetate	UJ	CCV %D<LCL
ZB09B	B136-22-24	Vinyl acetate	UJ	CCV %D<LCL
ZB09C	B139-22-24	Vinyl acetate	UJ	CCV %D<LCL
ZB09D	B137-22-24	Vinyl acetate	UJ	CCV %D<LCL
ZB09E	B138-22-24	Vinyl acetate	UJ	CCV %D<LCL
ZB09K	TripBlanks-091914	Vinyl acetate	UJ	CCV %D<LCL
YY13B	B120-22-24	Carbon disulfide	J	CCV %D>UCL
YY13D	B121-22-24	Carbon disulfide	J	CCV %D>UCL
YY13E	B119-7-9	Carbon disulfide	J	CCV %D>UCL
YY13F	B119-22-24	Carbon disulfide	J	CCV %D>UCL
YY13H	B104-10-12	Carbon disulfide	J	CCV %D>UCL
YY13I	B104-22-24	Carbon disulfide	J	CCV %D>UCL
YY13K	B129-12-14	Carbon disulfide	J	CCV %D>UCL
YY13L	B129-21-23	Carbon disulfide	J	CCV %D>UCL
YY14B	B130-8-10	Carbon disulfide	J	CCV %D>UCL
YY14C	B130-13-15	Carbon disulfide	J	CCV %D>UCL

Laboratory ID	Sample ID	Analyte	Qualifier	Qualified Reason
YY14D	B130-22-24	Carbon disulfide	J	CCV %D>UCL
YY14F	B103-22-24	Carbon disulfide	J	CCV %D>UCL
YZ76A	B132-20-21	Carbon disulfide	J	CCV %D>UCL
YZ76B	B131-20-21	Carbon disulfide	J	CCV %D>UCL
YZ76C	B133-21-22	Carbon disulfide	J	CCV %D>UCL
YY09A	B129-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YY09B	B129-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YY09BDL	B129-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YY09C	B130-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YY09D	B130-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YY09DDL	B130-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YY13M	B120-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YY13N	B120-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YY13O	B121-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YY13P	B121-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YY13Q	B119-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YY13R	B119-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YY13S	B104-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YY13T	B104-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YY13U	TRIP BLANK 082514	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YY14L	B103-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YY14M	B103-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YY14N	TRIP BLANK 082514	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YZ69A	B132-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YZ69B	B131-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YZ69C	B133-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YZ69D	B134-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YZ76I	TripBlanks-091014	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
ZB08A	B135-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
ZB08B	B136-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
ZB08C	B139-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
ZB08D	B137-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
ZB08E	B138-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
ZB09K	TripBlanks-091914	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YY13A	B120-6.5-7.5	Oil Range Hydrocarbons	J	Exceeded calibration range
ZB08D	B137-20-24-GW	Chloromethane	J	Ion abundance ratio outside method criteria
YY09B	B129-20-24-GW	Acetone	U	Suspected laboratory artifact
YY13E	B119-7-9	Acetone	U	Suspected laboratory artifact
YY13F	B119-22-24	Acetone	U	Suspected laboratory artifact
YY13I	B104-22-24	Acetone	U	Suspected laboratory artifact
YY13J	B129-3-5	Acetone	U	Suspected laboratory artifact
YY13P	B121-20-24-GW	Acetone	U	Suspected laboratory artifact
YY13S	B104-6-10-GW	Acetone	U	Suspected laboratory artifact
YY14A	B130-3-5	Acetone	U	Suspected laboratory artifact
YY14B	B130-8-10	Acetone	U	Suspected laboratory artifact
YY14E	B103-3-4	Acetone	U	Suspected laboratory artifact
YY14L	B103-6-10-GW	Acetone	U	Suspected laboratory artifact
YZ69B	B131-20-24-GW	Acetone	U	Suspected laboratory artifact
YZ69C	B133-20-24-GW	Acetone	U	Suspected laboratory artifact
YZ76A	B132-20-21	Acetone	U	Suspected laboratory artifact
YZ76B	B131-20-21	Acetone	U	Suspected laboratory artifact
YY13A	B120-6.5-7.5	Methylene chloride	U	Suspected laboratory artifact

Laboratory ID	Sample ID	Analyte	Qualifier	Qualified Reason
YY13B	B120-22-24	Methylene chloride	U	Suspected laboratory artifact
YY13D	B121-22-24	Methylene chloride	U	Suspected laboratory artifact
YY13E	B119-7-9	Methylene chloride	U	Suspected laboratory artifact
YY13F	B119-22-24	Methylene chloride	U	Suspected laboratory artifact
YY13G	B104-2-3.5	Methylene chloride	U	Suspected laboratory artifact
YY13H	B104-10-12	Methylene chloride	U	Suspected laboratory artifact
YY13I	B104-22-24	Methylene chloride	U	Suspected laboratory artifact
YY13J	B129-3-5	Methylene chloride	U	Suspected laboratory artifact
YY13K	B129-12-14	Methylene chloride	U	Suspected laboratory artifact
YY13L	B129-21-23	Methylene chloride	U	Suspected laboratory artifact
YY14A	B130-3-5	Methylene chloride	U	Suspected laboratory artifact
YY14B	B130-8-10	Methylene chloride	U	Suspected laboratory artifact
YY14C	B130-13-15	Methylene chloride	U	Suspected laboratory artifact
YY14D	B130-22-24	Methylene chloride	U	Suspected laboratory artifact
YY14E	B103-3-4	Methylene chloride	U	Suspected laboratory artifact
YY14F	B103-22-24	Methylene chloride	U	Suspected laboratory artifact
YY14G	B103-7-8	Methylene chloride	U	Suspected laboratory artifact
YZ76A	B132-20-21	Methylene chloride	U	Suspected laboratory artifact
YZ76B	B131-20-21	Methylene chloride	U	Suspected laboratory artifact
YZ76C	B133-21-22	Methylene chloride	U	Suspected laboratory artifact
YZ76C	B134-21-22	Methylene chloride	U	Suspected laboratory artifact
ZB09A	B135-22-24	Acetone	UJ	Suspected laboratory artifact: CCV %D<LCL
ZB09B	B136-22-24	Acetone	UJ	Suspected laboratory artifact: CCV %D<LCL
ZB09A	B135-22-24	Methylene chloride	UJ	Suspected laboratory artifact: CCV %D<LCL
ZB09B	B136-22-24	Methylene chloride	UJ	Suspected laboratory artifact: CCV %D<LCL
ZB09D	B137-22-24	Methylene chloride	UJ	Suspected laboratory artifact: CCV %D<LCL
ZB09E	B138-22-24	Methylene chloride	UJ	Suspected laboratory artifact: CCV %D<LCL

Notes:

Sample identity suffixed with "DL" indicates the dilution analysis of the sample.

%D - Percent difference

CCV - Continuing calibration verification

LCL - Lower control limit

RPD - Relative percent difference

UCL - Upper control limit

Table II. Data Qualifiers are defined as follows:

Data Qualifier	Definition
J	The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.
U	The analyte was analyzed for, but was considered not detected at the reporting limit or reported value.
UJ	The analyte was analyzed for, and the associated quantitation limit was an estimated value.

Approved By: 
Mingta Lin, Senior Project Chemist

Date: 12/17/2014

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Data Validation Report

Port of Tacoma Alexander Avenue Petroleum Tank Facilities Site RI/FS
Tacoma, Washington

July 2014 Geo-probes Soil and Groundwater Samples

Laboratory SDGs:

YS56, YS57, YS58, YS59, YS60, YT50, YT51, YT53, YT57

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ACRONYMS

%D	percent difference
%D_f	percent drift
%R	percent recovery
%RSD	percent relative standard deviation
ARI	Analytical Resources, Inc. - Tukwila, Washington
BFB	bromofluorobenzene
CCB	continuing calibration blank
CCV	continuing calibration verification
CF	calibration factor
CLP	U.S. EPA Contract Laboratory Program
COC	chain-of-custody
CVAAS	cold vapor atomic absorption spectrometry
EPA	U.S. Environmental Protection Agency
GC/FID	gas chromatography/flame ionization detector
GC/MS	gas chromatograph/mass spectrometer
ICAL	initial calibration
ICB	initial calibration blank
ICP/AES	inductively coupled plasma/ atomic emission spectrometer
ICV	initial calibration verification
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MDL	method detection limit
µg/kg	microgram per kilogram
µg/L	microgram per liter
mg/kg	milligram per kilogram
mg/L	milligram per liter
MS	matrix spike
MSD	matrix spike duplicate
NFGs	CLP National Functional Guidelines for Data Review (EPA 2014)
QA/QC	quality assurance/quality control
RF	response factor
RL	reporting limit
RPD	relative percent difference
RRT	relative retention time

SDG sample delivery group
TCLP toxicity characteristics leaching procedure
VOCs volatile organic compounds

INTRODUCTION

This report presents and discusses findings of the data validation performed on analytical data for soil samples collected during July 2014 for the referenced project. The laboratory reports validated herein were submitted by Analytical Resources, Inc. (ARI) in Tukwila, Washington.

A level III data validation was performed on this laboratory report. The validation followed the procedures specified in USEPA CLP Functional Guidelines ([NFGs], EPA 2014), with modifications to accommodate project and analytical method requirements. The numerical quality assurance/quality control (QA/QC) criteria applied to the validation were in accordance with those specified in the quality assurance project plans ([QAPPs], Aspect 2014) and the current performance-based control limits established by the laboratory (laboratory control limits). Instrument calibration, frequency of QC analyses, and analytical sequence requirements were evaluated against the respective analytical methods.

Validation findings are discussed in each section pertinent to the QC parameter for each type of analysis. Qualified data with applied data qualifiers are summarized in the **Summary** section at the end of this report.

Samples and the associated analyses validated herein are summarized as follows:

Field Sample ID	Laboratory Sample ID	Sampling Date	Matrix	Analysis				
				VOC	TPH-Gx	TPH-Dx	Lead	pH
B128-0-3	14-14416-YS56A	07/15/14	Soil	X	X	X		
B128-6-8	14-14417-YS56B	07/15/14	Soil	X	X	X		
B127-1.5-3.5	14-14418-YS56C	07/15/14	Soil	X	X	X		
B127-6.5-8.5	14-14419-YS56D	07/15/14	Soil	X	X	X		
B108-1.5-3.5	14-14420-YS56E	07/15/14	Soil	X	X	X	X	
B108-6-7	14-14421-YS56F	07/15/14	Soil	X	X	X		
B108-20-22	14-14422-YS56G	07/15/14	Soil	X	X	X		
B106-1-3	14-14423-YS56H	07/16/14	Soil	X	X	X	X	
B106-6.5-8	14-14424-YS56I	07/16/14	Soil	X	X	X		
B106-20-22	14-14425-YS56J	07/16/14	Soil	X	X	X		
B501-20-22	14-14426-YS56K	07/16/14	Soil	X	X	X		
B109-2.5-3.5	14-14427-YS56L	07/16/14	Soil	X	X	X	X	
B109-6.5-8	14-14428-YS56M	07/16/14	Soil	X	X	X		
B109-20-22	14-14429-YS56N	07/16/14	Soil	X	X	X		
B107-5-6.5	14-14430-YS57A	07/17/14	Soil	X	X	X		
B107-7.5-8.5	14-14431-YS57B	07/17/14	Soil	X	X	X		
B107-20-22	14-14432-YS57C	07/17/14	Soil	X	X	X		

Field Sample ID	Laboratory Sample ID	Sampling Date	Matrix	Analysis				
				VOC	TPH-Gx	TPH-Dx	Lead	pH
B102-3-4	14-14433-YS57D	07/17/14	Soil	X	X	X	X	
B102-8-9	14-14434-YS57E	07/17/14	Soil	X	X	X		
B102-20-21.5	14-14435-YS57F	07/17/14	Soil	X	X	X		
B111-5-6	14-14436-YS57G	07/17/14	Soil	X	X	X	X	
B111-8-9	14-14437-YS57H	07/17/14	Soil	X	X	X		
B111-20-22	14-14438-YS57I	07/17/14	Soil	X	X	X		
B101-2-4	14-14439-YS57J	07/17/14	Soil	X	X	X	X	
B101-8-9	14-14440-YS57K	07/17/14	Soil	X	X	X		
B101-20-21.5	14-14441-YS57L	07/17/14	Soil	X	X	X		
B113-2-4	14-14442-YS58A	07/18/14	Soil	X	X	X	X	
B113-8-9	14-14443-YS58B	07/18/14	Soil	X	X	X	X	
B113-20-22	14-14444-YS58C	07/18/14	Soil	X	X	X		
B116-1-2	14-14445-YS58D	07/18/14	Soil	X	X	X		
B116-10-11	14-14446-YS58E	07/18/14	Soil	X	X	X		
B115-2-3	14-14447-YS58F	07/18/14	Soil	X	X	X		
B115-10-11	14-14448-YS58G	07/18/14	Soil	X	X	X		
B114-2.5-3.5	14-14449-YS58H	07/18/14	Soil	X	X	X	X	
B114-9-10	14-14450-YS58I	07/18/14	Soil	X	X	X	X	
B114-20-22	14-14451-YS58J	07/18/14	Soil	X	X	X		
B128-5-10-GW	14-14452-YS59A	07/15/14	Water	X	X			
B127-5-10-GW	14-14453-YS59B	07/15/14	Water	X	X			
B108-5-10-GW	14-14454-YS59C	07/15/14	Water	X	X			
B106-6-10-GW	14-14455-YS59D	07/16/14	Water	X	X			
B500-6-10-GW	14-14456-YS59E	07/16/14	Water	X	X			
B109-8-13-GW	14-14457-YS59F	07/16/14	Water	X	X			
B107-5-9-GW	14-14458-YS59G	07/17/14	Water	X	X			
B102-6-10-GW	14-14459-YS59H	07/17/14	Water	X	X			
B102-20-24-GW	14-14460-YS59I	07/17/14	Water	X	X			
B111-6-10-GW	14-14461-YS59J	07/17/14	Water	X	X			
B111-20-24-GW	14-14462-YS59K	07/17/14	Water	X	X			
B101-6-10-GW	14-14463-YS59L	07/17/14	Water	X	X			
B101-20-24-GW	14-14464-YS59M	07/17/14	Water	X	X			
B502-20-24-GW	14-14465-YS59N	07/17/14	Water	X	X			
B113-6-10-GW	14-14466-YS59O	07/18/14	Water	X	X		X ^(B)	
B113-20-24-GW	14-14467-YS59P	07/18/14	Water	X				

Field Sample ID	Laboratory Sample ID	Sampling Date	Matrix	Analysis				
				VOC	TPH-Gx	TPH-Dx	Lead	pH
B116-7-11-GW	14-14468-YS59Q	07/18/14	Water	X	X			
B115-6-10-GW	14-14469-YS59R	07/18/14	Water	X	X			
B114-6-10-GW	14-14470-YS59S	07/18/14	Water	X	X		X ^(B)	
B114-20-24-GW	14-14471-YS59T	07/18/14	Water	X	X		X ^(B)	
B503-6-10-GW	14-14472-YS60A	07/18/14	Water	X	X		X ^(B)	
Trip Blanks 071514	14-14473-YS60B	07/15/14	Water	X	X			
B118-3-4	14-14938-YT50A	07/22/14	Soil	X	X	X		
B118-9-10	14-14939-YT50B	07/22/14	Soil	X	X	X		
B118-21-23	14-14940-YT50C	07/22/14	Soil	X	X	X		
B506-21-23	14-14941-YT50D	07/22/14	Soil	X	X	X		
B122-3-4	14-14942-YT50E	07/22/14	Soil	X	X	X		
B122-9-10	14-14943-YT50F	07/22/14	Soil	X	X	X		
B122-21-22.5	14-14944-YT50G	07/22/14	Soil	X	X	X		
B123-4-5	14-14945-YT50H	07/21/14	Soil	X	X	X		
B123-8-10	14-14946-YT50I	07/21/14	Soil	X	X	X		
B123-23-24	14-14947-YT50J	07/21/14	Soil	X	X	X		
B505-8-10	14-14948-YT50K	07/21/14	Soil	X	X	X		
B124-4-5	14-14949-YT50L	07/21/14	Soil	X	X	X		
COMP-072314	14-14918-YT51A	07/23/14	Soil				X ^(A)	X
B105-3-4	14-14919-YT51B	07/23/14	Soil	X	X	X	X	
B105-7-8	14-14920-YT51C	07/23/14	Soil	X	X	X		
B105-20-21	14-14921-YT51D	07/23/14	Soil	X	X	X		
B110-3-4	14-14922-YT51E	07/23/14	Soil	X	X	X	X	
B110-7-8	14-14923-YT51F	07/23/14	Soil	X	X	X		
B110-20-21	14-14924-YT51G	07/23/14	Soil	X	X	X		
B112-4-5	14-14925-YT51H	07/21/14	Soil	X	X	X	X	
B112-8.5-9.5	14-14926-YT51I	07/21/14	Soil	X	X	X	X	
B504-4-5	14-14927-YT51J	07/21/14	Soil	X	X	X	X	
B112-22.5-23.5	14-14928-YT51K	07/21/14	Soil	X	X	X		
B117-3-4	14-14929-YT51L	07/22/14	Soil	X	X	X		
B117-9-10	14-14930-YT51M	07/22/14	Soil	X	X	X		
B117-21-23.5	14-14931-YT51N	07/22/14	Soil	X	X	X		
B124-9-10	14-14950-YT53A	07/21/14	Soil	X	X	X		
B124-22-23	14-14951-YT53B	07/21/14	Soil	X	X	X		
B125-3-4	14-14952-YT53C	07/21/14	Soil	X	X	X		

Field Sample ID	Laboratory Sample ID	Sampling Date	Matrix	Analysis				
				VOC	TPH-Gx	TPH-Dx	Lead	pH
B125-8-9	14-14953-YT53D	07/21/14	Soil	X	X	X		
B125-23-24	14-14954-YT53E	07/21/14	Soil	X	X	X		
B126-3.5-4.5	14-14955-YT53F	07/22/14	Soil	X	X	X		
B126-10-12	14-14956-YT53G	07/22/14	Soil	X	X	X		
B126-23-24	14-14957-YT53H	07/22/14	Soil	X	X	X		
B126-27-29	14-14958-YT53I	07/22/14	Soil	X	X	X		
B105-6-10-GW	14-14984-YT57A	07/23/14	Water	X	X			
B105-20-24-GW	14-14985-YT57B	07/23/14	Water	X	X			
B110-6-10-GW	14-14986-YT57C	07/23/14	Water	X	X			
B110-20-24-GW	14-14987-YT57D	07/23/14	Water	X	X			
B112-6-10-GW	14-14988-YT57E	07/21/14	Water	X	X		X ^(B)	
B112-20-24-GW	14-14989-YT57F	07/21/14	Water	X	X		X ^(B)	
B122-6-10-GW	14-14990-YT57G	07/22/14	Water	X	X			
B122-20-24-GW	14-14991-YT57H	07/22/14	Water	X	X			
B123-6-10-GW	14-14992-YT57I	07/21/14	Water	X	X			
B123-20-24-GW	14-14993-YT57J	07/21/14	Water	X	X			
B117-6-10-GW	14-14994-YT57K	07/22/14	Water	X	X			
B117-20-24-GW	14-14995-YT57L	07/22/14	Water	X	X			
B118-6-10-GW	14-14996-YT57M	07/22/14	Water	X	X			
B118-20-24-GW	14-14997-YT57N	07/22/14	Water	X	X			
B124-6-10-GW	14-14998-YT57O	07/21/14	Water	X	X			
B124-20-24-GW	14-14999-YT57P	07/21/14	Water	X	X			
B125-6-10-GW	14-15000-YT57Q	07/21/14	Water	X	X			
B125-20-24-GW	14-15001-YT57R	07/21/14	Water	X	X			
B126-6-10-GW	14-15002-YT57S	07/22/14	Water	X	X			
B126-20-24-GW	14-15003-YT57T	07/22/14	Water	X	X			
Trip Blanks 072114	14-14936-YT57U	07/21/14	Water	X	X			

Notes:

^(A) - The sample was extracted with the toxicity characteristics leaching procedure (TCLP), and extract analyzed for Arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver.

^(B) - The sample was analyzed for dissolved lead.

TPH-Dx - Diesel and motor oil range total petroleum hydrocarbon

TPH-Gx - Gasoline range total petroleum hydrocarbon

VOC - Volatile organic compound

X - The analysis was requested and performed on the sample.

The analytical parameters requested for the samples, the respective analytical methods, and the analytical laboratories are summarized below:

Parameter	Analytical Method	Analytical Laboratory
Volatile Organic Compounds (VOCs)	SW846 Method 8260C	Analytical Resources, Inc. Tukwila, Washington
TPH - Gasoline Range	NWTPH-Gx	
TPH - Diesel & Motor Oil Range	NWTPH-Dx	
Total and Dissolved Lead	SW846 Method 6010C	
TCLP/Metals	SW846 Methods 1311/6010C/7470A	
pH	SW846 Method 9045	

Notes:

1. SW846 - *USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846*, Third Edition, December 1996.
2. NWTPH Methods – *Washington State Department of Ecology, Analytical Methods for Petroleum Hydrocarbons*, Publication No. ECY 97-602, June 1997.

DATA VALIDATION FINDINGS

1. VOCs by GC/MS (EPA Method SW8260C)

1.1 Sample Management and Holding Time

Samples were received in the laboratory intact and in consistence with the accompanying chain-of-custody (COC) documentation. No anomalies were identified in relation to sample preservation, handling, and transport.

Soil and water samples should be preserved at the time of collection, and analyzed analyzed within 14 days of collection. All samples were preserved as required and analyzed within the required holding times.

1.2 GC/MS Instrument Performance Check

The method require that (1) gas chromatograph/mass spectrometer (GC/MS) tuning analysis be performed, using bromofluorobenzene (BFB), at the beginning of each 12-hour period prior to any analysis, and (2) specific mass ions meet the criteria provided in the method. All instrument performance checks met the requirements.

1.3 Initial Calibration (ICAL)

The ICAL criteria require that (1) if linear average RFs is chosen as the quantitation option, at least five standards at different concentrations should be analyzed and the percent relative standard deviation (%RSD) of response factors (RFs) be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be >0.995 , and (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be >0.99 . ICALs either met the requirements or the outliers had no adverse effects on data usability (*e.g.*, %RSD $>20\%$ for a compound not detected in samples).

An initial calibration verification (ICV) standard (second source standard) was analyzed to verify the calibration curve. Percent difference (%D) values were either within $\pm 30\%$, or the exceedance had no adverse effects on data usability (*e.g.*, biased high ICV recovery for a compound not detected in samples).

1.4 Calibration Verification (CCV)

The CCV criteria requires that (1) continuing calibrations be analyzed at the beginning of each 12-hour analysis period prior to the analysis of method blank and samples, and (2) the %D value be within $\pm 20\%$.

Calibration verifications either met the requirements, or the exceedance had no adverse effects on data usability (e.g., biased high CCV recovery for a compound not detected in samples), except for the following:

SDG	CCV ID	Compound	%D	Bias	Affected Sample	Data Qualifier
YS56	Instrument: NT5 7/22/14, 9:45 7/28/14, 10:53	Bromomethane	-36.4% -34.2%	Low	B106-1-3 B106-6.5-8 B108-1.5-3.5 B108-20-22 B108-6-7 B109-2.5-3.5 B109-6.5-8 B127-1.5-3.5 B127-6.5-8.5 B128-0-3 B128-6-8	UJ
YS56	Instrument: NT5 7/22/14, 9:45	Carbon Disulfide	25.1%	High	B108-20-22	J
YS57	Instrument: NT5 7/22/14, 9:45 7/28/14, 10:53	Bromomethane	-36.4% -34.2%	Low	B102-8-9 B107-5-6.5 B107-7.5-8.5 B111-20-22 B111-8-9	UJ
YS57	Instrument: NT5 7/22/14, 9:45	Carbon Disulfide	25.1%	High	B111-20-22	J
YS58	Instrument: NT5 7/28/14, 10:53 7/29/14, 9:35	Bromomethane	-34.2%	Low	B113-20-22 B113-2-4 B113-8-9 B114-2.5-3.5 B114-20-22 B114-9-10 B115-10-11 B115-2-3 B116-10-11 B116-1-2	UJ
YS58	Instrument: NT5 7/29/14, 9:35	Carbon Disulfide	21.9%	High	B114-20-22 B114-9-10 B115-10-11	J

SDG	CCV ID	Compound	%D	Bias	Affected Sample	Data Qualifier
YS59	Instrument: NT2 7/24/14, 8:53	Bromoform 1,2-Dibromo-3-chloropropane	-28.8% -24.6%	Low	B101-20-24-GW B101-6-10-GW B102-20-24-GW B102-6-10-GW B106-6-10-GW B107-5-9-GW B108-5-10-GW B109-8-13-GW B111-6-10-GW B113-20-24-GW B113-6-10-GW B114-20-24-GW B114-6-10-GW B115-6-10-GW B116-7-11-GW B127-5-10-GW B128-5-10-GW B500-6-10-GW B502-20-24-GW	UJ
YT50	Instrument: NT5 7/29/14, 9:35 7/30/14, 13:03 7/31/14, 11:28	Bromomethane	-54.3% -51.9% -71.1%	Low	B118-21-23 B118-3-4 B118-9-10 B122-21-22.5 B122-3-4 B122-9-10 B123-23-24 B123-4-5 B123-8-10 B124-4-5 B505-8-10 B506-21-23	UJ
YT50	Instrument: NT5 7/29/14, 9:35	Carbon Disulfide	21.9%	High	B118-21-23 B118-3-4 B118-9-10 B122-3-4 B122-9-10 B506-21-23	J
YT50	Instrument: NT5 7/30/14, 13:03	Acrolein 1,2-Dibromo-3-chloropropane	-28.3% -24.5%	Low	B122-21-22.5 B123-23-24 B123-4-5 B123-8-10 B505-8-10	UJ
YT50	Instrument: NT5 7/30/14, 13:03	Methylene Chloride	23.1%	High	B122-21-22.5 B123-23-24 B123-4-5 B123-8-10 B505-8-10	J

SDG	CCV ID	Compound	%D	Bias	Affected Sample	Data Qualifier
YT51	Instrument: NT5 7/30/14, 13:03 7/31/14, 11:28 8/4/14, 9:52	Bromomethane	-51.9% -71.1% -65.6	Low	B105-20-21 B105-3-4 B105-7-8 B110-20-21 B110-3-4 B110-7-8 B112-22.5-23.5 B112-4-5 B112-8.5-9.5 B117-21-23.5 B117-3-4 B117-9-10 B504-4-5	UJ
YT51	Instrument: NT5 7/30/14, 13:03	Acrolein 1,2-Dibromo-3- chloropropane	-28.3% -24.5%	Low	B105-20-21 B105-3-4 B105-7-8 B110-3-4 B112-22.5-23.5 B112-8.5-9.5 B117-3-4 B117-9-10 B504-4-5	UJ
YT51	Instrument: NT5 7/30/14, 13:03	Methylene Chloride	23.1%	High	B105-20-21 B105-3-4 B105-7-8 B110-3-4 B112-22.5-23.5 B112-8.5-9.5 B117-3-4 B117-9-10 B504-4-5	J
YT51	Instrument: NT5 8/4/14, 9:52	Chloromethane	-22.7%	Low	B117-21-23.5	UJ
YT53	Instrument: NT5 7/31/14, 11:28 8/4/14, 9:52	Bromomethane	-71.1% -65.6%	Low	B124-22-23 B124-9-10 B125-23-24 B125-3-4 B125-8-9 B126-10-12 B126-23-24 B126-27-29 B126-3.5-4.5	UJ

SDG	CCV ID	Compound	%D	Bias	Affected Sample	Data Qualifier
YT57	Instrument: NT3 7/29/14, 12:38	Acetone	-48.2%	Low	B105-20-24-GW B105-6-10-GW B110-20-24-GW B110-6-10-GW B112-20-24-GW B112-6-10-GW B117-20-24-GW B117-6-10-GW B118-20-24-GW B118-6-10-GW B122-20-24-GW B122-6-10-GW B123-20-24-GW B123-6-10-GW B124-20-24-GW B124-6-10-GW B125-6-10-GW Trip Blanks 072114	UJ
YT57	Instrument: NT3 7/30/14, 9:55	Bromomethane Carbon Disulfide	-23.0% -23.2%	Low	B125-20-24-GW B126-20-24-GW B126-6-10-GW	UJ

1.5 Blanks

Method Blanks: Method blanks were prepared and analyzed as required. Target compounds were not detected at or above the method detection limits (MDLs) in method blanks.

Low-level (less than or slightly greater than the reporting limits [RLs]) methylene chloride and acetone were consistently detected in samples. Although not detected method blanks at levels greater than the RLs, these compounds are common laboratory contaminants. Methylene chloride and acetone results less than five times (5x) the RLs were qualified (U) as non-detected at the reported values.

Trip Blanks: Samples Trip Blanks 071514 and Trip Blanks 072114 were trip blanks associated with water samples. Target compounds were not detected at or above the MDLs in these samples, except methylene chloride. The detections of methylene chloride in the trip blanks were determined as a result of laboratory artifact. No further data qualifying action was required.

1.6 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and LCSD were prepared and analyzed as required by the method. Percent recovery (%R) and relative percent difference (RPD) values either met the project control limits, or

the outliers had no adverse effects on data usability (*e.g.*, biased high recovery for a compound not detected in samples).

1.7 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were either within the project control limits, or the outliers had no adverse effects on data quality (*e.g.*, biased high recovery and associated compounds not detected in the sample).

1.8 Matrix Spike (MS) and MS Duplicate (MSD)

MS and MSD analyses were performed on project and batch QC samples at the proper frequency ($\geq 5\%$ of the samples analyzed for VOCs). All %Rand RPD values were within the laboratory control limits, except that 2-chloroethylvinyl ether was not recovered from the MS/MSD analyses performed on samples B102-6-10-GW and B126-20-24-GW. Due to the chemical nature (see **Section 1.12**), 2-chloroethylvinyl results were qualified (R) and rejected. No further data qualifying action was taken herein.

1.9 Internal Standards

The method requires that (1) internal standard retention time be within ± 30 seconds from that of the associated 12-hour calibration standard, and (2) the area counts of all internal standards be within -50% to $+100\%$ of the associated 12-hour calibration standard. All internal standards in the sample and associated QC analyses met the criteria.

1.10 Reporting Limit and Target Compound Quantitation

RLs were supported with adequate initial calibration concentrations. Due to high levels of selected target compounds in a number of samples, the analyses were performed on the methanol-preserved vials or samples were diluted for analysis. As a consequence, RLs were elevated for all compounds in these samples, including those potentially at levels less than the original RLs. The raised RLs were limited to sample matrices; the reported RLs were considered the best-possible quantitation limits for the samples. No further action was required.

1.11 Field Duplicates

Field duplicates were submitted for VOCs analyses. Field duplicate results for detected target compounds, RPD (or concentration difference) values, and data qualification were presented in **Appendix A**.

1.12 Overall Assessment of VOCs Data Usability

2-Chloroethylvinyl ether is known to break down in acidic water samples. Since all water samples in these SDGs were acid preserved, 2-chloroethylvinyl ether results for all water samples were qualified (R) and rejected.

VOCs data are of known quality and acceptable for use, as qualified.

2. TPH-Gasoline by GC/FID (Method NWTPH-Gx)

2.1 Sample Management and Holding Times

No anomalies were identified in relation to sample preservation, handling, and transport as discussed in Section 1.1.

Soil and water samples should be preserved at the time of collection, and analyzed within 14 days of collection. All samples were preserved as required and analyzed within the required holding times.

2.2 Initial Calibration (ICAL)

The method criteria require that (1) if linear average RFs is chosen as the quantitation option, the %RSD of RFs be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be ≥ 0.995 , (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be ≥ 0.990 , and (4) the back-calculated %D value for each calibration standard be within $\pm 15\%$. Initial calibration met the criteria for all target compounds.

An ICV (second source) standard was analyzed to verify the calibration curve. %D values were within $\pm 20\%$.

2.3 Calibration Verification

Continuing calibration verification (CCV) analyses were performed at the required frequency for all analytical sequences as required by the method. The %D values for all CCVs met the method criterion ($\pm 20\%$).

2.4 Blanks

Method Blanks: Method blanks were prepared and analyzed as required. TPH-Gasoline was not detected at or above the MDLs in the method blanks.

Trip Blanks: Samples Trip Blanks 071514 and Trip Blanks 072114 were trip blanks associated with water samples. TPH-Gasoline was not detected at or above the MDLs in trip blanks.

2.5 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were either within the project control limits, or outside the control limits due to matrix interference, or diluted below quantitation limits due to high levels of target or non-target compounds in the samples. No data qualifying actions were taken in these cases.

2.6 Matrix Spike and Matrix Spike Duplicate

MS/MSD analyses were performed on project samples at the adequate frequency. The %R and RPD values met the laboratory control criteria.

2.7 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and LCSD analyses were performed as required by the method. All %R and RPD values were within the laboratory control limits.

2.8 Reporting Limits and Target Compound Quantitation

Sample-specific RLs were supported with adequate initial calibration concentrations.

2.9 Field Duplicates

Field duplicates were submitted for TPH-Gasoline analyses. Field duplicate results for detected target compounds, RPD (or concentration difference) values, and data qualification were presented in **Appendix A**.

2.10 Overall Assessment of TPH-Gasoline Data Usability

TPH-Gasoline data are of known quality and acceptable for use, as qualified.

3. TPH-Diesel & Motor Oil by GC/FID (Method NWTPH-Dx)

3.1 Holding Time

No anomalies were identified in relation to sample preservation, handling, and transport as discussed in Section 1.1.

Soil and acid-preserved water samples should be extracted within 14 days of collection. Extracts should be analyzed within 40 days of extraction. All samples were extracted and analyzed within the recommended holding times.

3.2 Initial Calibration

The method criteria require that (1) if linear average RFs is chosen as the quantitation option, the %RSD of RFs be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be ≥ 0.995 , (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be ≥ 0.990 , and (4) the back-calculated %D value for each calibration standard be within $\pm 15\%$. Initial calibration met the criteria for all target compounds.

An ICV (second source) standard was analyzed to verify the calibration curve. %D values were within $\pm 20\%$.

3.3 Calibration Verification

The method requires that (1) a mid-range check standard be analyzed prior to and after each analytical batch, and (2) the percent drift (%D) value be within $\pm 20\%$ of the true value.

Calibration verification was performed at required frequency. The %D values were either within the $\pm 20\%$ criterion or at levels that had no adverse effects on data quality (e.g., high-bias %D value where the target compound was not detected in associated sample).

3.4 Method Blanks

Method blanks were prepared and analyzed as required. TPH-Diesel and TPH-Motor Oil were not detected at or above the MDLs in the method blanks.

3.5 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were either within the project control limits, or outside the control limits due to matrix interference, or diluted below quantitation limits due to high levels of target or non-target compounds in the samples. No data qualifying actions were taken in these cases.

3.6 Matrix Spike (MS) and MS Duplicate (MSD)

MS and MSD analyses were performed on project and batch QC samples at the proper frequency. The %R and RPD values either met the laboratory control criteria, or the analyte concentrations in parent samples were greater than 4x the spiking levels and not applicable for matrix effect evaluation. No data qualifying action was taken in these cases.

3.7 Laboratory Control Sample (LCS) and LCSD Duplicate (LCSD)

LCS and LCSD analyses were performed as required by the method. All %R and RPD values were within the laboratory control limits.

3.8 Reporting Limits and Target Compound Quantitation

The reported RLs were supported with adequate ICAL concentrations, and met the project requirements.

3.9 Field Duplicates

Field duplicates were submitted for TPH-Diesel and TPH-Motor Oil analyses. Field duplicate results, RPD (or concentration difference) values, and data qualification for detected TPH-Diesel or Motor Oil were presented in **Appendix A**.

3.10 Overall Assessment of TPH-Diesel and Motor Oil Data Usability

TPH-Diesel and TPH-Motor Oil data are of known quality and acceptable for use, as qualified.

4. TCLP/Metals and Lead by ICP/AES and CVAAS (SW846 Methods 1311/6010C/7470A and 6010C)

4.1 Sample Management and Holding Times

No anomalies were identified in relation to sample preservation, handling, and transport, as discussed in Section 1.1.

Soil and water samples should be analyzed within 180 days for metals and 28 days for mercury. Samples were analyzed within the required holding times.

4.2 Initial Calibration (ICAL)

The ICP/AES method requires that (1) a blank and one calibration standard be used in establishing the analytical curve, and (2) the average of replicate exposures be reported for all standards, QC, and sample analyses.

The CVAAS method require that (1) a blank and five calibration standards be employed to establish the analytical curve, and (2) the linearity of the calibration curve should meet the criteria of correlation coefficient ≥ 0.995 for linear regression.

All ICALs met the method requirements.

4.3 Calibration Verification (ICV and CCV)

Initial calibration verifications (ICVs) and continuing calibration verifications (CCVs) for ICP/AES and CVAA were analyzed at the required frequency. The %R values either met the control criteria (90 – 110% for lead, 80 – 120% for mercury) or the exceedance had no adverse effects on data usability (e.g., high-bias %D value where the target compound was not detected in associated sample).

4.4 Blanks

Calibration Blanks: Initial calibration blanks (ICBs) and continuing calibration blanks (CCBs) were not analyzed after calibration verification standards. Target analytes were either not detected at or above the RLs in the ICBs and CCBs, or sample results affected by the ICB/CCB detections were qualified as results of detections in preparation blanks.

Preparation Blanks: Preparation blanks were prepared and analyzed as required. Target analytes were not detected at or above the RLs in the preparation blanks.

4.5 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and/or LCSD analyses were performed as required by the method. All %R and RPD values were within the project control limits, or the exceedance had no adverse effects on data usability (e.g., high-bias %R value where the target compound was not detected in associated sample).

4.6 Matrix Spike (MS)

MS analyses were performed on project and batch QC samples at the adequate frequency (>5% of field sample). The %R and RPD values met the laboratory control limits.

4.7 Laboratory Duplicate Analysis

Laboratory duplicate analyses were performed on project samples at the adequate frequency ($\geq 5\%$). The RPD (or concentration difference) values were within the laboratory control criteria, except for the following:

SDG#	Parent Sample ID	Analyte	RPD	Control Limit	Affected Sample	Data Qualifier
YT51	COMP-072313	TCLP/Barium	22%	$\leq 20\%$	COMP-072313	J

4.8 Method Reporting Limits and Analyte Quantitation

Sample-specific RLs were supported with adequate initial calibration concentrations.

4.9 Field Duplicates

Field duplicates were submitted for lead analyses. Field duplicate results, RPD (or concentration difference) values, and data qualification for detected TPH-Diesel or Motor Oil were presented in **Appendix A**.

4.10 Overall Assessment of Metals Data Usability

Metals data are of known quality and acceptable for use, as qualified.

5. pH (SW846 Method 9045)

5.1 Sample Management and Holding Times

No anomalies in relation to sample delivery and preservation were noted, according to the completed COC forms submitted by the laboratory unless discussed in Section 1.1.

The method recommends that soil samples be analyzed immediately after collection. The analysis was performed seven days after collection. As a conservative measure, the pH result for the sample was qualified (J) as estimated.

5.2 Laboratory Control Sample (LCS)

LCS analyses were performed as required by the method. The LCS result met the laboratory control criteria.

5.3 Field Duplicates

Field duplicates were not collected for pH analysis.

5.4 Overall Assessment of pH Data Usability

pH data are of known quality and acceptable for use, as qualified.

SUMMARY

Table I. Data Affected by QC Anomalies:

Laboratory ID	Sample ID	Analyte	Qualifier	Qualified Reason
YT51A	COMP-072314	pH	J	Analysis performed past holding time
YS59A	B128-5-10-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YS59B	B127-5-10-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YS59C	B108-5-10-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YS59D	B106-6-10-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YS59E	B500-6-10-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YS59F	B109-8-13-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YS59G	B107-5-9-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YS59H	B102-6-10-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YS59I	B102-20-24-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YS59J	B111-6-10-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YS59L	B101-6-10-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YS59M	B101-20-24-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YS59N	B502-20-24-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YS59O	B113-6-10-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YS59P	B113-20-24-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YS59Q	B116-7-11-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YS59R	B115-6-10-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YS59S	B114-6-10-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YS59T	B114-20-24-GW	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YT50G	B122-21-22.5	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YT50H	B123-4-5	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YT50I	B123-8-10	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YT50J	B123-23-24	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YT50K	B505-8-10	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YT51B	B105-3-4	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YT51C	B105-7-8	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YT51D	B105-20-21	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YT51E	B110-3-4	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YT51I	B112-8.5-9.5	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YT51J	B504-4-5	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YT51K	B112-22.5-23.5	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YT51L	B117-3-4	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YT51M	B117-9-10	1,2-Dibromo-3-chloropropane	UJ	CCV %D <LCL
YT57A	B105-6-10-GW	Acetone	UJ	CCV %D <LCL
YT57B	B105-20-24-GW	Acetone	UJ	CCV %D <LCL
YT57C	B110-6-10-GW	Acetone	UJ	CCV %D <LCL
YT57D	B110-20-24-GW	Acetone	UJ	CCV %D <LCL
YT57E	B112-6-10-GW	Acetone	UJ	CCV %D <LCL
YT57F	B112-20-24-GW	Acetone	UJ	CCV %D <LCL
YT57G	B122-6-10-GW	Acetone	UJ	CCV %D <LCL
YT57H	B122-20-24-GW	Acetone	UJ	CCV %D <LCL
YT57I	B123-6-10-GW	Acetone	UJ	CCV %D <LCL
YT57J	B123-20-24-GW	Acetone	UJ	CCV %D <LCL
YT57K	B117-6-10-GW	Acetone	UJ	CCV %D <LCL
YT57L	B117-20-24-GW	Acetone	UJ	CCV %D <LCL
YT57M	B118-6-10-GW	Acetone	UJ	CCV %D <LCL
YT57N	B118-20-24-GW	Acetone	UJ	CCV %D <LCL

Laboratory ID	Sample ID	Analyte	Qualifier	Qualified Reason
YT57O	B124-6-10-GW	Acetone	UJ	CCV %D <LCL
YT57P	B124-20-24-GW	Acetone	UJ	CCV %D <LCL
YT57Q	B125-6-10-GW	Acetone	UJ	CCV %D <LCL
YT57U	Trip Blanks 072114	Acetone	UJ	CCV %D <LCL
YT50G	B122-21-22.5	Acrolein	UJ	CCV %D <LCL
YT50H	B123-4-5	Acrolein	UJ	CCV %D <LCL
YT50I	B123-8-10	Acrolein	UJ	CCV %D <LCL
YT50J	B123-23-24	Acrolein	UJ	CCV %D <LCL
YT50K	B505-8-10	Acrolein	UJ	CCV %D <LCL
YT51B	B105-3-4	Acrolein	UJ	CCV %D <LCL
YT51C	B105-7-8	Acrolein	UJ	CCV %D <LCL
YT51D	B105-20-21	Acrolein	UJ	CCV %D <LCL
YT51E	B110-3-4	Acrolein	UJ	CCV %D <LCL
YT51I	B112-8.5-9.5	Acrolein	UJ	CCV %D <LCL
YT51J	B504-4-5	Acrolein	UJ	CCV %D <LCL
YT51K	B112-22.5-23.5	Acrolein	UJ	CCV %D <LCL
YT51L	B117-3-4	Acrolein	UJ	CCV %D <LCL
YT51M	B117-9-10	Acrolein	UJ	CCV %D <LCL
YS59A	B128-5-10-GW	Bromoform	UJ	CCV %D <LCL
YS59B	B127-5-10-GW	Bromoform	UJ	CCV %D <LCL
YS59C	B108-5-10-GW	Bromoform	UJ	CCV %D <LCL
YS59D	B106-6-10-GW	Bromoform	UJ	CCV %D <LCL
YS59E	B500-6-10-GW	Bromoform	UJ	CCV %D <LCL
YS59F	B109-8-13-GW	Bromoform	UJ	CCV %D <LCL
YS59G	B107-5-9-GW	Bromoform	UJ	CCV %D <LCL
YS59H	B102-6-10-GW	Bromoform	UJ	CCV %D <LCL
YS59I	B102-20-24-GW	Bromoform	UJ	CCV %D <LCL
YS59J	B111-6-10-GW	Bromoform	UJ	CCV %D <LCL
YS59L	B101-6-10-GW	Bromoform	UJ	CCV %D <LCL
YS59M	B101-20-24-GW	Bromoform	UJ	CCV %D <LCL
YS59N	B502-20-24-GW	Bromoform	UJ	CCV %D <LCL
YS59O	B113-6-10-GW	Bromoform	UJ	CCV %D <LCL
YS59P	B113-20-24-GW	Bromoform	UJ	CCV %D <LCL
YS59Q	B116-7-11-GW	Bromoform	UJ	CCV %D <LCL
YS59R	B115-6-10-GW	Bromoform	UJ	CCV %D <LCL
YS59S	B114-6-10-GW	Bromoform	UJ	CCV %D <LCL
YS59T	B114-20-24-GW	Bromoform	UJ	CCV %D <LCL
YS56A	B128-0-3	Bromomethane	UJ	CCV %D <LCL
YS56B	B128-6-8	Bromomethane	UJ	CCV %D <LCL
YS56C	B127-1.5-3.5	Bromomethane	UJ	CCV %D <LCL
YS56D	B127-6.5-8.5	Bromomethane	UJ	CCV %D <LCL
YS56E	B108-1.5-3.5	Bromomethane	UJ	CCV %D <LCL
YS56F	B108-6-7	Bromomethane	UJ	CCV %D <LCL
YS56G	B108-20-22	Bromomethane	UJ	CCV %D <LCL
YS56H	B106-1-3	Bromomethane	UJ	CCV %D <LCL
YS56I	B106-6.5-8	Bromomethane	UJ	CCV %D <LCL
YS56L	B109-2.5-3.5	Bromomethane	UJ	CCV %D <LCL
YS56M	B109-6.5-8	Bromomethane	UJ	CCV %D <LCL
YS57A	B107-5-6.5	Bromomethane	UJ	CCV %D <LCL
YS57B	B107-7.5-8.5	Bromomethane	UJ	CCV %D <LCL
YS57H	B111-8-9	Bromomethane	UJ	CCV %D <LCL
YS57I	B111-20-22	Bromomethane	UJ	CCV %D <LCL

Laboratory ID	Sample ID	Analyte	Qualifier	Qualified Reason
YS58A	B113-2-4	Bromomethane	UJ	CCV %D <LCL
YS58B	B113-8-9	Bromomethane	UJ	CCV %D <LCL
YS58C	B113-20-22	Bromomethane	UJ	CCV %D <LCL
YS58D	B116-1-2	Bromomethane	UJ	CCV %D <LCL
YS58E	B116-10-11	Bromomethane	UJ	CCV %D <LCL
YS58F	B115-2-3	Bromomethane	UJ	CCV %D <LCL
YS58G	B115-10-11	Bromomethane	UJ	CCV %D <LCL
YS58H	B114-2.5-3.5	Bromomethane	UJ	CCV %D <LCL
YS58I	B114-9-10	Bromomethane	UJ	CCV %D <LCL
YS58J	B114-20-22	Bromomethane	UJ	CCV %D <LCL
YT50A	B118-3-4	Bromomethane	UJ	CCV %D <LCL
YT50B	B118-9-10	Bromomethane	UJ	CCV %D <LCL
YT50C	B118-21-23	Bromomethane	UJ	CCV %D <LCL
YT50D	B506-21-23	Bromomethane	UJ	CCV %D <LCL
YT50E	B122-3-4	Bromomethane	UJ	CCV %D <LCL
YT50F	B122-9-10	Bromomethane	UJ	CCV %D <LCL
YT50G	B122-21-22.5	Bromomethane	UJ	CCV %D <LCL
YT50H	B123-4-5	Bromomethane	UJ	CCV %D <LCL
YT50I	B123-8-10	Bromomethane	UJ	CCV %D <LCL
YT50J	B123-23-24	Bromomethane	UJ	CCV %D <LCL
YT50K	B505-8-10	Bromomethane	UJ	CCV %D <LCL
YT50L	B124-4-5	Bromomethane	UJ	CCV %D <LCL
YT51B	B105-3-4	Bromomethane	UJ	CCV %D <LCL
YT51C	B105-7-8	Bromomethane	UJ	CCV %D <LCL
YT51D	B105-20-21	Bromomethane	UJ	CCV %D <LCL
YT51E	B110-3-4	Bromomethane	UJ	CCV %D <LCL
YT51F	B110-7-8	Bromomethane	UJ	CCV %D <LCL
YT51G	B110-20-21	Bromomethane	UJ	CCV %D <LCL
YT51H	B112-4-5	Bromomethane	UJ	CCV %D <LCL
YT51I	B112-8.5-9.5	Bromomethane	UJ	CCV %D <LCL
YT51J	B504-4-5	Bromomethane	UJ	CCV %D <LCL
YT51K	B112-22.5-23.5	Bromomethane	UJ	CCV %D <LCL
YT51L	B117-3-4	Bromomethane	UJ	CCV %D <LCL
YT51M	B117-9-10	Bromomethane	UJ	CCV %D <LCL
YT51N	B117-21-23.5	Bromomethane	UJ	CCV %D <LCL
YT53A	B124-9-10	Bromomethane	UJ	CCV %D <LCL
YT53B	B124-22-23	Bromomethane	UJ	CCV %D <LCL
YT53C	B125-3-4	Bromomethane	UJ	CCV %D <LCL
YT53D	B125-8-9	Bromomethane	UJ	CCV %D <LCL
YT53E	B125-23-24	Bromomethane	UJ	CCV %D <LCL
YT53F	B126-3.5-4.5	Bromomethane	UJ	CCV %D <LCL
YT53G	B126-10-12	Bromomethane	UJ	CCV %D <LCL
YT53H	B126-23-24	Bromomethane	UJ	CCV %D <LCL
YT53I	B126-27-29	Bromomethane	UJ	CCV %D <LCL
YT57R	B125-20-24-GW	Bromomethane	UJ	CCV %D <LCL
YT57S	B126-6-10-GW	Bromomethane	UJ	CCV %D <LCL
YT57T	B126-20-24-GW	Bromomethane	UJ	CCV %D <LCL
YT57R	B125-20-24-GW	Carbon disulfide	UJ	CCV %D <LCL
YT57S	B126-6-10-GW	Carbon disulfide	UJ	CCV %D <LCL
YT57T	B126-20-24-GW	Carbon disulfide	UJ	CCV %D <LCL
YT51N	B117-21-23.5	Chloromethane	UJ	CCV %D <LCL
YS56G	B108-20-22	Carbon disulfide	J	CCV %D >UCL

Laboratory ID	Sample ID	Analyte	Qualifier	Qualified Reason
YS57I	B111-20-22	Carbon disulfide	J	CCV %D >UCL
YS58G	B115-10-11	Carbon disulfide	J	CCV %D >UCL
YS58I	B114-9-10	Carbon disulfide	J	CCV %D >UCL
YS58J	B114-20-22	Carbon disulfide	J	CCV %D >UCL
YT50A	B118-3-4	Carbon disulfide	J	CCV %D >UCL
YT50B	B118-9-10	Carbon disulfide	J	CCV %D >UCL
YT50C	B118-21-23	Carbon disulfide	J	CCV %D >UCL
YT50D	B506-21-23	Carbon disulfide	J	CCV %D >UCL
YT50E	B122-3-4	Carbon disulfide	J	CCV %D >UCL
YT50F	B122-9-10	Carbon disulfide	J	CCV %D >UCL
YS59A	B128-5-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59B	B127-5-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59C	B108-5-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59D	B106-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59E	B500-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59F	B109-8-13-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59G	B107-5-9-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59H	B102-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59I	B102-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59J	B111-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59K	B111-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59L	B101-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59M	B101-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59N	B502-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59O	B113-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59P	B113-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59Q	B116-7-11-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59R	B115-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59S	B114-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS59T	B114-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS60A	B503-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS60B	Trip Blanks 071514	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57A	B105-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57B	B105-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57C	B110-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57D	B110-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57E	B112-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57F	B112-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57G	B122-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57H	B122-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57I	B123-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57J	B123-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57K	B117-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57L	B117-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57M	B118-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57N	B118-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57O	B124-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57P	B124-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57Q	B125-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57R	B125-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57S	B126-6-10-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YT57T	B126-20-24-GW	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation

Laboratory ID	Sample ID	Analyte	Qualifier	Qualified Reason
YT57U	Trip Blanks 072114	2-Chloroethyl Vinyl Ether	R	Compound breaks down in acid preservation
YS56B	B128-6-8	Oil Range Hydrocarbons	J	Exceeded calibration range
YT51A	COMP-072314	Barium	J	Laboratory duplicate RPD >20%
YS56G	B108-20-22	Acetone	U	Potential laboratory artifact
YS56H	B106-1-3	Acetone	U	Potential laboratory artifact
YS56J	B106-20-22	Acetone	U	Potential laboratory artifact
YS57C	B107-20-22	Acetone	U	Potential laboratory artifact
YS57D	B102-3-4	Acetone	U	Potential laboratory artifact
YS57F	B102-20-21.5	Acetone	U	Potential laboratory artifact
YS57G	B111-5-6	Acetone	U	Potential laboratory artifact
YS57I	B111-20-22	Acetone	U	Potential laboratory artifact
YS57J	B101-2-4	Acetone	U	Potential laboratory artifact
YS57L	B101-20-21.5	Acetone	U	Potential laboratory artifact
YS58A	B113-2-4	Acetone	U	Potential laboratory artifact
YS58B	B113-8-9	Acetone	U	Potential laboratory artifact
YS58C	B113-20-22	Acetone	U	Potential laboratory artifact
YS58D	B116-1-2	Acetone	U	Potential laboratory artifact
YS58E	B116-10-11	Acetone	U	Potential laboratory artifact
YS58F	B115-2-3	Acetone	U	Potential laboratory artifact
YS58G	B115-10-11	Acetone	U	Potential laboratory artifact
YS58H	B114-2.5-3.5	Acetone	U	Potential laboratory artifact
YS58I	B114-9-10	Acetone	U	Potential laboratory artifact
YS58J	B114-20-22	Acetone	U	Potential laboratory artifact
YS59T	B114-20-24-GW	Acetone	U	Potential laboratory artifact
YT50A	B118-3-4	Acetone	U	Potential laboratory artifact
YT50B	B118-9-10	Acetone	U	Potential laboratory artifact
YT50D	B506-21-23	Acetone	U	Potential laboratory artifact
YT50E	B122-3-4	Acetone	U	Potential laboratory artifact
YT50F	B122-9-10	Acetone	U	Potential laboratory artifact
YT50G	B122-21-22.5	Acetone	U	Potential laboratory artifact
YT50H	B123-4-5	Acetone	U	Potential laboratory artifact
YT50I	B123-8-10	Acetone	U	Potential laboratory artifact
YT50J	B123-23-24	Acetone	U	Potential laboratory artifact
YT50K	B505-8-10	Acetone	U	Potential laboratory artifact
YT50L	B124-4-5	Acetone	U	Potential laboratory artifact
YT51B	B105-3-4	Acetone	U	Potential laboratory artifact
YT51D	B105-20-21	Acetone	U	Potential laboratory artifact
YT51E	B110-3-4	Acetone	U	Potential laboratory artifact
YT51G	B110-20-21	Acetone	U	Potential laboratory artifact
YT51H	B112-4-5	Acetone	U	Potential laboratory artifact
YT51I	B112-8.5-9.5	Acetone	U	Potential laboratory artifact
YT51J	B504-4-5	Acetone	U	Potential laboratory artifact
YT51K	B112-22.5-23.5	Acetone	U	Potential laboratory artifact
YT51L	B117-3-4	Acetone	U	Potential laboratory artifact
YT51M	B117-9-10	Acetone	U	Potential laboratory artifact
YT51N	B117-21-23.5	Acetone	U	Potential laboratory artifact
YT53A	B124-9-10	Acetone	U	Potential laboratory artifact
YT53B	B124-22-23	Acetone	U	Potential laboratory artifact
YT53C	B125-3-4	Acetone	U	Potential laboratory artifact
YT53D	B125-8-9	Acetone	U	Potential laboratory artifact
YT53E	B125-23-24	Acetone	U	Potential laboratory artifact
YT53F	B126-3.5-4.5	Acetone	U	Potential laboratory artifact

Laboratory ID	Sample ID	Analyte	Qualifier	Qualified Reason
YT57T	B126-20-24-GW	Acetone	U	Potential laboratory artifact
YS56G	B108-20-22	Methylene chloride	U	Potential laboratory artifact
YS56H	B106-1-3	Methylene chloride	U	Potential laboratory artifact
YS56K	B501-20-22	Methylene chloride	U	Potential laboratory artifact
YS56N	B109-20-22	Methylene chloride	U	Potential laboratory artifact
YS57C	B107-20-22	Methylene chloride	U	Potential laboratory artifact
YS57D	B102-3-4	Methylene chloride	U	Potential laboratory artifact
YS57E	B102-8-9	Methylene chloride	U	Potential laboratory artifact
YS57F	B102-20-21.5	Methylene chloride	U	Potential laboratory artifact
YS57G	B111-5-6	Methylene chloride	U	Potential laboratory artifact
YS57I	B111-20-22	Methylene chloride	U	Potential laboratory artifact
YS57J	B101-2-4	Methylene chloride	U	Potential laboratory artifact
YS57K	B101-8-9	Methylene chloride	U	Potential laboratory artifact
YS57L	B101-20-21.5	Methylene chloride	U	Potential laboratory artifact
YS58A	B113-2-4	Methylene chloride	U	Potential laboratory artifact
YS58B	B113-8-9	Methylene chloride	U	Potential laboratory artifact
YS58C	B113-20-22	Methylene chloride	U	Potential laboratory artifact
YS58D	B116-1-2	Methylene chloride	U	Potential laboratory artifact
YS58E	B116-10-11	Methylene chloride	U	Potential laboratory artifact
YS58F	B115-2-3	Methylene chloride	U	Potential laboratory artifact
YS58H	B114-2.5-3.5	Methylene chloride	U	Potential laboratory artifact
YS60B	Trip Blanks 071514	Methylene chloride	U	Potential laboratory artifact
YT50A	B118-3-4	Methylene chloride	U	Potential laboratory artifact
YT50B	B118-9-10	Methylene chloride	U	Potential laboratory artifact
YT50C	B118-21-23	Methylene chloride	U	Potential laboratory artifact
YT50D	B506-21-23	Methylene chloride	U	Potential laboratory artifact
YT50E	B122-3-4	Methylene chloride	U	Potential laboratory artifact
YT50F	B122-9-10	Methylene chloride	U	Potential laboratory artifact
YT50L	B124-4-5	Methylene chloride	U	Potential laboratory artifact
YT51G	B110-20-21	Methylene chloride	U	Potential laboratory artifact
YT51H	B112-4-5	Methylene chloride	U	Potential laboratory artifact
YT51N	B117-21-23.5	Methylene chloride	U	Potential laboratory artifact
YT53A	B124-9-10	Methylene chloride	U	Potential laboratory artifact
YT53B	B124-22-23	Methylene chloride	U	Potential laboratory artifact
YT53C	B125-3-4	Methylene chloride	U	Potential laboratory artifact
YT53D	B125-8-9	Methylene chloride	U	Potential laboratory artifact
YT53E	B125-23-24	Methylene chloride	U	Potential laboratory artifact
YT53F	B126-3.5-4.5	Methylene chloride	U	Potential laboratory artifact
YT53G	B126-10-12	Methylene chloride	U	Potential laboratory artifact
YT53H	B126-23-24	Methylene chloride	U	Potential laboratory artifact
YT53I	B126-27-29	Methylene chloride	U	Potential laboratory artifact
YT57U	Trip Blanks 072114	Methylene chloride	U	Potential laboratory artifact
YT50G	B122-21-22.5	Methylene chloride	UJ	Potential laboratory artifact; CCV %D >UCL
YT50H	B123-4-5	Methylene chloride	UJ	Potential laboratory artifact; CCV %D >UCL
YT50I	B123-8-10	Methylene chloride	UJ	Potential laboratory artifact; CCV %D >UCL
YT50J	B123-23-24	Methylene chloride	UJ	Potential laboratory artifact; CCV %D >UCL
YT50K	B505-8-10	Methylene chloride	UJ	Potential laboratory artifact; CCV %D >UCL
YT51B	B105-3-4	Methylene chloride	UJ	Potential laboratory artifact; CCV %D >UCL
YT51C	B105-7-8	Methylene chloride	UJ	Potential laboratory artifact; CCV %D >UCL
YT51D	B105-20-21	Methylene chloride	UJ	Potential laboratory artifact; CCV %D >UCL
YT51E	B110-3-4	Methylene chloride	UJ	Potential laboratory artifact; CCV %D >UCL
YT51I	B112-8.5-9.5	Methylene chloride	UJ	Potential laboratory artifact; CCV %D >UCL

Laboratory ID	Sample ID	Analyte	Qualifier	Qualified Reason
YT51J	B504-4-5	Methylene chloride	UJ	Potential laboratory artifact; CCV %D >UCL
YT51K	B112-22.5-23.5	Methylene chloride	UJ	Potential laboratory artifact; CCV %D >UCL
YT51L	B117-3-4	Methylene chloride	UJ	Potential laboratory artifact; CCV %D >UCL
YT51M	B117-9-10	Methylene chloride	UJ	Potential laboratory artifact; CCV %D >UCL
YT50C	B118-21-23	Carbon disulfide	J	Field duplicate did not meet advisory criteria
YT50D	B506-21-23	Carbon disulfide	J	Field duplicate did not meet advisory criteria
YT50I	B123-8-10	Carbon disulfide	J	Field duplicate did not meet advisory criteria
YT50K	B505-8-10	Carbon disulfide	J	Field duplicate did not meet advisory criteria
YT51H	B112-4-5	Lead	J	Field duplicate did not meet advisory criteria
YT51J	B504-4-5	Lead	J	Field duplicate did not meet advisory criteria
YS56J	B106-20-22	Gasoline Range Hydrocarbons	J	Field duplicate did not meet advisory criteria
YS56J	B106-20-22	n-Propylbenzene	UJ	Field duplicate did not meet advisory criteria
YS56J	B106-20-22	n-Butylbenzene	UJ	Field duplicate did not meet advisory criteria
YS56J	B106-20-22	Ethylbenzene	J	Field duplicate did not meet advisory criteria
YS56J	B106-20-22	Toluene	UJ	Field duplicate did not meet advisory criteria
YS56J	B106-20-22	1,3,5-Trimethylbenzene	J	Field duplicate did not meet advisory criteria
YS56J	B106-20-22	sec-Butylbenzene	UJ	Field duplicate did not meet advisory criteria
YS56J	B106-20-22	m,p-Xylenes	J	Field duplicate did not meet advisory criteria
YS56J	B106-20-22	Methylene chloride	UJ	Field duplicate did not meet advisory criteria
YS56J	B106-20-22	Naphthalene	UJ	Field duplicate did not meet advisory criteria
YS56J	B106-20-22	1,2,4-Trimethylbenzene	J	Field duplicate did not meet advisory criteria
YS56J	B106-20-22	o-Xylene	UJ	Field duplicate did not meet advisory criteria
YS56J	B106-20-22	Isopropylbenzene	UJ	Field duplicate did not meet advisory criteria
YS56J	B106-20-22	p-Isopropyltoluene	UJ	Field duplicate did not meet advisory criteria
YS56K	B501-20-22	Gasoline Range Hydrocarbons	J	Field duplicate did not meet advisory criteria
YS56K	B501-20-22	n-Butylbenzene	J	Field duplicate did not meet advisory criteria
YS56K	B501-20-22	n-Propylbenzene	J	Field duplicate did not meet advisory criteria
YS56K	B501-20-22	Ethylbenzene	J	Field duplicate did not meet advisory criteria
YS56K	B501-20-22	Toluene	J	Field duplicate did not meet advisory criteria
YS56K	B501-20-22	1,3,5-Trimethylbenzene	J	Field duplicate did not meet advisory criteria
YS56K	B501-20-22	sec-Butylbenzene	J	Field duplicate did not meet advisory criteria
YS56K	B501-20-22	m,p-Xylenes	J	Field duplicate did not meet advisory criteria
YS56K	B501-20-22	Acetone	UJ	Field duplicate did not meet advisory criteria
YS56K	B501-20-22	Naphthalene	J	Field duplicate did not meet advisory criteria
YS56K	B501-20-22	1,2,4-Trimethylbenzene	J	Field duplicate did not meet advisory criteria
YS56K	B501-20-22	o-Xylene	J	Field duplicate did not meet advisory criteria
YS56K	B501-20-22	Isopropylbenzene	J	Field duplicate did not meet advisory criteria
YS56K	B501-20-22	p-Isopropyltoluene	J	Field duplicate did not meet advisory criteria

Notes:

%D - Percent difference
 CCV - Continuing calibration verification
 LCL - Lower control limit
 RPD - Relative percent difference
 UCL - Upper control limit

Table II. Data Qualifiers are defined as follows:

Data Qualifier	Definition
DNR	The result should be reported from an alternative analysis.
J	The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.
U	The analyte was analyzed for, but was considered not detected at the reporting limit or reported value.
UJ	The analyte was analyzed for, and the associated quantitation limit was an estimated value.

Approved By: 
Mingta Lin, Senior Project Chemist

Date: 12/11/2014

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Appendix A

Field duplicate RPD is indicative of field and laboratory precision and sample homogeneity in combination. The CLP National Functional Guidelines or *Work Plan* do not specify criteria for field duplicate evaluation. An advisory criterion of 35% for water and 50% for soil was applied to evaluating the RPD values of field duplicate results that are $\geq 5 \times \text{RL}$. For results that are $< 5 \times \text{RL}$, an advisory criterion of $\pm 2 \text{RL}$ was applied to evaluating the concentration differences. The RPD (or concentration difference as applicable) values and data qualification for detected compounds in field duplicates are presented as follows:

Analyte	Units	RL	Parent & Field Duplicate Sample Result		RPD	Delta	Data Qualifier
			B106-6-10-GW	B500-6-10-GW			
TPH-Gasoline	mg/L	0.25	8.1	8.1	0%		
1,2,4-Trimethylbenzene	µg/L	10	120	110	9%		
1,3,5-Trimethylbenzene	µg/L	10	27	24		3	
Benzene	µg/L	10	1700	1800	6%		
Ethylbenzene	µg/L	10	440	460	4%		
Isopropylbenzene	µg/L	10	20	19		1	
<i>m,p</i> -Xylenes	µg/L	20	440	420	5%		
Naphthalene	µg/L	25	90	80		10	
<i>n</i> -Propylbenzene	µg/L	10	42	41		1	
<i>o</i> -Xylene	µg/L	10	43	42		1	
Toluene	µg/L	10	210	210	0%		
			B101-20-24-GW	B502-20-24-GW			
TPH-Gasoline	mg/L	0.25	0.43	0.6		0.17	
Benzene	µg/L	0.2	0.54	0.45		0.09	
Isopropylbenzene	µg/L	0.2	0.45	0.51		0.06	
<i>n</i> -Butylbenzene	µg/L	0.2	0.26	0.25		0.01	
<i>n</i> -Propylbenzene	µg/L	0.2	0.63	0.66		0.03	
<i>sec</i> -Butylbenzene	µg/L	0.2	0.33	0.34		0.01	
			B114-6-10-GW	B503-6-10-GW			
Benzene	µg/L	0.2	0.61	0.57		0.04	
<i>cis</i> -1,2-Dichloroethene	µg/L	0.2	1.4	1.4	0%		
Ethylbenzene	µg/L	0.2	ND	0.22		0.22	
Tetrachloroethene	µg/L	0.2	20	20	0%		
<i>trans</i> -1,2-Dichloroethene	µg/L	0.2	1.3	1.3	0%		
Trichloroethene	µg/L	0.2	7.3	6.8	7%		

Analyte	Units	RL	Parent & Field Duplicate Sample Result		RPD	Delta	Data Qualifier
			B106-20-22	B501-20-22			
TPH-Diesel	mg/kg	6.2	25	16		9	
TPH-Gasoline	mg/kg	6.7	10	40		30	J/J
1,2,4-Trimethylbenzene	µg/kg	1.1	4.6	110		105.4	J/J
1,3,5-Trimethylbenzene	µg/kg	1.1	1.1	24	182%		J/J
Acetone	µg/kg	5.6	22	ND		22	UJ/J
Benzene	µg/kg	1.1	8.3	11	28%		
Carbon disulfide	µg/kg	1.1	4	3		1	
Ethylbenzene	µg/kg	1.1	2.2	34		31.8	J/J
Isopropylbenzene	µg/kg	1.1	ND	6		6	UJ/J
<i>m,p</i> -Xylenes	µg/kg	1.1	4.2	70		65.8	J/J
Methylene chloride	µg/kg	2.2	ND	6.2		6.2	UJ/J
Naphthalene	µg/kg	5.6	ND	19		19	UJ/J
<i>n</i> -Butylbenzene	µg/kg	1.1	ND	11		11	UJ/J
<i>n</i> -Propylbenzene	µg/kg	1.1	ND	16		16	UJ/J
<i>o</i> -Xylene	µg/kg	1.1	ND	6		6	UJ/J
<i>p</i> -Isopropyltoluene	µg/kg	1.1	ND	5.8		5.8	UJ/J
<i>sec</i> -Butylbenzene	µg/kg	1.1	ND	4.9		4.9	UJ/J
Toluene	µg/kg	1.1	ND	3.5		3.5	UJ/J
			B112-4-5	B504-4-5			
TPH-Diesel	mg/kg	5.2	ND	7.8		7.8	
TPH-Motor Oil	mg/kg	10	ND	ND		0	
TPH-Gasoline	mg/kg	4	ND	ND		0	
Lead	mg/kg	2	11	20	58%		J/J
Acetone	µg/kg	4.5	9.5	9.2		0.3	
Methylene chloride	µg/kg	1.8	4.4	4.5		0.1	
			B123-8-10	B505-8-10			
TPH-Diesel	mg/kg	5.9	ND	ND		0	
TPH-Motor Oil	mg/kg	12	ND	ND		0	
TPH-Gasoline	mg/kg	4	ND	7.8		7.8	
Acetone	µg/kg	3.1	10	7.3		2.7	
Carbon disulfide	µg/kg	0.6	7.6	2.7		4.9	J/J
Methylene chloride	µg/kg	1.2	1.7	3.2		1.5	
			B118-21-23	B506-21-23			
TPH-Diesel	mg/kg	6.2	ND	ND			
TPH-Motor Oil	mg/kg	12	ND	ND			

Analyte	Units	RL	Parent & Field Duplicate		RPD	Delta	Data Qualifier
			Sample Result				
TPH-Gasoline	mg/kg	5.6	ND	ND			
Acetone	µg/kg	4.2	22	11		11	J/J
Carbon disulfide	µg/kg	0.8	5.7	4.3	28%		
Methylene chloride	µg/kg	1.7	3.7	4.3		0.6	

Notes:

Delta – Concentration difference between the parent sample and its field duplicate

mg/kg – milligram per kilogram

µg/kg – microgram per kilogram

mg/L – milligram per liter

µg/L – microgram per liter

ND – The analyte was not detected at or above the RL.

RL – Reporting limit

RPD – Relative percent difference

Data Validation Report

Port of Tacoma Alexander Avenue Petroleum Tank Facilities Site
Tacoma, Washington

August 2015 Groundwater Monitoring

Laboratory SDGs:

AML7, ALM9

Prepared for:

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Prepared by:

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ACRONYMS

%D	percent difference
%D_f	percent drift
%R	percent recovery
%RSD	percent relative standard deviation
ARI	Analytical Resources, Inc. - Tukwila, Washington
BFB	bromofluorobenzene
CCB	continuing calibration blank
CCV	continuing calibration verification
CF	calibration factor
CLP	U.S. EPA Contract Laboratory Program
COC	chain-of-custody
EPA	U.S. Environmental Protection Agency
GC/FID	gas chromatography/flame ionization detector
GC/MS	gas chromatograph/mass spectrometer
ICAL	initial calibration
ICV	initial calibration verification
LCL	lower control limit
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MDL	method detection limit
µg/L	microgram per liter
mg/L	milligram per liter
MS	matrix spike
MSD	matrix spike duplicate
NFGs	CLP National Functional Guidelines for Data Review (EPA 2014)
QA/QC	quality assurance/quality control
RF	response factor
RL	reporting limit
RPD	relative percent difference
RRT	relative retention time
SDG	sample delivery group
VOCs	volatile organic compounds

INTRODUCTION

This report presents and discusses findings of the data validation performed on analytical data for water samples collected during August 2015 for the referenced project. The laboratory report validated herein was submitted by Analytical Resources, Inc. (ARI) in Tukwila, Washington.

A level III (or Stage 2B as defined in EPA 2009) data validation was performed on this laboratory report. The validation followed the procedures specified in USEPA CLP Functional Guidelines ([NFGs], EPA 2014a and 2014b), with modifications to accommodate project and analytical method requirements. The numerical quality assurance/quality control (QA/QC) criteria applied to the validation were in accordance with those specified in the quality assurance project plans ([QAPPs], Aspect 2014) and the current performance-based control limits established by the laboratory (laboratory control limits). Instrument calibration, frequency of QC analyses, and analytical sequence requirements were evaluated against the respective analytical methods.

Validation findings are discussed in each section pertinent to the QC parameter for each type of analysis. Qualified data with applied data qualifiers are summarized in the **Summary** section at the end of this report. Samples and the associated analyses validated herein are summarized as follows:

Field Sample ID	Laboratory Sample ID	Sampling Date	Matrix	Analysis		
				VOCs	TPH-G	TPH-Dx
95C-25-082815	15-15132-ALM7A	08/28/15	Water	X	X	X
721-MW9-15-082815	15-15133-ALM7B	08/28/15	Water	X	X	X
95-15-082815	15-15134-ALM7C	08/28/15	Water	X	X	X
MW-95-082815	15-15135-ALM7D	08/28/15	Water	X	X	X
721-MW10-25-082815	15-15136-ALM7E	08/28/15	Water	X	X	X
MW-104-15-082815	15-15137-ALM7F	08/28/15	Water	X	X	X
MW-104-25-082815	15-15138-ALM7G	08/28/15	Water	X	X	X
MW-130-15-082715	15-15150-ALM9A	08/27/15	Water	X	X	X
MW-105-25-082815	15-15151-ALM9B	08/27/15	Water	X	X	X
721-MW102-25-082815	15-15152-ALM9C	08/27/15	Water	X	X	X
MW-137-25-082715	15-15153-ALM9D	08/27/15	Water	X	X	X
MW-110-15-082815	15-15154-ALM9E	08/27/15	Water	X	X	X
721-MW10-15-082815	15-15155-ALM9F	08/27/15	Water	X	X	X
MW-110-25-082815	15-15156-ALM9G	08/27/15	Water	X	X	X
Trip Blank	15-15168-ALM9O	08/27/15	Water	X	X	X

Notes:

TPH-Dx - Diesel and motor oil range total petroleum hydrocarbon

TPH-G - Gasoline range total petroleum hydrocarbon
 VOCs - Volatile organic compounds
 X - The analysis was requested and performed on the sample.

The analytical parameters requested for the samples, the respective analytical methods, and the analytical laboratories are summarized below:

Parameter	Analytical Method	Analytical Laboratory
Volatile Organic Compounds (VOCs)	SW846 Method 8260C	Analytical Resources, Inc. Tukwila, Washington
TPH - Gasoline Range	NWTPH-Gx	
TPH - Diesel & Motor Oil Range	NWTPH-Dx	

Notes:

1. SW846 - *USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition, December 1996.
2. NWTPH Methods – *Washington State Department of Ecology, Analytical Methods for Petroleum Hydrocarbons*, Publication No. ECY 97-602, June 1997.

DATA VALIDATION FINDINGS

1. VOCs by GC/MS (EPA Method SW8260C)

1.1 Sample Management and Holding Time

Samples were received in the laboratory intact and in consistence with the accompanying chain-of-custody (COC) documentation. No anomalies were identified in relation to sample preservation, handling, and transport.

Water samples should be preserved (pH <2) at the time of collection, and analyzed within 14 days (7 days if unpreserved) of collection. All samples were preserved and analyzed within the required holding time.

1.2 GC/MS Instrument Performance Check

The method require that (1) gas chromatograph/mass spectrometer (GC/MS) tuning analysis be performed, using bromofluorobenzene (BFB), at the beginning of each 12-hour period prior to any analysis, and (2) specific mass ions meet the criteria provided in the method. All instrument performance checks met the requirements.

1.3 Initial Calibration (ICAL)

The ICAL criteria require that (1) if linear average RFs is chosen as the quantitation option, at least five standards at different concentrations should be analyzed and the percent relative standard deviation (%RSD) of response factors (RFs) be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be > 0.995 , and (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be > 0.99 . ICALs either met the requirements or the outliers had no adverse effects on data usability (*e.g.*, %RSD $> 20\%$ for a compound not detected in samples).

An initial calibration verification (ICV) standard (second source standard) was analyzed to verify the calibration curve. Percent difference (%D) values were either within $\pm 30\%$, or the exceedance had no adverse effects on data usability (*e.g.*, biased high ICV recovery for a compound not detected in samples). Initial calibrations met the criteria.

1.4 Calibration Verification (CCV)

The CCV criteria requires that (1) continuing calibrations be analyzed at the beginning of each 12-hour analysis period prior to the analysis of method blank and samples, and (2) the %D value be within $\pm 20\%$.

Calibration verifications met the requirements, except for the following:

CCV ID	Compound	%D	Bias	Affected Sample	Data Qualifier
Instrument: NT2 9/3/15, 11:04	Chloromethane Carbon Tetrachloride Bromoform	-32.7% -21.2% -32.6%	Low	95C-25-082815 721-MW9-15-082815 95-15-082815 MW-95-082815 721-MW10-25-082815 MW-104-15-082815 MW-104-25-082815	UJ
Instrument: NT2 9/2/15, 20:11	Carbon Tetrachloride Bromoform	-20.4% -29.1%	Low	MW-130-15-082715 MW-105-25-082815 721-MW102-25-082815 MW-137-25-082715 MW-110-15-082815 721-MW10-15-082815 MW-110-25-082815 Trip Blank	UJ

1.5 Blanks

Method Blanks: Method blanks were prepared and analyzed as required. Target compounds were not detected at or above the method detection limits (MDLs) in method blanks.

Acetone was detected in most samples collected on 8/27/2015 (ARI SDG: ALM9) at levels comparable to their reporting limits (RLs), all <2xRL. These detections appeared to be a background contamination in the laboratory, although not detected in associated method blank. Acetone results were qualified (U) as non-detected in these samples.

Trip Blank: One trip blank was submitted for VOCs analysis. Target compounds were not detected at or above the MDLs in the trip blank, except methylene chloride. This compound was not detected in any of the field samples; no data qualifiers were assigned in this case.

1.6 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and LCSD were prepared and analyzed as required by the method. Percent recovery (%R) and relative percent difference (RPD) values met the project control limits, except for the following:

SDG#	LCS/LCSD ID	Compound	%R	Control Limit	Affected Sample	Data Qualifier
ALM7	NT2-090315LCSW NT2-090315-LCSDW	Chloromethane	70.7% 68.0%	77-122%	95C-25-082815 721-MW9-15-082815 95-15-082815 MW-95-082815 721-MW10-25-082815 MW-104-15-082815 MW-104-25-082815	UJ

1.7 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were within the project control limits.

1.8 Matrix Spike (MS) and MS Duplicate (MSD)

MS and MSD analyses were not performed on project samples in these SDGs.

1.9 Internal Standards

The method requires that (1) internal standard retention time be within ± 30 seconds from that of the associated 12-hour calibration standard, and (2) the area counts of all internal standards be within -50% to $+100\%$ of the associated 12-hour calibration standard. All internal standards in the sample and associated QC analyses met the criteria.

1.10 Reporting Limit and Target Compound Quantitation

Reporting limits (RLs) were supported with adequate initial calibration concentrations. RLs in a number of samples were raised due to high-level analytes (mostly benzene) present in the samples. The reported RLs were considered the best-possible quantitation limits for the samples. No further action was required.

1.11 Field Duplicates

One field duplicate pair was submitted for VOCs analyses. Sample results, RPD (or concentration difference) values, and data qualification for detected analytes were presented in **Appendix A**.

1.12 Overall Assessment of VOCs Data Usability

VOCs data are of known quality and acceptable for use, as qualified.

2. TPH-Gasoline by GC/MS (Method NWTPH-Gx)

2.1 Sample Management and Holding Times

No anomalies were identified in relation to sample preservation, handling, and transport.

Water samples should be preserved at the time of collection, and analyzed within 14 days of collection. All samples were preserved as required and analyzed within the required holding times.

2.2 Initial Calibration (ICAL)

The method criteria require that (1) if linear average RFs is chosen as the quantitation option, the %RSD of RFs be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be ≥ 0.995 , (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be ≥ 0.990 , and (4) the back-calculated %D value for each calibration standard be within $\pm 15\%$. Initial calibration met the criteria for all target compounds. An ICV (second source) standard was analyzed to verify the calibration curve. %D values were within $\pm 20\%$.

2.3 Calibration Verification

Continuing calibration verification (CCV) analyses were performed at the required frequency for all analytical sequences as required by the method. The %D values for all CCVs met the method criterion ($\pm 20\%$).

2.4 Method Blanks

Method blanks were prepared and analyzed as required. TPH-Gasoline was not detected at or above the MDLs in the method blanks.

2.5 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were within the project control limits.

2.6 Matrix Spike and Matrix Spike Duplicate

MS and MSD analyses were performed on sample 95-15-082815 as requested. All %R and RPD values were within the laboratory control limits.

2.7 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and LCSD analyses were performed as required by the method. All %R and RPD values were within the laboratory control limits.

2.8 Reporting Limits and Target Compound Quantitation

Sample-specific RLs were supported with adequate initial calibration concentrations.

2.9 Field Duplicates

One field duplicate pair was submitted for TPH-Gasoline analyses. Sample results, RPD (or concentration difference) values, and data qualification were presented in **Appendix A**.

2.10 Overall Assessment of TPH-Gasoline Data Usability

TPH-Gasoline data are of known quality and acceptable for use.

3. TPH-Diesel & Motor Oil by GC/FID (Method NWTPH-Dx)

3.1 Holding Time

No anomalies were identified in relation to sample preservation, handling, and transport as discussed in Section 1.1.

Acid-preserved water samples should be extracted within 14 days of collection. Extracts should be analyzed within 40 days of extraction. All samples were extracted and analyzed within the recommended holding times.

3.2 Initial Calibration

The method criteria require that (1) if linear average RFs is chosen as the quantitation option, the %RSD of RFs be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be ≥ 0.995 , (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be ≥ 0.990 , and (4) the back-calculated %D value for each calibration standard be within $\pm 15\%$. Initial calibration met the criteria for all target compounds.

An ICV (second source) standard was analyzed to verify the calibration curve. %D values were within $\pm 20\%$.

3.3 Calibration Verification

The method requires that (1) a mid-range check standard be analyzed prior to and after each analytical batch, and (2) the percent drift (%D) value be within $\pm 20\%$ of the true value. Calibration verification was performed at required frequency. The %D values were within the $\pm 20\%$ criterion.

3.4 Method Blanks

Method blanks were prepared and analyzed as required. TPH-Diesel and TPH-Motor Oil were not detected at or above the MDLs in the method blank.

3.5 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were within the laboratory control limits.

3.6 Matrix Spike (MS) and MS Duplicate (MSD)

MS and MSD analyses were performed on sample 95-15-082815 as requested. All %R and RPD values were within the laboratory control limits.

3.7 Laboratory Control Sample (LCS) and LCSD Duplicate (LCSD)

LCS and LCSD analyses were performed as required by the method. All %R and RPD values were within the laboratory control limits.

3.8 Reporting Limits and Target Compound Quantitation

The reported RLs were supported with adequate ICAL concentrations, and met the project requirements.

3.9 Field Duplicates

One field duplicate pair was submitted for TPH-Diesel and TPH-Motor Oil analyses. Sample results, RPD (or concentration difference) values, and data qualification were presented in **Appendix A**.

3.10 Overall Assessment of TPH-Diesel and Motor Oil Data Usability

TPH-Diesel and TPH-Motor Oil data are of known quality and acceptable for use, as qualified.

SUMMARY

Table I. Data Affected by QC Anomalies:

Laboratory Sample ID	Field Sample ID	Analyte	Qualifier	Qualified Reason
ALM7A ALM7B ALM7C ALM7D ALM7E ALM7F ALM7G	95C-25-082815 721-MW9-15-082815 95-15-082815 MW-95-082815 721-MW10-25-082815 MW-104-15-082815 MW-104-25-082815	Chloromethane Carbon Tetrachloride Bromoform	UJ	CCV %D value was <LCL
ALM9A ALM9B ALM9C ALM9D ALM9E ALM9F ALM9G ALM9O	MW-130-15-082715 MW-105-25-082815 721-MW102-25-082815 MW-137-25-082715 MW-110-15-082815 721-MW10-15-082815 MW-110-25-082815 Trip Blank	Carbon Tetrachloride Bromoform	UJ	CCV %D value was <LCL
ALM7A ALM7C ALM7D ALM7F ALM7G ALM9A ALM9B ALM9C ALM9E ALM9F ALM9G	95C-25-082815 95-15-082815 MW-95-082815 MW-104-15-082815 MW-104-25-082815 MW-130-15-082715 MW-105-25-082815 721-MW102-25-082815 MW-110-15-082815 721-MW10-15-082815 MW-110-25-082815	Acetone	U	The detection was a result of laboratory contamination
ALM7A ALM7B ALM7C ALM7D ALM7E ALM7F ALM7G	95C-25-082815 721-MW9-15-082815 95-15-082815 MW-95-082815 721-MW10-25-082815 MW-104-15-082815 MW-104-25-082815	Chloromethane	UJ	LCS/LCSD %R values were <LCL
ALM7C ALM7D	95-15-082815 MW-95-082815	Acrolein	UJ J	The field duplicate result was outside advisory criteria

Notes:

%D – Percent difference

CCV –Continuing calibration verification

J/UJ – Detects were qualified (J) and non-detects qualified (UJ)

LCL – Lower control limit

LCS/LCSD – Laboratory control sample (LCSD) and LCS duplicate (LCSD)

Table II. Data Qualifiers are defined as follows:

Data Qualifier	Definition
J	The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.
U	The analyte was analyzed for, but was considered not detected at the reporting limit or reported value.
UJ	The analyte was analyzed for, and the associated quantitation limit was an estimated value.

Approved By: 
Mingta Lin, Senior Project Chemist

Date: 12/14/2015

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- Ecology (Washington State Department of). 1997. *Analytical Methods for Petroleum Hydrocarbons*. Publication No.: ECY 97-602. June 1997.
- Port of Tacoma. 2014. *Work Plan for Alexander Avenue Petroleum Tank Facilities Site RI/FS Tacoma, Washington. Appendix A: Sampling and Analysis Plan*. Aspect Consulting, LLC. June 2014.

Appendix A

Field duplicate RPD is indicative of field and laboratory precision and sample homogeneity in combination. The EPA *CLP National Functional Guidelines or Sampling and Analysis Plan* do not specify criteria for field duplicate evaluation. An advisory criterion of 30% was applied to evaluating the RPD values of field duplicate results that are $\geq 5 \times \text{RL}$. For results that are $< 5 \times \text{RL}$, an advisory criterion of $\pm 2 \times \text{RL}$ was applied to evaluating the concentration differences. The RPD (or concentration difference as applicable) values and data qualification for detected compounds in field duplicates are presented as follows:

Analytes	Unit	RL	Sample ID & Results		RPD	Difference	Data Qualifier
			95-15-082815	MW-95-082815			
TPH-Diesel	mg/L	0.1	2.6	2.6	0%		
TPH-Motor Oil	mg/L	0.2	0.67	0.64		0.03	
TPH-Diesel (SG)	mg/L	0.1	0.51	0.49		0.02	
TPH-Motor Oil (SG)	mg/L	0.2	ND	ND		0	
TPH-Gasoline	mg/L	1.2	1.9	2		0.1	
1,2,4-Trimethylbenzene	$\mu\text{g/L}$	1	1.6	1.6		0	
Acetone	$\mu\text{g/L}$	25	43	43		0	
Acrolein	$\mu\text{g/L}$	25	ND	76		76	UJ/J
Benzene	$\mu\text{g/L}$	1	13	13	0%		
Ethylbenzene	$\mu\text{g/L}$	1	2.4	2.4		0	
Isopropylbenzene	$\mu\text{g/L}$	1	23	23	0%		
<i>m,p</i> -Xylene	$\mu\text{g/L}$	2	6.2	6.2	0%	0	
Naphthalene	$\mu\text{g/L}$	2.5	3	3		0	
<i>n</i> -Butylbenzene	$\mu\text{g/L}$	1	2.4	2.3		0.1	
<i>n</i> -Propylbenzene	$\mu\text{g/L}$	1	23	22	4%		
<i>o</i> -Xylene	$\mu\text{g/L}$	1	2	2		0	
<i>sec</i> -Butylbenzene	$\mu\text{g/L}$	1	3.6	3.4		0.2	
Toluene	$\mu\text{g/L}$	1	2.2	2.2		0	

Notes:

RPD – Relative percent difference

Difference – Concentration difference between the field replicates

$\mu\text{g/L}$ – micrograms per liter

mg/L – milligram per liter

ND – Not detected at or above the method detection limit

RL – Reporting limit

SG – Sample extract went through acid/silica gel clean up to remove biogenic matters in the extract

DATA VALIDATION REPORT

Alexander Avenue
Groundwater Testing
December 2015
SDG ASM0, ASM1

Prepared by:

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Project No. 130097 • January 11, 2016

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Sampling Rounds 52 & 53.docx

1 Introduction

This report summarizes the findings of the United States Environmental Protection Agency (USEPA) Stage 2A data validation performed on analytical data for the groundwater samples collected on December 8-9, 2015 for Alexander Avenue sampling. This data quality review is divided into sections by sample delivery group (SDG). A complete list of samples and analyses for each SDG is provided in the Sample Index at the beginning of each section.

Samples were analyzed for select VOCs, and Total Petroleum Hydrocarbons (TPH) by Analytical Resources, Inc. (ARI). The analytical methods are summarized below:

Analysis	Method	Laboratory
TPH-DX	NWTPH-DX	ARI
TPH-DXS	NWTPH-DX (with silica gel clean up)	ARI
TPH-GX	NWTPH-GX	ARI
VOC	SW 8260C	ARI

The validation followed the procedures documented in the analytical methods, the Quality Assurance Project Plan (QAPP; in Appendix A to Aspect, 2013), *National Functional Guidelines for Organic Data Review* (USEPA, 1999), and *National Functional Guidelines for Inorganic Data Review* (USEPA, 2004).

Data assigned a J qualifier (estimated) may be used for site evaluation purposes but the reasons for qualification should be taken into account when interpreting sample concentrations. Data marked as do-not-report (DNR) should not be used under any circumstances. Values without qualification meet all data measurement quality objectives and are suitable for use.

Data qualifier definitions and a summary table of the qualified data are included in the Qualified Data Summary at the end of this report. Data qualifiers have been incorporated into the project chemistry database to reflect the validation in this report.

2 Data Validation Findings for SDG ASM0

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review by analyte group (analysis).

Sample Index

Sample ID	Date	Type	Matrix	TPH-DX	TPH-DXS	Analysis	
						TPH-GX	VOCs
721-MW15-15-120915	12/9/2015	N	GrWtr	X	X	X	X
721-MW501-120915	12/9/2015	FD	GrWtr	X	X	X	X
721-MW2-120915	12/9/2015	N	GrWtr	X	X	X	X
721-MW14-15-120915	12/9/2015	N	GrWtr	X	X	X	X
721-MW12-15-120915	12/9/2015	N	GrWtr	X	X	X	X
MW-109-15-120915	12/9/2015	N	GrWtr	X	X	X	X
MW-106-15-120915	12/9/2015	N	GrWtr	X	X	X	X
721-MW6-15-120915	12/9/2015	N	GrWtr	X	X	X	X
721-MW8-15-120915	12/9/2015	N	GrWtr	X	X	X	X
721-MW11-15-120915	12/9/2015	N	GrWtr	X	X	X	X
721-MW10-25-120915	12/9/2015	N	GrWtr	X	X	X	X
721-MW9-15-120915	12/9/2015	N	GrWtr	X	X	X	X

2.1 TPH-DX (NWTPH-DX)

2.1.1 Sample Receipt, Preservation, and Holding Times

Sample receipt, and preservation (2-6 degrees C) were acceptable.

Samples were analyzed within the requisite holding time limit.

2.1.2 Method Blanks/Detection Levels

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

2.1.3 Dilutions and Reanalyses

Eight (8) diesel results exceeded the calibration range for the analysis and had to be reanalyzed at dilution. The results that exceeded the linear range were flagged as do-not-report (R). Results for all other analytes (Motor Oil) in the dilutions were flagged do-not-report (R) in favor of the lower dilution results.

2.1.4 Laboratory Control Samples (LCS)

All LCS %R were within the laboratory specified control limits. No qualification or action was needed.

2.1.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

Both MS and MSD results exceeded calibration range for the instrument and had to be dismissed as having no relevance to the associated sample results. Used LCS and Field Duplicate (FD) to assess accuracy and precision of sample results.

2.1.6 Surrogates

Three (3) surrogate recoveries were flagged “NRS” by the laboratory to indicate they were unable to resolve the result do to interference. In all instances the samples were later reanalyzed at dilution with no surrogate issues. No qualification or action was needed.

2.1.7 Field Duplicate (FD)

One FD was collected as part of this sample set. All FD RPD were within the laboratory specified control limits. No qualification or action was needed.

2.2 TPH-DXS (NWTPH-DX with silica gel cleanup)

2.2.1 Sample Receipt, Preservation, and Holding Times

Sample receipt, and preservation (2-6 degrees C) were acceptable.

Samples were analyzed within the requisite holding time limit.

2.2.2 Method Blanks/Detection Levels

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

2.2.3 Dilutions and Reanalyses

Two (2) diesel results exceeded the calibration range for the analysis and had to be reanalyzed at dilution. The results that exceeded the linear range were flagged as do-not-report (R). Results for all other analytes (Motor Oil) in the dilutions were flagged do-not-report (R) in favor of the lower dilution results.

2.2.4 Laboratory Control Samples (LCS)

All LCS %R were within the laboratory specified control limits. No qualification or action was needed.

2.2.5 Surrogates

All surrogate %R values were within laboratory specified control limit. No qualification or action was needed.

2.2.6 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

The MS result exceeded instrument calibration range with a high %R. The MSD %R was below lower control limit. The RPD exceeded control limit for this set. All associated results qualified as estimated (J/UJ).

2.2.7 Field Duplicate (FD)

One FD was collected as part of this sample set. All FD RPD were within the laboratory specified control limits. No qualification or action was needed.

2.3 TPH-GX (NWTPH-GX)

2.3.1 Sample Receipt, Preservation, and Holding Times

Sample receipt, and preservation (2-6 degrees C) were acceptable.

Samples were analyzed within the requisite holding time limit.

One trip blank was received with the cooler, but was not listed on the COC. Lab analyzed trip blank as per normal.

2.3.2 Method Blanks/Detection Levels

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

Because the analysis was done in conjunction with method 8260, some dilutions were run on samples that did not need dilutions for GX. Gasoline results from these dilutions have been qualified rejected (R), in favor of the lower dilutions.

2.3.3 Trip Blank

Target analytes were not detected at or above the reporting levels in the trip blank. No qualification or action was needed.

2.3.4 Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD)

All LCS and LCSD %R and RPD were within the laboratory specified control limits. No qualification or action was needed.

2.3.5 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

All MS and MSD %R and RPD were within the laboratory specified control limits. No qualification or action was needed.

2.3.6 Field Duplicate (FD)

One FD was collected as part of this sample set. All FD RPD were within the laboratory specified control limits. No qualification or action was needed.

2.4 VOCs (SW 8260C)

2.4.1 Sample Receipt, Preservation, and Holding Times

Sample receipt, and preservation (2-6 degrees C) were acceptable.

Samples were analyzed within the requisite holding time limit.

One trip blank was received with the cooler, but was not listed on the COC. Lab analyzed trip blank as per normal.

2.4.2 Method Blanks/Detection Levels

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

2.4.3 Trip Blank

Target analytes were not detected at or above the reporting levels in the trip blank. No qualification or action was needed.

2.4.4 Dilutions and Reanalyses

Some results exceeded the calibration range for the analysis and had to be reanalyzed at dilution. The results that exceeded the linear range were flagged as do-not-report (R). Results for all other analytes in the dilutions were flagged do-not-report (R) in favor of the lower dilution results.

2.4.5 Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD)

All LCS and LCSD %R and RPD were within the laboratory specified control limits. No qualification or action was needed.

2.4.6 Surrogates

The surrogate bromofluorobenzene had %R values below the lower control limit in the 1x dilutions of the following samples:

721-MW11-15-120915
MW-106-15-120915

Associated results from these dilutions have been qualified as estimated (J/UJ).

The surrogate d4-1,2-dichloroethane has %R in exceedance of the upper control limit in the 1x dilutions of the following samples:

721-MW14-15-120915
721-MW15-15-120915
721-MW501-120915
MW-106-15-120915
MW-109-15-120915

Detected results in these from these dilutions have been qualified as estimated (J).

2.4.7 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Benzene had a high %R in both the MS and MSD. Associated detected results have been qualified as estimated (J).

2-Chloroethylvinylether had a %R below the lower control limit in both the MS and MSD. Associated results have been qualified as estimated (J/UJ).

The RPD between the MS and MSD was in exceedance of control criteria for naphthalene. Associated results have been qualified as estimated (J/UJ).

2.4.8 Field Duplicate (FD)

One FD was collected as part of this sample set. All FD RPD were within the laboratory specified control limits. No qualification or action was needed.

2.4.9 Case Narrative/Laboratory Qualification

The laboratory noted in the case narrative that %D values for the continuing calibration standards were outside control parameters for some parts of this analysis. The lab qualified some of the results using lab flag "Q" to indicate this. Results flagged "Q" by the lab have been qualified as estimated (J) in validation.

The lab also indicated that some results had low spectral match and were flagged "M" to indicate such. Results flagged "M" by the lab have been qualified as estimated (J/UJ).

2.4.10 Overall Assessment

Accuracy was acceptable based on the LCS/LCSD, except as noted. Precision was acceptable based on the LCS/LCSD RPD values (when available), MS/MSD RPD (except as noted) and Field Duplicated RPD. The data are acceptable for use as qualified.

3 Data Validation Findings for SDG ASM1

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review by analyte group (analysis).

Sample Index

Sample ID	Date	Type	Matrix	TPH-DX	TPH-DXS	Analysis	
						TPH-GX	VOCs
29-14-120815	12/8/2015	N	GrWtr	X	X		
709-MW18-15-120915	12/9/2015	N	GrWtr	X	X		
709-MW17-15-120915	12/9/2015	N	GrWtr	X	X		
709-MW17-15-120815	12/8/2015	N	GrWtr			X	X
709-MW9-15-120815	12/8/2015	N	GrWtr			X	X
709-MW9-15-120915	12/9/2015	N	GrWtr	X	X		
709-MW11-15-120815	12/8/2015	N	GrWtr			X	X
709-MW11-15-120915	12/9/2015	N	GrWtr	X	X		
HC-N11-6-120815	12/8/2015	N	GrWtr	X	X	X	X
MW-105-25-120815	12/8/2015	N	GrWtr	X	X	X	X
MW130-15-120815	12/8/2015	N	GrWtr	X	X	X	X
709-MW20-15-120815	12/8/2015	N	GrWtr	X	X		
MW-137-25-120815	12/8/2015	N	GrWtr	X	X	X	X
95-15-120815	12/8/2015	N	GrWtr	X	X	X	X
MW110-25-120815	12/8/2015	N	GrWtr	X	X	X	X
MW104-25-120815	12/8/2015	N	GrWtr	X	X	X	X
MW104-15-120815	12/8/2015	N	GrWtr	X	X	X	X
721-MW-3-120915	12/9/2015	N	GrWtr	X	X	X	X
721-MW500-120915	12/9/2015	FD	GrWtr	X	X	X	X

3.1 TPH-DX (NWTPH-DX)

3.1.1 Sample Receipt, Preservation, and Holding Times

Samples were received in acceptable condition and within temperature requirements (2-6 degrees C). Laboratory receiving indicated the following:

1 sample was mislabeled on the COC. – The lab was able to correctly identify the sample.

1 sample ID was incorrectly transcribed by the lab. – Lab resubmitted data with corrected ID.

1 bottle had labels from 2 different samples affixed. – The lab was able to sort out the correct label.

The lab submitted a cooler receipt form with the lab report which is dated 12/15/2015 and appears to have no relevance to this project.

Samples were analyzed within the requisite holding time limit.

3.1.2 Method Blanks/Detection Levels

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

3.1.3 Dilutions and Reanalyses

Some results exceeded the calibration range for the analysis and had to be reanalyzed at dilution. The results that exceeded the linear range were flagged as do-not-report (R). Results for all other analytes in the dilutions were flagged do-not-report (R) in favor of the lower dilution results.

3.1.4 Laboratory Control Samples (LCS)

All LCS %R were within the laboratory specified control limits. No qualification or action was needed.

3.1.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

Both MS and MSD results exceeded calibration range for the instrument and had to be dismissed as having no relevance to the associated sample results. Used LCS and Field Duplicate (FD) to assess accuracy and precision of sample results.

3.1.6 Surrogates

Surrogate recovery was unable to be resolved in sample 709-MW17-15-120915 at 1x dilution due to interference. Associated results have been qualified as estimated (J/UJ).

Surrogate %R exceeded control limit for sample MW104-15-120815. Results were non-detect so no further qualification was applied.

3.1.7 Field Duplicate (FD)

One FD was collected as part of this sample set. All FD RPD were within the laboratory specified control limits. No qualification or action was needed.

3.2 TPH-DXS (NWTPH-DX with silica gel cleanup)

3.2.1 Sample Receipt, Preservation, and Holding Times

Samples were received in acceptable condition and within temperature requirements (2-6 degrees C). Laboratory receiving indicated the following:

1 sample was mislabeled on the COC. – The lab was able to correctly identify the sample.

1 sample ID was incorrectly transcribed by the lab. – Lab resubmitted data with corrected ID.

1 bottle had labels from 2 different samples affixed. – The lab was able to sort out the correct label.

The lab submitted a cooler receipt form with the lab report which is dated 12/15/2015 and appears to have no relevance to this project.

Samples were analyzed within the requisite holding time limit.

3.2.2 Method Blanks/Detection Levels

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

3.2.3 Dilutions and Reanalyses

Some results exceeded the calibration range for the analysis and had to be reanalyzed at dilution. The results that exceeded the linear range were flagged as do-not-report (R). Results for all other analytes in the dilutions were flagged do-not-report (R) in favor of the lower dilution results.

3.2.4 Laboratory Control Samples (LCS)

All LCS %R were within the laboratory specified control limits. No qualification or action was needed.

3.2.5 Surrogates

All surrogate %R values were within laboratory specified control limit. No qualification or action was needed.

3.2.6 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

All MS and MSD %R and RPD were within control limits. No qualification or action was needed.

3.2.7 Field Duplicate (FD)

One FD was collected as part of this sample set. All FD RPD were within the laboratory specified control limits. No qualification or action was needed.

3.3 TPH-GX (NWTPH-GX)

3.3.1 Sample Receipt, Preservation, and Holding Times

Samples were received in acceptable condition and within temperature requirements (2-6 degrees C). Laboratory receiving indicated the following:

1 sample was mislabeled on the COC. – The lab was able to correctly identify the sample.

1 sample ID was incorrectly transcribed by the lab. – Lab resubmitted data with corrected ID.

1 bottle had labels from 2 different samples affixed. – The lab was able to sort out the correct label.

The lab submitted a cooler receipt form with the lab report which is dated 12/15/2015 and appears to have no relevance to this project.

The lab noted the presence of some small air bubbles in some of the sample vials. The quantity of air in the vials was judged insufficient to have adversely affected recovery of volatile compounds. No action was needed.

Samples were analyzed within the requisite holding time limit.

3.3.2 Method Blanks/Detection Levels

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

Because the analysis was done in conjunction with method 8260, some dilutions were run on samples that did not need dilutions for GX. Gasoline results from these dilutions have been qualified rejected (R), in favor of the lower dilutions.

3.3.3 Trip Blank

Target analytes were not detected at or above the reporting levels in the trip blank. No qualification or action was needed.

3.3.4 Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD)

All LCS and LCSD %R and RPD were within the laboratory specified control limits. No qualification or action was needed.

3.3.5 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

No MS or MSD analyses were provided by the laboratory in association with this analysis. Used LCS and Field Duplicate (FD) to assess accuracy and precision of sample results.

3.3.6 Field Duplicate (FD)

One FD was collected as part of this sample set. All FD RPD were within the laboratory specified control limits. No qualification or action was needed.

3.4 VOCs (SW 8260C)

3.4.1 Sample Receipt, Preservation, and Holding Times

Samples were received in acceptable condition and within temperature requirements (2-6 degrees C). Laboratory receiving indicated the following:

1 sample was mislabeled on the COC. – The lab was able to correctly identify the sample.

1 sample ID was incorrectly transcribed by the lab. – Lab resubmitted data with corrected ID.

1 bottle had labels from 2 different samples affixed. – The lab was able to sort out the correct label.

The lab submitted a cooler receipt form with the lab report which is dated 12/15/2015 and appears to have no relevance to this project.

The lab noted the presence of some small air bubbles in some of the sample vials. The quantity of air in the vials was judged insufficient to have adversely affected recovery of volatile compounds. No action was needed.

Samples were analyzed within the requisite holding time limit.

3.4.2 Method Blanks/Detection Levels

Target analytes were not detected at or above the reporting levels in the method blank. No qualification or action was needed.

3.4.3 Trip Blank

Target analytes were not detected at or above the reporting levels in the trip blank. No qualification or action was needed.

3.4.4 Dilutions and Reanalyses

Some results exceeded the calibration range for the analysis and had to be reanalyzed at dilution. The results that exceeded the linear range were flagged as do-not-report (R). Results for all other analytes in the dilutions were flagged do-not-report (R) in favor of the lower dilution results.

3.4.5 Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD)

All LCS and LCSD %R and RPD were within the laboratory specified control limits. No qualification or action was needed.

3.4.6 Surrogates

The surrogate d4-1,2-dichloroethane has %R in exceedance of the upper control limit in the 1x dilutions of the following samples:

HC-N11-6-120815
MW130-15-120815
709-MW9-15-120815

Detected results in these from these dilutions have been qualified as estimated (J).

3.4.7 Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Acetone had a %R below the lower control limit in both the MS and MSD. Associated results have been qualified as estimated (J/UJ).

2-Chloroethylvinylether had a %R below the lower control limit in both the MS and MSD. Associated results have been qualified as estimated (J/UJ).

The RPD between the MS and MSD was acceptable for all analytes.

3.4.8 Field Duplicate (FD)

One FD was collected as part of this sample set. All FD RPD were within the laboratory specified control limits. No qualification or action was needed.

3.4.9 Overall Assessment

Accuracy was acceptable based on the LCS/LCSD and MS/MSD, except at noted. Precision was acceptable based on the LCS/LCSD RPD values (when available), MS/MSD RPD (when available) and Field Duplicated RPD. The data are acceptable for use as qualified.

4 Qualified Data Summary

Qualified sample results are listed below. This list does not include non-detected values simply qualified U. This list also does not include results that were rejected in favor of a lower dilution.

Qualified Sample Results for ASM0

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
721-MW10-25-120915	2-Chloroethylvinylether	1	UJ	MS/MSD %R low.
721-MW10-25-120915	Benzene	1	R	Result exceeded calibration range. MS/MSD %R exceeds upper control limit.
721-MW10-25-120915	Benzene	5	J	MS/MSD %R exceeds upper control limit
721-MW10-25-120915	Diesel Range Hydrocarbons	1	UJ	MSD %R Low, MS/MSD RPD exceeds control
721-MW10-25-120915	Naphthalene	1	UJ	MS/MSD RPD exceeds control.
721-MW11-15-120915	1,1,1,2-Tetrachloroethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,1,1-Trichloroethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,1,2,2-Tetrachloroethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,1,2-Trichloro-1,2,2-trifluoroethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,1,2-Trichloroethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,1-Dichloroethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,1-Dichloroethene	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,1-Dichloropropene	1	UJ	Surrogate recovery low for

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
				bromofluorobenzene.
721-MW11-15-120915	1,2,3-Trichlorobenzene	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,2,3-Trichloropropane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,2,4-Trichlorobenzene	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,2,4-Trimethylbenzene	1	J	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,2-Dibromo-3-chloropropane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,2-Dibromoethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,2-Dichlorobenzene	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,2-Dichloroethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,2-Dichloropropane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,3,5-Trimethylbenzene	1	J	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,3-Dichlorobenzene	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,3-Dichloropropane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	1,4-Dichlorobenzene	1	UJ	Surrogate recovery low for

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
				bromofluorobenzene.
721-MW11-15-120915	2,2-Dichloropropane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	2-Butanone	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	2-Chloroethylvinylether	1	UJ	MS/MSD %R low. Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	2-Chlorotoluene	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	2-Hexanone	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	4-Chlorotoluene	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	4-Isopropyltoluene	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	4-Methyl-2-Pentanone (MIBK)	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Acetone	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Acrolein	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Acrylonitrile	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Benzene	1	R	Result exceeded calibration range. MS/MSD %R exceeds upper control limit. Surrogate

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
				recovery low for bromofluorobenzene.
721-MW11-15-120915	Benzene	5	J	MS/MSD %R exceeds upper control limit
721-MW11-15-120915	Bromobenzene	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Bromochloromethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Bromodichloromethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Bromoethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Bromoform	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Bromomethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Carbon Disulfide	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Carbon Tetrachloride	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Chlorobenzene	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Chloroethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Chloroform	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Chloromethane	1	UJ	Surrogate recovery low for

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
				bromofluorobenzene.
721-MW11-15-120915	cis-1,2-Dichloroethene	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	cis-1,3-Dichloropropene	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Dibromochloromethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Dibromomethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Diesel Range Hydrocarbons	1	J	MSD %R Low, MS/MSD RPD exceeds control
721-MW11-15-120915	Ethylbenzene	1	J	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Hexachlorobutadiene	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Iodomethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Isopropylbenzene	1	J	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	m,p-Xylene	1	J	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Methylene Chloride	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Naphthalene	1	J	Associated Continuing Calibration Standard out of control; Estimated value with low spectral match parameters.

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
				MS/MSD RPD exceeds control. Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Naphthalene	5	R	Associated Continuing Calibration Standard out of control. Rejected in favor of lower dilution. MS/MSD RPD exceeds control.
721-MW11-15-120915	n-Butylbenzene	1	J	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	n-Propylbenzene	1	J	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	o-Xylene	1	J	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	sec-Butylbenzene	1	J	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Styrene	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	tert-Butylbenzene	1	J	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Tetrachloroethene	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Toluene	1	J	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	trans-1,2-Dichloroethene	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	trans-1,3-Dichloropropene	1	UJ	Surrogate recovery low for

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
				bromofluorobenzene.
721-MW11-15-120915	trans-1,4-Dichloro-2-butene	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Trichloroethene	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Trichlorofluoromethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Vinyl Acetate	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW11-15-120915	Vinyl Chloride	1	UJ	Surrogate recovery low for bromofluorobenzene.
721-MW12-15-120915	2-Chloroethylvinylether	1	UJ	MS/MSD %R low.
721-MW12-15-120915	Benzene	1	R	Result exceeded calibration range; MS/MSD %R exceeds upper control limit.
721-MW12-15-120915	Benzene	5	J	MS/MSD %R exceeds upper control limit
721-MW12-15-120915	Diesel Range Hydrocarbons	1	R	Result exceeded calibration range
721-MW12-15-120915	Diesel Range Hydrocarbons	1	J	MSD %R Low, MS/MSD RPD exceeds control
721-MW12-15-120915	m,p-Xylene	1	R	Result exceeded calibration range
721-MW12-15-120915	Naphthalene	1	J	Associated Continuing Calibration Standard out of control. MS/MSD RPD exceeds control.
721-MW12-15-120915	Naphthalene	5	R	Associated Continuing Calibration Standard out of control. Rejected in favor of lower dilution. MS/MSD

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
				RPD exceeds control.
721-MW14-15-120915	1,2,4-Trimethylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW14-15-120915	1,3,5-Trimethylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW14-15-120915	2-Chloroethylvinylether	1	UJ	MS/MSD %R low.
721-MW14-15-120915	4-Isopropyltoluene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW14-15-120915	Benzene	1	J	MS/MSD %R exceeds upper control limit. Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW14-15-120915	Diesel Range Hydrocarbons	1	R	Result exceeded calibration range
721-MW14-15-120915	Diesel Range Hydrocarbons	1	J	MSD %R Low, MS/MSD RPD exceeds control
721-MW14-15-120915	Ethylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW14-15-120915	Isopropylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW14-15-120915	m,p-Xylene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW14-15-120915	Naphthalene	1	UJ	The reporting limit is raised due to chromatographic interference. MS/MSD RPD exceeds control.
721-MW14-15-120915	n-Butylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW14-15-120915	n-Propylbenzene	1	J	Surrogate recovery high for

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
				d4-1,2-Dichloroethane.
721-MW14-15-120915	o-Xylene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW14-15-120915	sec-Butylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW14-15-120915	tert-Butylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW14-15-120915	Toluene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW15-15-120915	1,2,4-Trimethylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW15-15-120915	1,3,5-Trimethylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW15-15-120915	2-Chloroethylvinylether	1	UJ	MS/MSD %R low.
721-MW15-15-120915	4-Isopropyltoluene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW15-15-120915	Benzene	1	R	Result exceeded calibration range and saturated detector. MS/MSD %R exceeds upper control limit. Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW15-15-120915	Benzene	50	J	MS/MSD %R exceeds upper control limit
721-MW15-15-120915	Diesel Range Hydrocarbons	1	R	Result exceeded calibration range
721-MW15-15-120915	Diesel Range Hydrocarbons	1	R	Result exceeded calibration range
721-MW15-15-120915	Diesel Range Hydrocarbons	5	J	MSD %R Low, MS/MSD RPD exceeds control

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
721-MW15-15-120915	Ethylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW15-15-120915	Isopropylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW15-15-120915	m,p-Xylene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW15-15-120915	Naphthalene	1	UJ	The reporting limit is raised due to chromatographic interference. MS/MSD RPD exceeds control.
721-MW15-15-120915	n-Butylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW15-15-120915	n-Propylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW15-15-120915	o-Xylene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW15-15-120915	sec-Butylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW15-15-120915	tert-Butylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW15-15-120915	Toluene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW2-120915	2-Chloroethylvinylether	1	UJ	MS/MSD %R low.
721-MW2-120915	Benzene	1	R	Result exceeded calibration range and saturated detector. MS/MSD %R exceeds upper control limit.
721-MW2-120915	Benzene	20	J	MS/MSD %R exceeds upper control limit

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
721-MW2-120915	Diesel Range Hydrocarbons	1	R	Result exceeded calibration range
721-MW2-120915	Diesel Range Hydrocarbons	1	J	MSD %R Low, MS/MSD RPD exceeds control
721-MW2-120915	Naphthalene	1	UJ	The reporting limit is raised due to chromatographic interference. MS/MSD RPD exceeds control.
721-MW501-120915	1,2,4-Trimethylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW501-120915	1,3,5-Trimethylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW501-120915	2-Chloroethylvinylether	1	UJ	MS/MSD %R low.
721-MW501-120915	4-Isopropyltoluene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW501-120915	Benzene	50	J	MS/MSD %R exceeds upper control limit
721-MW501-120915	Benzene	1	R	Result exceeded calibration range and saturated detector. MS/MSD %R exceeds upper control limit. Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW501-120915	Diesel Range Hydrocarbons	1	R	Result exceeded calibration range
721-MW501-120915	Diesel Range Hydrocarbons	1	R	Result exceeded calibration range
721-MW501-120915	Diesel Range Hydrocarbons	5	J	MSD %R Low, MS/MSD RPD exceeds control
721-MW501-120915	Ethylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW501-120915	Isopropylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
721-MW501-120915	m,p-Xylene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW501-120915	Naphthalene	1	UJ	The reporting limit is raised due to chromatographic interference. MS/MSD RPD exceeds control.
721-MW501-120915	n-Butylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW501-120915	n-Propylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW501-120915	o-Xylene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW501-120915	sec-Butylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW501-120915	tert-Butylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW501-120915	Toluene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
721-MW6-15-120915	2-Chloroethylvinylether	1	UJ	MS/MSD %R low.
721-MW6-15-120915	Benzene	1	R	Result exceeded calibration range and saturated detector. MS/MSD %R exceeds upper control limit.
721-MW6-15-120915	Benzene	50	J	MS/MSD %R exceeds upper control limit
721-MW6-15-120915	Diesel Range Hydrocarbons	1	R	Result exceeded calibration range
721-MW6-15-120915	Diesel Range Hydrocarbons	1	J	MSD %R Low, MS/MSD RPD exceeds control
721-MW6-15-120915	Naphthalene	1	J	Associated Continuing Calibration

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
				Standard out of control. MS/MSD RPD exceeds control.
721-MW8-15-120915	2-Chloroethylvinylether	1	UJ	MS/MSD %R low.
721-MW8-15-120915	Benzene	1	J	MS/MSD %R exceeds upper control limit
721-MW8-15-120915	Diesel Range Hydrocarbons	1	UJ	MSD %R Low, MS/MSD RPD exceeds control
721-MW8-15-120915	Naphthalene	1	J	Associated Continuing Calibration Standard out of control. MS/MSD RPD exceeds control.
721-MW9-15-120915	2-Chloroethylvinylether	1	UJ	MS/MSD %R low.
721-MW9-15-120915	Benzene	1	J	MS/MSD %R exceeds upper control limit
721-MW9-15-120915	Diesel Range Hydrocarbons	1	UJ	MSD %R Low, MS/MSD RPD exceeds control
721-MW9-15-120915	Naphthalene	1	UJ	MS/MSD RPD exceeds control.
MW-106-15-120915	1,1,1,2-Tetrachloroethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	1,1,1-Trichloroethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	1,1,2,2-Tetrachloroethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	1,1,2-Trichloro-1,2,2-trifluoroethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	1,1,2-Trichloroethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	1,1-Dichloroethane	1	UJ	Surrogate recovery low for bromofluorobenzene.

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
MW-106-15-120915	1,1-Dichloroethene	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	1,1-Dichloropropene	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	1,2,3-Trichlorobenzene	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	1,2,3-Trichloropropane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	1,2,4-Trichlorobenzene	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	1,2,4-Trimethylbenzene	1	J	Surrogate recovery low for bromofluorobenzene. Surrogate recovery high for d4-1,2-Dichloroethane.
MW-106-15-120915	1,2-Dibromo-3-chloropropane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	1,2-Dibromoethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	1,2-Dichlorobenzene	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	1,2-Dichloroethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	1,2-Dichloropropane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	1,3,5-Trimethylbenzene	1	J	Surrogate recovery low for bromofluorobenzene. Surrogate recovery high for

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
				d4-1,2-Dichloroethane.
MW-106-15-120915	1,3-Dichlorobenzene	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	1,3-Dichloropropane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	1,4-Dichlorobenzene	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	2,2-Dichloropropane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	2-Butanone	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	2-Chloroethylvinylether	1	UJ	MS/MSD %R low. Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	2-Chlorotoluene	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	2-Hexanone	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	4-Chlorotoluene	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	4-Isopropyltoluene	1	J	Surrogate recovery low for bromofluorobenzene. Surrogate recovery high for d4-1,2-Dichloroethane.
MW-106-15-120915	4-Methyl-2-Pentanone (MIBK)	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Acetone	1	UJ	Surrogate recovery low for

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
				bromofluorobenzene.
MW-106-15-120915	Acrolein	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Acrylonitrile	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Benzene	1	R	Result exceeded calibration range. MS/MSD %R exceeds upper control limit. Surrogate recovery low for bromofluorobenzene. Surrogate recovery high for d4-1,2-Dichloroethane.
MW-106-15-120915	Benzene	5	J	MS/MSD %R exceeds upper control limit
MW-106-15-120915	Bromobenzene	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Bromochloromethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Bromodichloromethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Bromoethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Bromoform	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Bromomethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Carbon Disulfide	1	UJ	Surrogate recovery low for bromofluorobenzene.

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
MW-106-15-120915	Carbon Tetrachloride	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Chlorobenzene	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Chloroethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Chloroform	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Chloromethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	cis-1,2-Dichloroethene	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	cis-1,3-Dichloropropene	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Dibromochloromethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Dibromomethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Diesel Range Hydrocarbons	1	R	Result exceeded calibration range
MW-106-15-120915	Diesel Range Hydrocarbons	1	J	MSD %R Low, MS/MSD RPD exceeds control
MW-106-15-120915	Ethylbenzene	1	R	Result exceeded calibration range. Surrogate recovery low for bromofluorobenzene. Surrogate recovery high for d4-1,2-Dichloroethane.
MW-106-15-120915	Hexachlorobutadiene	1	UJ	Surrogate recovery low for

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
				bromofluorobenzene.
MW-106-15-120915	Iodomethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Isopropylbenzene	1	J	Surrogate recovery low for bromofluorobenzene. Surrogate recovery high for d4-1,2-Dichloroethane.
MW-106-15-120915	m,p-Xylene	1	J	Surrogate recovery low for bromofluorobenzene. Surrogate recovery high for d4-1,2-Dichloroethane.
MW-106-15-120915	Methylene Chloride	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Naphthalene	1	J	Associated Continuing Calibration Standard out of control. MS/MSD RPD exceeds control. Surrogate recovery low for bromofluorobenzene. Surrogate recovery high for d4-1,2-Dichloroethane.
MW-106-15-120915	Naphthalene	5	R	Associated Continuing Calibration Standard out of control; Rejected in favor of lower dilution. MS/MSD RPD exceeds control.
MW-106-15-120915	n-Butylbenzene	1	J	Surrogate recovery low for bromofluorobenzene. Surrogate recovery high for d4-1,2-Dichloroethane.

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
MW-106-15-120915	n-Propylbenzene	1	J	Surrogate recovery low for bromofluorobenzene. Surrogate recovery high for d4-1,2-Dichloroethane.
MW-106-15-120915	o-Xylene	1	J	Surrogate recovery low for bromofluorobenzene. Surrogate recovery high for d4-1,2-Dichloroethane.
MW-106-15-120915	sec-Butylbenzene	1	J	Surrogate recovery low for bromofluorobenzene. Surrogate recovery high for d4-1,2-Dichloroethane.
MW-106-15-120915	Styrene	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	tert-Butylbenzene	1	J	Surrogate recovery low for bromofluorobenzene. Surrogate recovery high for d4-1,2-Dichloroethane.
MW-106-15-120915	Tetrachloroethene	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Toluene	1	J	Surrogate recovery low for bromofluorobenzene. Surrogate recovery high for d4-1,2-Dichloroethane.
MW-106-15-120915	trans-1,2-Dichloroethene	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	trans-1,3-Dichloropropene	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	trans-1,4-Dichloro-2-butene	1	UJ	Surrogate recovery low for

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
				bromofluorobenzene.
MW-106-15-120915	Trichloroethene	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Trichlorofluoromethane	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Vinyl Acetate	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-106-15-120915	Vinyl Chloride	1	UJ	Surrogate recovery low for bromofluorobenzene.
MW-109-15-120915	1,2,4-Trimethylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
MW-109-15-120915	1,3,5-Trimethylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
MW-109-15-120915	2-Chloroethylvinylether	1	UJ	MS/MSD %R low.
MW-109-15-120915	4-Isopropyltoluene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
MW-109-15-120915	Benzene	1	R	Result exceeded calibration range and saturated detector. MS/MSD %R exceeds upper control limit. Surrogate recovery high for d4-1,2-Dichloroethane.
MW-109-15-120915	Benzene	20	J	MS/MSD %R exceeds upper control limit
MW-109-15-120915	Diesel Range Hydrocarbons	1	R	Result exceeded calibration range
MW-109-15-120915	Diesel Range Hydrocarbons	1	J	MSD %R Low, MS/MSD RPD exceeds control
MW-109-15-120915	Ethylbenzene	1	R	Result exceeded calibration range. Surrogate

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
				recovery high for d4-1,2-Dichloroethane.
MW-109-15-120915	Isopropylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
MW-109-15-120915	m,p-Xylene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
MW-109-15-120915	Naphthalene	1	J	Associated Continuing Calibration Standard out of control. MS/MSD RPD exceeds control. Surrogate recovery high for d4-1,2-Dichloroethane.
MW-109-15-120915	Naphthalene	20	R	Associated Continuing Calibration Standard out of control; Rejected in favor of lower dilution. MS/MSD RPD exceeds control.
MW-109-15-120915	n-Butylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
MW-109-15-120915	n-Propylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
MW-109-15-120915	o-Xylene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
MW-109-15-120915	sec-Butylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
MW-109-15-120915	tert-Butylbenzene	1	J	Surrogate recovery high for d4-1,2-Dichloroethane.
MW-109-15-120915	Toluene	1	J	Surrogate recovery high for

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
				d4-1,2-Dichloroethane.
MW-109-15-120915	trans-1,3-Dichloropropene	1	J	Estimated value with low spectral match parameters. Surrogate recovery high for d4-1,2-Dichloroethane.

Qualified Sample Results for ASM1

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
709-MW11-15-120815	2-Chloroethylvinylether	1	U	MS/MSD %R below lower control limit
709-MW11-15-120815	Acetone	1	UJ	MS/MSD %R below lower control limit
709-MW11-15-120815	Naphthalene	1	J	Associated Continuing Calibration Standard out of control.
709-MW11-15-120915	Diesel Range Hydrocarbons	1	R	Result exceeded calibration range
709-MW17-15-120815	2-Chloroethylvinylether	1	UJ	MS/MSD %R below lower control limit
709-MW17-15-120815	Acetone	1	J	MS/MSD %R below lower control limit
709-MW17-15-120815	Naphthalene	1	J	Associated Continuing Calibration Standard out of control.
709-MW17-15-120915	Diesel Range Hydrocarbons	1	R	Result exceeded calibration range. Surrogate recovery unable to resolve.
709-MW17-15-120915	Motor Oil	1	J	Surrogate recovery unable to resolve.
709-MW9-15-120815	1,2,4-Trimethylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
709-MW9-15-120815	1,3,5-Trimethylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
709-MW9-15-120815	2-Chloroethylvinylether	1	UJ	MS/MSD %R below lower control limit
709-MW9-15-120815	4-Isopropyltoluene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
709-MW9-15-120815	Acetone	1	UJ	MS/MSD %R below lower control limit
709-MW9-15-120815	Acetone	5	UJ	MS/MSD %R below lower control limit

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
709-MW9-15-120815	Benzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
709-MW9-15-120815	cis-1,2-Dichloroethene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
709-MW9-15-120815	Ethylbenzene	1	R	Result exceeded calibration range. Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
709-MW9-15-120815	Isopropylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
709-MW9-15-120815	m,p-Xylene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
709-MW9-15-120815	Naphthalene	1	J	Associated Continuing Calibration Standard out of control. Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
709-MW9-15-120815	Naphthalene	5	R	Associated Continuing Calibration Standard out of control. Rejected in favor of lower dilution.
709-MW9-15-120815	n-Butylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
709-MW9-15-120815	n-Propylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
709-MW9-15-120815	o-Xylene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
709-MW9-15-120815	sec-Butylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
709-MW9-15-120815	tert-Butylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
709-MW9-15-120815	Toluene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
709-MW9-15-120815	Vinyl Chloride	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
709-MW9-15-120915	Diesel Range Hydrocarbons	1	R	Result exceeded calibration range
721-MW-3-120915	2-Chloroethylvinylether	1	UJ	MS/MSD %R below lower control limit

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
721-MW-3-120915	Acetone	1	UJ	MS/MSD %R below lower control limit
721-MW-3-120915	Diesel Range Hydrocarbons	1	R	Result exceeded calibration range
721-MW500-120915	2-Chloroethylvinylether	1	UJ	MS/MSD %R below lower control limit
721-MW500-120915	Acetone	1	UJ	MS/MSD %R below lower control limit
721-MW500-120915	Diesel Range Hydrocarbons	1	R	Result exceeded calibration range
95-15-120815	2-Chloroethylvinylether	1	UJ	MS/MSD %R below lower control limit
95-15-120815	Acetone	1	UJ	MS/MSD %R below lower control limit
HC-N11-6-120815	1,2,4-Trimethylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
HC-N11-6-120815	1,3,5-Trimethylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
HC-N11-6-120815	2-Chloroethylvinylether	1	UJ	MS/MSD %R below lower control limit
HC-N11-6-120815	4-Isopropyltoluene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
HC-N11-6-120815	Acetone	1	UJ	MS/MSD %R below lower control limit
HC-N11-6-120815	Benzene	1	R	Result exceeded calibration range
HC-N11-6-120815	Diesel Range Hydrocarbons	1	R	Result exceeded calibration range
HC-N11-6-120815	Ethylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
HC-N11-6-120815	Isopropylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
HC-N11-6-120815	m,p-Xylene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
HC-N11-6-120815	Naphthalene	1	U	The reporting limit is raised due to chromatographic interference
HC-N11-6-120815	n-Butylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
HC-N11-6-120815	n-Propylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
HC-N11-6-120815	o-Xylene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
HC-N11-6-120815	sec-Butylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
HC-N11-6-120815	tert-Butylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
HC-N11-6-120815	Toluene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
MW104-15-120815	2-Chloroethylvinylether	1	UJ	MS/MSD %R below lower control limit
MW104-15-120815	Acetone	1	UJ	MS/MSD %R below lower control limit
MW104-25-120815	2-Chloroethylvinylether	1	UJ	MS/MSD %R below lower control limit
MW104-25-120815	Acetone	1	UJ	MS/MSD %R below lower control limit
MW-105-25-120815	2-Chloroethylvinylether	1	UJ	MS/MSD %R below lower control limit
MW-105-25-120815	Acetone	1	UJ	MS/MSD %R below lower control limit
MW-105-25-120815	Benzene	1	R	Result exceeded calibration range
MW110-25-120815	2-Chloroethylvinylether	1	UJ	MS/MSD %R below lower control limit
MW110-25-120815	Acetone	1	UJ	MS/MSD %R below lower control limit
MW110-25-120815	Diesel Range Hydrocarbons	1	R	Result exceeded calibration range
MW130-15-120815	1,2,4-Trimethylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
MW130-15-120815	1,3,5-Trimethylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
MW130-15-120815	2-Chloroethylvinylether	1	UJ	MS/MSD %R below lower control limit
MW130-15-120815	4-Isopropyltoluene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
MW130-15-120815	Acetone	1	UJ	MS/MSD %R below lower control limit
MW130-15-120815	Benzene	1	R	Result exceeded calibration range. Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
MW130-15-120815	Diesel Range Hydrocarbons	1	R	Result exceeded calibration range
MW130-15-120815	Ethylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.

Sample	Analyte	Dilution Factor	Qualifier	Qualification Reason
MW130-15-120815	Isopropylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
MW130-15-120815	m,p-Xylene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
MW130-15-120815	Naphthalene	1	U	The reporting limit is raised due to chromatographic interference
MW130-15-120815	n-Propylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
MW130-15-120815	o-Xylene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
MW130-15-120815	sec-Butylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
MW130-15-120815	tert-Butylbenzene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
MW130-15-120815	Toluene	1	J	Surrogate recovery of d4-1,2-Dichloroethane exceeds control limit.
MW-137-25-120815	2-Chloroethylvinylether	1	UJ	MS/MSD %R below lower control limit
MW-137-25-120815	Acetone	1	UJ	MS/MSD %R below lower control limit

Data Qualifier Definitions

Data Qualifier	Definition
J	The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.
R	The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
U	The analyte was analyzed for, but was considered not detected at the reporting limit or reported value.
UJ	The analyte was analyzed for, and the associated quantitation limit was an estimated value.

5 References

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Data Validation Report

Port of Tacoma Alexander Avenue Petroleum Tank Facilities Site
Tacoma, Washington

May 2015 Groundwater Monitoring

Laboratory SDGs:

AGI7, AGI8, AGI9, AGL3

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ACRONYMS

%D	percent difference
%D_f	percent drift
%R	percent recovery
%RSD	percent relative standard deviation
ARI	Analytical Resources, Inc. - Tukwila, Washington
BFB	bromofluorobenzene
CCB	continuing calibration blank
CCV	continuing calibration verification
CF	calibration factor
CLP	U.S. EPA Contract Laboratory Program
COC	chain-of-custody
EPA	U.S. Environmental Protection Agency
GC/FID	gas chromatography/flame ionization detector
GC/MS	gas chromatograph/mass spectrometer
ICAL	initial calibration
ICV	initial calibration verification
LCL	lower control limit
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MDL	method detection limit
µg/L	microgram per liter
mg/L	milligram per liter
MS	matrix spike
MSD	matrix spike duplicate
NFGs	CLP National Functional Guidelines for Data Review (EPA 2014)
QA/QC	quality assurance/quality control
RF	response factor
RL	reporting limit
RPD	relative percent difference
RRT	relative retention time
SDG	sample delivery group
SG	sample extract went through acid/silica gel clean up to remove biogenic matters
VOCs	volatile organic compounds

INTRODUCTION

This report presents and discusses findings of the data validation performed on analytical data for water samples collected during May 2015 for the referenced project. The laboratory report validated herein was submitted by Analytical Resources, Inc. (ARI) in Tukwila, Washington.

A level III (or Stage 2B as defined in EPA 2009) data validation was performed on this laboratory report. The validation followed the procedures specified in USEPA CLP Functional Guidelines ([NFGs], EPA 2014a and 2014b), with modifications to accommodate project and analytical method requirements. The numerical quality assurance/quality control (QA/QC) criteria applied to the validation were in accordance with those specified in the quality assurance project plans ([QAPPs], Aspect 2014) and the current performance-based control limits established by the laboratory (laboratory control limits). Instrument calibration, frequency of QC analyses, and analytical sequence requirements were evaluated against the respective analytical methods.

Validation findings are discussed in each section pertinent to the QC parameter for each type of analysis. Qualified data with applied data qualifiers are summarized in the **Summary** section at the end of this report. Samples and the associated analyses validated herein are summarized as follows:

Field Sample ID	Laboratory Sample ID	Sampling Date	Matrix	Analysis			
				VOCs	TPH-G	TPH-Dx	Lead
MW-110-15-051815	15-9644-AGI7A	05/18/15	Water	X	X	X	
MW-110-25-051815	15-9645-AGI7B	05/18/15	Water	X	X	X	
MW-104-25-051815	15-9646-AGI7C	05/18/15	Water	X	X	X	
721-MW-10-15-051815	15-9647-AGI7D	05/18/15	Water	X	X	X	
MW-102-15-051815	15-9648-AGI7E	05/18/15	Water	X	X	X	
95-15-051815	15-9649-AGI7F	05/18/15	Water	X	X	X	
MW-104-15-051815	15-9650-AGI7G	05/18/15	Water	X	X	X	
721-MW10-25-051815	15-9651-AGI7H	05/18/15	Water	X	X	X	
MW-105-25-051815	15-9652-AGI7I	05/18/15	Water	X	X	X	
MW-105-15-051815	15-9653-AGI7J	05/18/15	Water	X	X	X	
MW-102-25-051815	15-9664-AGI8A	05/18/15	Water	X	X	X	
MW-130-15-051915	15-9665-AGI8B	05/19/15	Water	X	X	X	
MW-137-25-051915	15-9666-AGI8C	05/19/15	Water	X	X	X	
721-MW9-15-051915	15-9667-AGI8D	05/19/15	Water	X	X	X	
721-MW9-25-051915	15-9668-AGI8E	05/19/15	Water	X	X	X	X
MW-109-15-051915	15-9669-AGI8F	05/19/15	Water	X	X	X	
721-MW8-15-051915	15-9670-AGI8G	05/19/15	Water	X	X	X	

Field Sample ID	Laboratory Sample ID	Sampling Date	Matrix	Analysis			
				VOCs	TPH-G	TPH-Dx	Lead
721-MW15-25-051915	15-9671-AGI8H	05/19/15	Water	X	X	X	
721-MW13-15-051915	15-9672-AGI8I	05/19/15	Water	X	X	X	
721-MW3-051915	15-9673-AGI8J	05/19/15	Water	X	X	X	
721-MW13-50-051915	15-9674-AGI8K	05/19/15	Water	X	X		
SP-101-051915	15-9685-AGI9A	05/19/15	Water	X	X	X	
SP-102-051915	15-9686-AGI9B	05/19/15	Water	X	X	X	
SP-103-051915	15-9687-AGI9C	05/19/15	Water	X	X	X	
93C-50-052015	15-9799-AGL3A	05/20/15	Water	X	X		
709-MW21-25-052015	15-9800-AGL3B	05/20/15	Water	X	X	X	
709-MW3-15-052015	15-9801-AGL3C	05/20/15	Water	X	X	X	
MW106-15-052015	15-9802-AGL3D	05/20/15	Water	X	X	X	
MWFD-052015	15-9803-AGL3E	05/20/15	Water	X	X	X	
709-MW9-15-052015	15-9804-AGL3F	05/20/15	Water	X	X	X	
709-MW9-25-052015	15-9805-AGL3G	05/20/15	Water	X	X	X	
95C-25-052015	15-9806-AGL3H	05/20/15	Water	X	X	X	

Notes:

TPH-Dx - Diesel and motor oil range total petroleum hydrocarbon

TPH-G - Gasoline range total petroleum hydrocarbon

VOCs - Volatile organic compounds

X - The analysis was requested and performed on the sample.

The analytical parameters requested for the samples, the respective analytical methods, and the analytical laboratories are summarized below:

Parameter	Analytical Method	Analytical Laboratory
Volatile Organic Compounds (VOCs)	SW846 Method 8260C	Analytical Resources, Inc. Tukwila, Washington
TPH - Gasoline Range	NWTPH-Gx	
TPH - Diesel & Motor Oil Range	NWTPH-Dx	
Total Lead	SW846 Method 6010C	

Notes:

1. SW846 - USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Third Edition, December 1996.
2. NWTPH Methods – Washington State Department of Ecology, Analytical Methods for Petroleum Hydrocarbons, Publication No. ECY 97-602, June 1997.

DATA VALIDATION FINDINGS

1. VOCs by GC/MS (EPA Method SW8260C)

1.1 Sample Management and Holding Time

Samples were received in the laboratory intact and in consistence with the accompanying chain-of-custody (COC) documentation. The temperature of all coolers were greater than 6°C upon the receipt at the laboratory. According to the sampler, samples were stored at or below 6°C before hand-delivered to the laboratory. The elevated cooler temperature had no significant effects in sample integrity. No data qualifying action was taken in this case. No other anomalies were identified in relation to sample preservation, handling, and transport.

Water samples should be preserved (pH <2) at the time of collection, and analyzed within 14 days (7 days if unpreserved) of collection. All samples were preserved and analyzed within the required holding time, except that sample 93C-50-052015 was not preserved to pH<2 and was analyzed 2 days past the 7-day required holding time. All VOCs results for this sample were qualified (UJ) for non-detects and (J) for detects as estimated.

1.2 GC/MS Instrument Performance Check

The method require that (1) gas chromatograph/mass spectrometer (GC/MS) tuning analysis be performed, using bromofluorobenzene (BFB), at the beginning of each 12-hour period prior to any analysis, and (2) specific mass ions meet the criteria provided in the method. All instrument performance checks met the requirements.

1.3 Initial Calibration (ICAL)

The ICAL criteria require that (1) if linear average RFs is chosen as the quantitation option, at least five standards at different concentrations should be analyzed and the percent relative standard deviation (%RSD) of response factors (RFs) be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be >0.995 , and (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be >0.99 . ICALs either met the requirements or the outliers had no adverse effects on data usability (*e.g.*, %RSD $>20\%$ for a compound not detected in samples).

An initial calibration verification (ICV) standard (second source standard) was analyzed to verify the calibration curve. Percent difference (%D) values were either within $\pm 30\%$, or the exceedance had no adverse effects on data usability (*e.g.*, biased high ICV recovery for a compound not detected in samples).

1.4 Calibration Verification (CCV)

The CCV criteria requires that (1) continuing calibrations be analyzed at the beginning of each 12-hour analysis period prior to the analysis of method blank and samples, and (2) the %D value be within $\pm 20\%$.

Calibration verifications either met the requirements, or the exceedance had no adverse effects on data usability (*e.g.*, biased high CCV recovery for a compound not detected in samples), except for the following:

CCV ID	Compound	%D	Bias	Affected Sample	Data Qualifier
Instrument: NT3 5/26/15, 10:01	Bromomethane Acrolein	-22.0% -36.3%	Low	MW-110-15-051815 MW-110-25-051815 MW-104-25-051815 721-MW-10-15-051815 MW-102-15-051815 95-15-051815 MW-104-15-051815 721-MW10-25-051815 MW-105-25-051815 MW-105-15-051815	UJ
Instrument: NT3 5/26/15, 10:01	Chloromethane Bromomethane	-20.6% -23.9%	Low	721-MW13-15-051915 721-MW8-15-051915	UJ
Instrument: NT3 5/29/15, 08:43	Chloromethane Bromomethane	-20.6% -23.9%	Low	93C-50-052015 709-MW21-25-052015 709-MW3-15-052015 MW106-15-052015 MWFD-052015 709-MW9-15-052015 709-MW9-25-052015 95C-25-052015	UJ

1.5 Method Blanks

Method blanks were prepared and analyzed as required. Target compounds were not detected at or above the method detection limits (MDLs) in method blanks, except methylene chloride in two of the method blanks.

1.6 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and LCSD were prepared and analyzed as required by the method. Percent recovery (%R) and relative percent difference (RPD) values either met the project control limits, or the outliers had no adverse effects on data usability (*e.g.*, biased high recovery for a compound not detected in samples).

1.7 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were either within the project control limits, or the outliers had no adverse effects on data quality (e.g., biased high recovery and associated compounds not detected in the sample, or resulted from chemical interference).

1.8 Matrix Spike (MS) and MS Duplicate (MSD)

MS and MSD analyses were performed on sample MW106-15-052015 as requested. All %R and RPD values were either within the project control limits, or the outliers had no adverse effects on data quality (e.g., biased high recovery and associated compounds not detected in the sample, or the low-bias %R value deviation from the LCL was <10% in either MS or MSD).

1.9 Internal Standards

The method requires that (1) internal standard retention time be within ± 30 seconds from that of the associated 12-hour calibration standard, and (2) the area counts of all internal standards be within -50% to $+100\%$ of the associated 12-hour calibration standard. All internal standards in the sample and associated QC analyses met the criteria.

1.10 Reporting Limit and Target Compound Quantitation

Reporting limits (RLs) were supported with adequate initial calibration concentrations. RLs for selected analytes in a number of samples were raised due to chemical interference present in the samples. The reported RLs were considered the best-possible quantitation limits for the samples. No further action was required.

1.11 Field Duplicates

One field duplicate pair was submitted for VOCs analyses. Sample results, RPD (or concentration difference) values, and data qualification for detected analytes were presented in **Appendix A**.

1.12 Overall Assessment of VOCs Data Usability

The ion abundance ratios for the detections of cis-1,2-dichloroethane in sample 95-15-051815 and 2-butanone in samples MW-130-15-051915 and 721-MW9-15-051915 did not meet method requirements for compound identification. These results were qualified (J) as estimated. VOCs data are of known quality and acceptable for use, as qualified.

2. TPH-Gasoline by GC/FID (Method NWTPH-Gx)

2.1 Sample Management and Holding Times

No anomalies were identified in relation to sample preservation, handling, and transport except discussed in Section 1.1.

Water samples should be preserved at the time of collection, and analyzed within 14 days of collection. All samples were preserved as required and analyzed within the required holding times.

2.2 Initial Calibration (ICAL)

The method criteria require that (1) if linear average RFs is chosen as the quantitation option, the %RSD of RFs be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be ≥ 0.995 , (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be ≥ 0.990 , and (4) the back-calculated %D value for each calibration standard be within $\pm 15\%$. Initial calibration met the criteria for all target compounds. An ICV (second source) standard was analyzed to verify the calibration curve. %D values were within $\pm 20\%$.

2.3 Calibration Verification

Continuing calibration verification (CCV) analyses were performed at the required frequency for all analytical sequences as required by the method. The %D values for all CCVs met the method criterion ($\pm 20\%$).

2.4 Method Blanks

Method blanks were prepared and analyzed as required. TPH-Gasoline was not detected at or above the MDLs in the method blanks.

2.5 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were within the project control limits, except for the following:

SDG#	Sample ID	Surrogate Spike	%R	Control Limit	Affected Analyte	Data Qualifier
AGI8	MW-102-25-051815	Trifluorotoluene	44.5%	50-150%	TPH-Gasoline	J

2.6 Matrix Spike and Matrix Spike Duplicate

MS and MSD analyses were performed on sample MW106-15-052015 as requested. All %R and RPD values were within the laboratory control limits.

2.7 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and LCSD analyses were performed as required by the method. All %R and RPD values were within the laboratory control limits.

2.8 Reporting Limits and Target Compound Quantitation

Sample-specific RLs were supported with adequate initial calibration concentrations.

2.9 Field Duplicates

One field duplicate pair was submitted for TPH-Gasoline analyses. Sample results, RPD (or concentration difference) values, and data qualification were presented in **Appendix A**.

2.10 Overall Assessment of TPH-Gasoline Data Usability

TPH-Gasoline data are of known quality and acceptable for use as qualified.

3. TPH-Diesel & Motor Oil by GC/FID (Method NWTPH-Dx)

3.1 Holding Time

No anomalies were identified in relation to sample preservation, handling, and transport as discussed in Section 1.1.

Acid-preserved water samples should be extracted within 14 days of collection. Extracts should be analyzed within 40 days of extraction. All samples were extracted and analyzed within the recommended holding times.

3.2 Initial Calibration

The method criteria require that (1) if linear average RFs is chosen as the quantitation option, the %RSD of RFs be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be ≥ 0.995 , (3) if six-point non-

linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be ≥ 0.990 , and (4) the back-calculated %D value for each calibration standard be within $\pm 15\%$. Initial calibration met the criteria for all target compounds.

An ICV (second source) standard was analyzed to verify the calibration curve. %D values were within $\pm 20\%$.

3.3 Calibration Verification

The method requires that (1) a mid-range check standard be analyzed prior to and after each analytical batch, and (2) the percent drift (%D) value be within $\pm 20\%$ of the true value.

Calibration verification was performed at required frequency. The %D values were within the $\pm 20\%$ criterion.

3.4 Method Blanks

Method blanks were prepared and analyzed as required. TPH-Diesel and TPH-Motor Oil were not detected at or above the MDLs in the method blank.

3.5 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were within the laboratory control limits, except for the following:

SDG#	Sample ID	Surrogate Spike	%R	Control Limit	Affected Analyte	Data Qualifier
AGI8	721-MW9-25-051915	<i>o</i> -Terphenyl	44.5%	50-150%	TPH-Diesel TPH-Motor Oil	J
AGI8	721-MW9-25-051915	<i>o</i> -Terphenyl	35.4%	50-150%	TPH-Diesel (SG) TPH-Motor Oil (SG)	UJ

Note: SG – Sample extract was treated with acid/silica gel to remove biogenic matters in the extract

3.6 Matrix Spike (MS) and MS Duplicate (MSD)

MS and MSD analyses were performed on sample MW106-15-052015 as requested. All %R and RPD values were within the laboratory control limits.

3.7 Laboratory Control Sample (LCS) and LCSD Duplicate (LCSD)

LCS and LCSD analyses were performed as required by the method. All %R and RPD values were within the laboratory control limits.

3.8 Reporting Limits and Target Compound Quantitation

The reported RLs were supported with adequate ICAL concentrations, and met the project requirements.

3.9 Field Duplicates

One field duplicate pair was submitted for TPH-Diesel and TPH-Motor Oil analyses. Sample results, RPD (or concentration difference) values, and data qualification were presented in **Appendix A**.

3.10 Overall Assessment of TPH-Diesel and Motor Oil Data Usability

TPH-Diesel and TPH-Motor Oil data are of known quality and acceptable for use, as qualified.

4. Total Lead by ICP/AES (SW846 Method 6010C)

4.1 Sample Management and Holding Times

No anomalies were identified in relation to sample preservation, handling, and transport.

Water samples should be analyzed within 180 days for total lead. Samples were analyzed within the required holding time.

4.2 Initial Calibration (ICAL)

The ICP/AES method requires that (1) a blank and one calibration standard be used in establishing the analytical curve, and (2) the average of replicate exposures be reported for all standards, QC, and sample analyses. All ICALs met the method requirements.

4.3 Calibration Verification (ICV and CCV)

Initial calibration verifications (ICVs) and continuing calibration verifications (CCVs) were analyzed at the required frequency. The %R values either met the control criteria (90 – 110%) or the exceedance had no adverse effects on data usability (e.g., high-bias %D value where the target compound was not detected in associated sample).

4.4 Blanks

Calibration Blanks: Initial calibration blanks (ICBs) and continuing calibration blanks (CCBs) were not analyzed after calibration verification standards. Target analytes were

either not detected at or above the RLs in the ICBs and CCBs, or sample results affected by the ICB/CCB detections were qualified as results of detections in preparation blanks.

Preparation Blanks: Preparation blanks were prepared and analyzed as required. Target analytes were not detected at or above the RLs in the preparation blanks.

4.5 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and/or LCSD analyses were performed as required by the method. All %R and RPD values were within the project control limits, or the exceedance had no adverse effects on data usability (e.g., high-bias %R value where the target compound was not detected in associated sample).

4.6 Matrix Spike (MS)

MS analysis was performed on sample 721-MW9-25-051915. The %R value met the laboratory control limits.

4.7 Laboratory Duplicate Analysis

Laboratory duplicate analysis was performed on sample 721-MW9-25-051915. The RPD value met the laboratory control limit.

4.8 Method Reporting Limits and Analyte Quantitation

Sample-specific RLs were supported with adequate initial calibration concentrations.

4.9 Field Duplicates

Field duplicates were not submitted for lead analyses.

4.10 Overall Assessment of Total Lead Data Usability

Total lead data are of known quality and acceptable for use.

SUMMARY

Table I. Data Affected by QC Anomalies:

Laboratory Sample ID	Field Sample ID	Analyte	Qualifier	Qualified Reason
AGL3A	93C-50-052015	VOCs (SW846 8260C)	J/UJ	Sample was analyzed past the required holding time
AGI7A AGI7B AGI7C AGI7D AGI7E AGI7F AGI7G AGI7H AGI7I AGI7J	MW-110-15-051815 MW-110-25-051815 MW-104-25-051815 721-MW-10-15-051815 MW-102-15-051815 95-15-051815 MW-104-15-051815 721-MW10-25-051815 MW-105-25-051815 MW-105-15-051815	Bromomethane Acrolein	UJ	CCV %D value was <LCL
AGI8G AGI8I	721-MW13-15-051915 721-MW8-15-051915	Chloromethane Bromomethane	UJ	CCV %D value was <LCL
AGL3A AGL3B AGL3C AGL3D AGL3E AGL3F AGL3G AGL3H	93C-50-052015 709-MW21-25-052015 709-MW3-15-052015 MW106-15-052015 MWFD-052015 709-MW9-15-052015 709-MW9-25-052015 95C-25-052015	Chloromethane Bromomethane	UJ	CCV %D value was <LCL
AGI7F	95-15-051815	<i>cis</i> -1,2-Dichloroethene	J	Ion abundance ratio did not meet method criteria for compound identification.
AGI8B AGI8D	MW-130-15-051915 721-MW9-15-051915	2-Butanone	J	Ion abundance ratio did not meet method criteria for compound identification.
AGI8A	MW-102-25-051815	TPH-Gasoline	UJ	Surrogate spike %R value <LCL
AGI8E	721-MW9-25-051915	TPH-Diesel TPH-Motor Oil	J	Surrogate spike %R value <LCL
AGI8E	721-MW9-25-051915	TPH-Diesel (SG) TPH-Motor Oil (SG)	UJ	Surrogate spike %R value <LCL

Notes:

%D – Percent difference

CCV –Continuing calibration verification

J/UJ – Detects were qualified (J) and non-detects qualified (UJ)

LCL – Lower control limit

SG – Sample extract went through acid/silica gel clean up to remove biogenic matters in the extract

Table II. Data Qualifiers are defined as follows:

Data Qualifier	Definition
J	The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.
U	The analyte was analyzed for, but was considered not detected at the reporting limit or reported value.
UJ	The analyte was analyzed for, and the associated quantitation limit was an estimated value.

Approved By: 
Mingta Lin, Senior Project Chemist

Date: 12/4/2015

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Appendix A

Field duplicate RPD is indicative of field and laboratory precision and sample homogeneity in combination. The EPA *CLP National Functional Guidelines or Sampling and Analysis Plan* do not specify criteria for field duplicate evaluation. An advisory criterion of 30% was applied to evaluating the RPD values of field duplicate results that are $\geq 5 \times \text{RL}$. For results that are $< 5 \times \text{RL}$, an advisory criterion of $\pm 2 \times \text{RL}$ was applied to evaluating the concentration differences. The RPD (or concentration difference as applicable) values and data qualification for detected compounds in field duplicates are presented as follows:

Analytes	Unit	RL	Sample ID & Results		RPD	Difference	Data Qualifier
			MW106-15-052015	MW-FD-052015			
TPH-Diesel	mg/L	1000	9500	9100	7%		
TPH-Oil	mg/L	200	1400	1400	0%		
TPH-Diesel (SG)	mg/L	100	730	730	0%		
TPH-Oil (SG)	mg/L	200	ND	ND		0	
TPH-Gasoline	mg/L	250	7600	7600	0%		
1,2,4-Trimethylbenzene	$\mu\text{g/L}$	0.2	64	67	8%		
1,3,5-Trimethylbenzene	$\mu\text{g/L}$	0.2	14	15	8%		
2-Butanone	$\mu\text{g/L}$	5	9.4	9	0%		
Benzene	$\mu\text{g/L}$	2	510	480	7%		
Ethylbenzene	$\mu\text{g/L}$	2	430	410	9%		
Isopropylbenzene	$\mu\text{g/L}$	0.2	31	36	4%		
<i>m,p</i> -Xylenes	$\mu\text{g/L}$	4	210	200	8%		
Naphthalene	$\mu\text{g/L}$	0.5	40	44	17%		
<i>n</i> -Butylbenzene	$\mu\text{g/L}$	0.2	5.5	5.4	0%		
<i>n</i> -Propylbenzene	$\mu\text{g/L}$	0.2	35	40	18%		
<i>o</i> -Xylene	$\mu\text{g/L}$	0.2	18	16	18%		
<i>sec</i> -Butylbenzene	$\mu\text{g/L}$	0.2	5.8	5.8	0%		
Toluene	$\mu\text{g/L}$	2	95	71	29%		

Notes:

RPD – Relative percent difference

Difference – Concentration difference between the field replicates

$\mu\text{g/L}$ – micrograms per liter

mg/L – milligram per liter

ND – Not detected at or above the method detection limit

RL – Reporting limit

SG – Sample extract went through acid/silica gel clean up to remove biogenic matters in the extract

Data Validation Report

Port of Tacoma Alexander Avenue Petroleum Tank Facilities Site
Tacoma, Washington

October 2014 Groundwater Monitoring

Laboratory SDGs:

ZF38, ZF50, ZF74, ZG00

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ACRONYMS

%D	percent difference
%D_f	percent drift
%R	percent recovery
%RSD	percent relative standard deviation
ARI	Analytical Resources, Inc. - Tukwila, Washington
BFB	bromofluorobenzene
CCB	continuing calibration blank
CCV	continuing calibration verification
CF	calibration factor
CLP	U.S. EPA Contract Laboratory Program
COC	chain-of-custody
DOC	dissolved organic carbon
EPA	U.S. Environmental Protection Agency
GC/FID	gas chromatography/flame ionization detector
GC/MS	gas chromatograph/mass spectrometer
ICAL	initial calibration
ICB	initial calibration blank
ICP/AES	inductively coupled plasma/ atomic emission spectrometer
ICV	initial calibration verification
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MDL	method detection limit
µg/L	microgram per liter
mg/L	milligram per liter
MEE	methane, ethane, and ethene
MS	matrix spike
MSD	matrix spike duplicate
NFGs	CLP National Functional Guidelines for Data Review (EPA 2014)
QA/QC	quality assurance/quality control
RF	response factor
RL	reporting limit
RPD	relative percent difference
RRT	relative retention time
SDG	sample delivery group

VOCs volatile organic compounds

INTRODUCTION

This report presents and discusses findings of the data validation performed on analytical data for soil samples collected during October 2014 for the referenced project. The laboratory reports validated herein were submitted by Analytical Resources, Inc. (ARI) in Tukwila, Washington and Brook Rand Labs in Seattle, Washington (lead in brackish samples).

A level III (or Stage 2B as defined in EPA 2009) data validation was performed on this laboratory report. The validation followed the procedures specified in USEPA CLP Functional Guidelines ([NFGs], EPA 2014a and 2014b), with modifications to accommodate project and analytical method requirements. The numerical quality assurance/quality control (QA/QC) criteria applied to the validation were in accordance with those specified in the quality assurance project plans ([QAPPs], Aspect 2014) and the current performance-based control limits established by the laboratory (laboratory control limits). Instrument calibration, frequency of QC analyses, and analytical sequence requirements were evaluated against the respective analytical methods.

Validation findings are discussed in each section pertinent to the QC parameter for each type of analysis. Qualified data with applied data qualifiers are summarized in the **Summary** section at the end of this report.

Samples and the associated analyses validated herein are summarized as follows:

Field Sample ID	Lab Sample ID	Sampling Date	Matrix	Analysis				
				VOC	TPH-Gx	TPH-Dx	Metals	GEN/MEE
721-MW11-25-101414	ZF38A	10/14/14	Water	X	X	X	Pb/D	
721-MW14-30-101414	ZF38B	10/14/14	Water	X	X	X	Pb/D	
Trip Blank_10/14/14	ZF38C	10/14/14	Water	X				
MW-110-15-101514	ZF50A	10/15/14	Water	X	X	X	X	X
MW-110-25-101514	ZF50B	10/15/14	Water	X	X	X	X	X
HC-N11-6-101514	ZF50C	10/15/14	Water	X	X	X	X ^(A)	X
MW-104-15-101514	ZF50D	10/15/14	Water	X	X	X	Pb/D	
MW-104-25-101514	ZF50E	10/15/14	Water	X	X	X	Pb/D	
95-15-101514	ZF50F	10/15/14	Water	X	X	X	Pb/D	
95C-25-101514	ZF50G	10/15/14	Water	X	X	X	Pb/D	
721-MW10-25-101514	ZF50H	10/15/14	Water	X	X	X	Pb	
721-MW10-15-101514	ZF50I	10/15/14	Water	X	X	X	Pb	
721-MW8-15-101514	ZF50J	10/15/14	Water	X	X	X	Pb/D	
MW-130-15-101514	ZF50K	10/15/14	Water	X	X	X	Pb/D	
MW-137-25-101514	ZF50L	10/15/14	Water	X	X	X	Pb/D	
721-MW5-15-101514	ZF50M	10/15/14	Water	X	X	X	Pb/D	

Field Sample ID	Lab Sample ID	Sampling Date	Matrix	Analysis				
				VOC	TPH-Gx	TPH-Dx	Metals	GEN/MEE
721-MW25-15-101514	ZF50N	10/15/14	Water	X	X	X	Pb	
Trip Blank_10/15/14	ZF50O	10/15/14	Water	X	X			
709-MW9-15-101614	ZF74A	10/16/14	Water	X	X	X	X ^(A)	X
MW-109-15-101614	ZF74B	10/16/14	Water	X	X	X	X ^(A)	X
721-MW12-15-101614	ZF74C	10/16/14	Water	X	X	X	X ^(A)	X
MW-112-25-101614	ZF74D	10/16/14	Water	X	X	X	X ^(A)	X
709-MW-16-25-101614	ZF74E	10/16/14	Water	X	X	X	X ^(A)	X
709-MW9-25-101614	ZF74F	10/16/14	Water	X	X	X	Pb/D	
721-MW-3-101614	ZF74G	10/16/14	Water	X	X	X	Pb/D	
721-MW-2-101614	ZF74H	10/16/14	Water	X	X	X	Pb/D	
MW-106-15-101614	ZF74I	10/16/14	Water	X	X	X	Pb/D	
MW-102-15-101614	ZF74J	10/16/14	Water	X	X	X	Pb/D	
MW-102-25-101614	ZF74K	10/16/14	Water	X	X	X	Pb/D	
721-MW-9-25-101614	ZF74L	10/16/14	Water	X	X	X	Pb/D	
721-MW9-15-101614	ZF74M	10/16/14	Water	X	X	X	Pb/D	
Trip Blank_10/16/14	ZF74N	10/16/14	Water	X	X			
721-MW9-15-101614	ZF74O	10/16/14	Water				Pb/T	
MW105-25-101714	ZG00A	10/17/14	Water	X	X	X	Pb/D	
MW105-15-101714	ZG00B	10/17/14	Water	X	X	X	Pb/D	
721-MW15-25-101714	ZG00C	10/17/14	Water	X	X	X	Pb/D	
721-MW15-15-101714	ZG00D	10/17/14	Water	X	X	X	Pb/D	
709-MW15-15-101714	ZG00E	10/17/14	Water	X	X	X	Pb/D	
709-MW501	ZG00F	10/17/14	Water	X	X	X	Pb/D	
709-MW-20-25-101714	ZG00G	10/17/14	Water	X	X	X	X ^(A)	X
29-14-101714	ZG00H	10/17/14	Water	X	X	X	Pb/D	
721-MW13-50-101714	ZG00I	10/17/14	Water	X	X	X	Pb/D	
721-MW13-25-101714	ZG00J	10/17/14	Water	X	X	X	Pb/D	
721-MW-13-15-101714	ZG00K	10/17/14	Water	X	X	X	Pb/D	
709-MW3-15-101714	ZG00L	10/17/14	Water	X	X	X	Pb/D	
709-MW18-25-101714	ZG00M	10/17/14	Water	X	X	X	Pb/D	
709-MW21-25-101714	ZG00N	10/17/14	Water	X	X	X	Pb/D	
709-MW17-15-101714	ZG00O	10/17/14	Water	X	X	X	Pb/D	
709-MW20-15-101714	ZG00P	10/17/14	Water	X	X	X	X	X
Trip Blank_10/17/14	ZG00Q	10/17/14	Water	X	X			

Notes:

- (A) – The sample was analyzed for dissolved lead and manganese only
- GEN – General chemistry parameters: sulfate, nitrate, nitrite, DOC, and alkalinity
- Metals – Total recoverable and dissolved lead and dissolved manganese
- MEE – Dissolved methane, ethane, and ethane gases
- Pb – Lead
- Pb/D – Dissolved lead
- Pb/T – Total recoverable lead
- TPH-Dx - Diesel and motor oil range total petroleum hydrocarbon
- TPH-Gx - Gasoline range total petroleum hydrocarbon
- VOC - Volatile organic compound
- X - The analysis was requested and performed on the sample.

The analytical parameters requested for the samples, the respective analytical methods, and the analytical laboratories are summarized below:

Parameter	Analytical Method	Analytical Laboratory
Volatile Organic Compounds (VOCs)	SW846 Method 8260C	Analytical Resources, Inc. Tukwila, Washington
TPH - Gasoline Range	NWTPH-Gx	
TPH - Diesel & Motor Oil Range	NWTPH-Dx	
Total Recoverable and Dissolved Lead	EPA Method 200.8	
Dissolved Methane, Ethane, & Ethene	RSK-175	
Sulfate, Nitrate, and Nitrite	EPA Method 300.0	
Dissolved Organic Carbon	SW846 Method 9060	
Total Alkalinity	SM 2320B	
Low-Level Lead	EPA Method 1640 Modified	Brook Rand Labs Seattle, Washington

Notes:

1. SW846 - *USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition, December 1996.
2. NWTPH Methods – *Washington State Department of Ecology, Analytical Methods for Petroleum Hydrocarbons*, Publication No. ECY 97-602, June 1997.
3. EPA Method 1640 - *Determination of Trace Elements in Water by Pre-concentration and Inductively Coupled Plasma-Mass Spectrometry*. U.S. Environmental Protection Agency, Office of Water & Office of Science and Technology. April 1997.
4. EPA Method 200.8 - *Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma - Mass Spectrometry Revision 5.4*. 1995.
5. EPA Methods - *Methods for Chemical Analysis of Water and Wastes*, EPA-600/4-79-020, March 1983 Revision.
6. SM - *Standard Methods for the Examination of Water and Wastewater*. American Public Health Association. January 5, 2012.
7. RSK-175 - *RSK SOP 175: Sample Preparation and Calculations for Dissolved Gas Analysis in Water Samples Using a GC Headspace Equilibration Technique*. Prepared for USEPA Ground Water and Ecosystems Restoration Division. Felisa Hudson. May 2004.

DATA VALIDATION FINDINGS

1. VOCs by GC/MS (EPA Method SW8260C)

1.1 Sample Management and Holding Time

Samples were received in the laboratory intact and in consistence with the accompanying chain-of-custody (COC) documentation. The temperature of a number of coolers were $>6^{\circ}\text{C}$ as samples were hand-delivered to the laboratory immediately after the completion of sample collection. Data quality was not adversely affected in these cases; no data qualifying action was necessary. No other anomalies were identified in relation to sample preservation, handling, and transport.

Water samples should be preserved ($\text{pH} < 2$) at the time of collection, and analyzed within 14 days of collection. All samples were preserved as required and analyzed within the required holding times, except that the pH values in samples 721-MW9-15-101614, 721-MW-9-25-101614, and MW-109-15-101614 were >2 , and samples were analyzed past the 7-day recommended holding time for unpreserved samples. VOCs results for these sample were qualified (J) for detects and (UJ) for non-detects as estimated.

1.2 GC/MS Instrument Performance Check

The method require that (1) gas chromatograph/mass spectrometer (GC/MS) tuning analysis be performed, using bromofluorobenzene (BFB), at the beginning of each 12-hour period prior to any analysis, and (2) specific mass ions meet the criteria provided in the method. All instrument performance checks met the requirements.

1.3 Initial Calibration (ICAL)

The ICAL criteria require that (1) if linear average RFs is chosen as the quantitation option, at least five standards at different concentrations should be analyzed and the percent relative standard deviation (%RSD) of response factors (RFs) be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be >0.995 , and (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be >0.99 . ICALs either met the requirements or the outliers had no adverse effects on data usability (*e.g.*, %RSD $>20\%$ for a compound not detected in samples).

An initial calibration verification (ICV) standard (second source standard) was analyzed to verify the calibration curve. Percent difference (%D) values were either within $\pm 30\%$, or the exceedance had no adverse effects on data usability (*e.g.*, biased high ICV recovery for a compound not detected in samples).

1.4 Calibration Verification (CCV)

The CCV criteria requires that (1) continuing calibrations be analyzed at the beginning of each 12-hour analysis period prior to the analysis of method blank and samples, and (2) the %D value be within $\pm 20\%$.

Calibration verifications either met the requirements, or the exceedance had no adverse effects on data usability (*e.g.*, biased high CCV recovery for a compound not detected in samples), except for the following:

CCV ID	Compound	%D	Bias	Affected Sample	Data Qualifier
Instrument: NT2 10/30/14, 9:39	Vinyl Acetate	-54.4%	Low	721-MW9-15-101614	UJ

1.5 Blanks

Method Blanks: Method blanks were prepared and analyzed as required. Target compounds were not detected at or above the method detection limits (MDLs) in method blanks, except methylene chloride in two of the method blanks.

Trip Blanks: One trip blank was submitted with SDG for VOCs analyses. Target compounds were not detected at or above the MDLs in these samples, except that methylene chloride was detected in two of the trip blanks. This compound was not detected in any of the field samples; no data qualifying action was necessary.

1.6 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and LCSD were prepared and analyzed as required by the method. Percent recovery (%R) and relative percent difference (RPD) values either met the project control limits, or the outliers had no adverse effects on data usability (*e.g.*, biased high recovery for a compound not detected in samples).

1.7 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were either within the project control limits, or the outliers had no adverse effects on data quality (*e.g.*, biased high recovery and associated compounds not detected in the sample).

1.8 Matrix Spike (MS) and MS Duplicate (MSD)

MS and/or MSD analyses were performed on project samples or laboratory batch QC samples at the adequate frequency. All %R and RPD values were within the laboratory control limits, except for the following:

Parent Sample ID	Analyte	MS %R	MSD %R	Control Limit	Data Qualifier
709-MW15-15-101714	Vinyl Acetate	41.8%	41.8%	74-120%	J

2-Chlorovinylethre was not recovered from the MS/MSD analyses performed on project sample. This compound was known to break down in acid preservation. Results of 2-chlorovinylether results in all acid preserved samples were to be qualified (R) and rejected.

1.9 Internal Standards

The method requires that (1) internal standard retention time be within ± 30 seconds from that of the associated 12-hour calibration standard, and (2) the area counts of all internal standards be within -50% to $+100\%$ of the associated 12-hour calibration standard. All internal standards in the sample and associated QC analyses met the criteria.

1.10 Reporting Limit and Target Compound Quantitation

RLs were supported with adequate initial calibration concentrations. Due to high levels of selected target compounds in a number of samples, the analyses were performed on the methanol-preserved vials or samples were diluted for analysis. As a consequence, RLs were elevated for all compounds in these samples, including those potentially at levels less than the original RLs. The raised RLs were limited to sample matrices; the reported RLs were considered the best-possible quantitation limits for the samples. No further action was required.

1.11 Field Duplicates

Three field duplicate pairs were submitted for VOCs analyses. Sample results, RPD (or concentration difference) values, and data qualification for detected analytes were presented in **Appendix A**.

1.12 Overall Assessment of VOCs Data Usability

2-Chloroethylvinyl ether is known to break down in acidic water samples. Since all water samples in these SDGs were acid preserved, 2-chloroethylvinyl ether results for all water samples were qualified (R) and rejected.

VOCs data are of known quality and acceptable for use, as qualified.

2. TPH-Gasoline by GC/FID (Method NWTPH-Gx)

2.1 Sample Management and Holding Times

No anomalies were identified in relation to sample preservation, handling, and transport as discussed in Section 1.1.

Water samples should be preserved at the time of collection, and analyzed within 14 days of collection. All samples were preserved as required and analyzed within the required holding times.

2.2 Initial Calibration (ICAL)

The method criteria require that (1) if linear average RFs is chosen as the quantitation option, the %RSD of RFs be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be ≥ 0.995 , (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be ≥ 0.990 , and (4) the back-calculated %D value for each calibration standard be within $\pm 15\%$. Initial calibration met the criteria for all target compounds.

An ICV (second source) standard was analyzed to verify the calibration curve. %D values were within $\pm 20\%$.

2.3 Calibration Verification

Continuing calibration verification (CCV) analyses were performed at the required frequency for all analytical sequences as required by the method. The %D values for all CCVs met the method criterion ($\pm 20\%$).

2.4 Blanks

Method Blanks: Method blanks were prepared and analyzed as required. TPH-Gasoline was not detected at or above the MDLs in the method blanks.

Trip Blanks: One trip blank was submitted with SDG for VOCs analyses. Target compounds were not detected at or above the MDLs in these samples.

2.5 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were within the project control limits.

2.6 Matrix Spike and Matrix Spike Duplicate

MS and/or MSD analyses were performed on project samples or laboratory batch QC samples at the adequate frequency. All %R and RPD values were within the laboratory control limits.

2.7 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and LCSD analyses were performed as required by the method. All %R and RPD values were within the laboratory control limits.

2.8 Reporting Limits and Target Compound Quantitation

Sample-specific RLs were supported with adequate initial calibration concentrations.

2.9 Field Duplicates

Three field duplicate pairs were submitted for TPH-Gasoline analyses. Sample results, RPD (or concentration difference) values, and data qualification for detected analytes were presented in **Appendix A**.

2.10 Overall Assessment of TPH-Gasoline Data Usability

TPH-Gasoline data are of known quality and acceptable for use, as qualified.

3. TPH-Diesel & Motor Oil by GC/FID (Method NWTPH-Dx)

3.1 Holding Time

No anomalies were identified in relation to sample preservation, handling, and transport as discussed in Section 1.1.

Acid-preserved water samples should be extracted within 14 days of collection. Extracts should be analyzed within 40 days of extraction. All samples were extracted and analyzed within the recommended holding times.

3.2 Initial Calibration

The method criteria require that (1) if linear average RFs is chosen as the quantitation option, the %RSD of RFs be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be ≥ 0.995 , (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be ≥ 0.990 , and (4) the back-calculated %D value for each calibration standard be within $\pm 15\%$. Initial calibration met the criteria for all target compounds.

An ICV (second source) standard was analyzed to verify the calibration curve. %D values were within $\pm 20\%$.

3.3 Calibration Verification

The method requires that (1) a mid-range check standard be analyzed prior to and after each analytical batch, and (2) the percent drift (%D) value be within $\pm 20\%$ of the true value.

Calibration verification was performed at required frequency. The %D values were either within the $\pm 20\%$ criterion or at levels that had no adverse effects on data quality (e.g., high-bias %D value where the target compound was not detected in associated sample).

3.4 Method Blanks

Method blanks were prepared and analyzed as required. TPH-Diesel and TPH-Motor Oil were not detected at or above the MDLs in the method blanks.

3.5 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were either within the project control limits, or outside the control limits due to matrix interference, or diluted below quantitation limits due to high levels of target or non-target compounds in the samples. No data qualifying actions were taken in these cases.

3.6 Matrix Spike (MS) and MS Duplicate (MSD)

MS and/or MSD analyses were performed on project samples or laboratory batch QC samples at the adequate frequency. All %R and RPD values were within the laboratory control limits.

3.7 Laboratory Control Sample (LCS) and LCSD Duplicate (LCSD)

LCS and LCSD analyses were performed as required by the method. All %R and RPD values were within the laboratory control limits.

3.8 Reporting Limits and Target Compound Quantitation

The reported RLs were supported with adequate ICAL concentrations, and met the project requirements.

3.9 Field Duplicates

Three field duplicate pairs were submitted for TPH-Diesel and TPH-Motor Oil analyses. Sample results, RPD (or concentration difference) values, and data qualification for detected analytes were presented in **Appendix A**.

3.10 Overall Assessment of TPH-Diesel and Motor Oil Data Usability

TPH-Diesel and TPH-Motor Oil data are of known quality and acceptable for use, as qualified.

4. Dissolved Methane, Ethane, and Ethene (MEE) Gases by GC/FID (Method RSK-175)

4.1 Holding Time

No anomalies were identified in relation to sample preservation, handling, and transport as discussed in Section 1.1.

Acid-preserved water samples should be analyzed within 14 days of collection. All samples were analyzed within the recommended holding times.

4.2 Initial Calibration

The method criteria require that (1) if linear average RFs is chosen as the quantitation option, the %RSD of RFs be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be ≥ 0.995 , and (3) if six-point non-

linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be ≥ 0.990 . Initial calibration met the criteria for all target compounds.

An ICV (second source) standard was analyzed to verify the calibration curve. %D values were within $\pm 20\%$.

4.3 Calibration Verification

The method requires that (1) a mid-range check standard be analyzed prior to and after each analytical batch, and (2) the percent drift (%D) value be within $\pm 20\%$ of the true value.

Calibration verification was performed at required frequency. The %D values were either within the $\pm 20\%$ criterion or at levels that had no adverse effects on data quality (e.g., high-bias %D value where the target compound was not detected in associated sample).

4.4 Method Blanks

Method blanks were prepared and analyzed as required. Target compounds were not detected at or above the MDLs in the method blanks.

4.5 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were within the laboratory control limits.

4.6 Matrix Spike (MS) and MS Duplicate (MSD)

MS and MSD analyses were not applicable for this analytical method.

4.7 Laboratory Control Sample (LCS) and LCSD Duplicate (LCSD)

LCS and LCSD analyses were performed as required by the method. All %R and RPD values were within the laboratory control limits.

4.8 Reporting Limits

The reported RLs were supported with adequate ICAL concentrations, and met the project requirements.

4.9 Field Duplicates

Field duplicates were not submitted for MEE gases analyses in these SDGs.

4.10 Overall Assessment of MEE Gases Data Usability

MEE gases data are of known quality and acceptable for use, as qualified.

5. Lead and Manganese by ICP/MS (EPA Method 200.8 and EPA Method 1640)

5.1 Sample Management and Holding Times

No anomalies were identified in relation to sample preservation, handling, and transport, as discussed in Section 1.1.

Water samples should be analyzed within 180 days. All samples were analyzed within the required holding time.

5.2 Initial Calibration (ICAL)

Initial calibration information was not submitted by the laboratory.

5.3 Calibration Verification (ICV and CCV)

Initial calibration verifications (ICVs) and continuing calibration verifications (CCVs) were analyzed at the required frequency. The %R values for EPA Method 200.8 met the control criteria (90 – 110%). The %R values for EPA Method 1640 were less than the lower control limit (80-108%) for lead analyses. Sample results were either less or slightly greater than the MRLs and were corrected with average CCV recovery factors. The lower CCV recovery had no significant effects on data accuracy; no data qualifying action was taken.

5.4 Blanks

Calibration Blanks: Initial calibration blanks (ICBs) and continuing calibration blanks (CCBs) were not analyzed after calibration verification standards. Target analytes were either not detected at or above the RLs in the ICBs and CCBs, or sample results affected by the ICB/CCB detections were qualified as results of detections in preparation blanks.

Preparation Blanks: Preparation blanks were prepared and analyzed as required. Target analytes were not detected at or above the RLs in the preparation blanks.

5.5 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and/or LCSD analyses were performed as required by the method. The %R and RPD values were within the project control limits.

5.6 Matrix Spike (MS) and MS Duplicate (MSD)

MS and/or MSD analyses were performed on project samples or laboratory batch QC samples at the adequate frequency. All %R and RPD values were within the laboratory control limits.

5.7 Laboratory Duplicate Analysis

Laboratory duplicate analyses were performed on project samples or laboratory batch QC samples at the adequate frequency. All RPD values were within the laboratory control limits.

5.8 Method Reporting Limits

Sample-specific RLs met the project requirements.

5.9 Field Duplicates

Three field duplicate pairs were submitted for dissolved lead analyses. Sample results, RPD (or concentration difference) values, and data qualification for detected analytes were presented in **Appendix A**.

5.10 Overall Assessment of Lead and Manganese Data Usability

Lead and manganese data are of known quality and acceptable for use.

6. Anions (Nitrate, Nitrite, and Sulfate), Dissolved Organic Carbon (DOC), and Total Alkalinity by EPA Method 300.0, SW846 Method 9060, and Standard Method 2320B

6.1 Holding Times

Water samples should be analyzed within 28 days of collection for sulfate; 14 days for DOC and total alkalinity; and 48 hours for nitrate and nitrite. All samples were analyzed within the required holding times.

6.2 Initial Calibration

A blank and five calibration standards were employed to establish the analytical curve; the linearity of the calibration curve correlation coefficient (r) was ≥ 0.995 .

6.3 Initial and Continuing Calibration Verification

Initial calibration verification (ICV) and continuing calibration verification (CCV) analyses were performed at the required frequency for all inorganic constituents. All percent recovery values were within the control limits of 90 – 110%.

6.4 Blanks

Calibration Blanks: ICBs and CCBs were analyzed at the required frequency. Target analytes were not detected at or above the MRLs.

Method Blanks: Method blanks were analyzed at the required frequency. Target analytes were not detected at or above the MRLs in the method blanks.

6.5 Laboratory Duplicate Analysis

Duplicate analyses were performed on a project and laboratory batch QC samples. The RPD or concentration difference values met the laboratory control criteria.

6.6 Matrix Spike (MS)

MS analyses were performed on project and laboratory batch QC samples. The %R values met the laboratory control criteria.

6.7 Laboratory Control Sample (LCS)

LCS analyses were performed for applicable inorganic constituents at the proper frequency. All %R values were within the laboratory control limits.

6.8 Method Reporting Limits

Sample-specific MRLs were supported with adequate initial calibration concentrations.

6.9 Field Duplicates

Field duplicates were not submitted for anions, DOC, or total alkalinity analyses in these SDGs.

6.10 Overall Assessment of Anions, DOC, and Total alkalinity Data Usability

Based on the information submitted by the laboratory, anions, DOC, and total alkalinity data are of known quality and acceptable for use.

SUMMARY

Table I. Data Affected by QC Anomalies:

Laboratory ID	Sample ID	Analyte	Qualifier	Qualified Reason
ZF74B ZF74L ZF74M	MW-109-15-101614 721-MW-9-25-101614 721-MW9-15-101614	VOCs	J/UJ	Sample was analyzed past the required holding time.
ZF74M	721-MW9-15-101614	Vinyl Acetate	UJ	CCV %D value was <LCL.
ZG00E	709-MW15-15-101714	Vinyl Acetate	UJ	MS/MSD %R value was <LCL
-	All samples except: MW-109-15-101614 721-MW-9-25-101614 721-MW9-15-101614	2-Chlorovinylether	R	Compound breaks down in acid preservation.

Notes:

J/UJ – Detects was qualified (J) and non-detects qualified (UJ)

%D - Percent difference

CCV - Continuing calibration verification

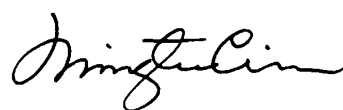
LCL - Lower control limit

RPD - Relative percent difference

Table II. Data Qualifiers are defined as follows:

Data Qualifier	Definition
J	The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.
R	The result was rejected.
U	The analyte was analyzed for, but was considered not detected at the reporting limit or reported value.
UJ	The analyte was analyzed for, and the associated quantitation limit was an estimated value.

Approved By: _____



Mingta Lin, Senior Project Chemist

Date: _____

2/17/2015

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Appendix A

Field duplicate RPD is indicative of field and laboratory precision and sample homogeneity in combination. The EPA *CLP National Functional Guidelines or Sampling and Analysis Plan* do not specify criteria for field duplicate evaluation. An advisory criteria of 20% for inorganic and 30% for organic parameters were applied to evaluating the RPD values of field duplicate results that are $\geq 5xRL$. For results that are $< 5xRL$, an advisory criterion of $\pm 2xRL$ was applied to evaluating the concentration differences. The RPD (or concentration difference as applicable) values and data qualification for detected compounds in field duplicates are presented as follows:

Analytes	Unit	MRL	Sample ID & Results		RPD	Difference	Data Qualifier
			709-MW15-15-101714	709-MW501			
Lead, Dissolved	µg/L	0.1	ND	ND		0	
TPH-Diesel	µg/L	100	ND	ND		0	
TPH-Motor Oil	µg/L	200	ND	ND		0	
TPH-Gasoline	µg/L	250	ND	ND		0	
<i>cis</i> -1,2-Dichloroethene	µg/L	0.40	3.2	3.6	12%		
Tetrachloroethene	µg/L	0.40	10	10	0%		
Trichloroethene	µg/L	0.40	10	11	10%		
			721-MW11-25-101414	721-MW14-30-101414			
Lead, Dissolved	µg/L	0.003	ND	ND		0	
TPH-Diesel	µg/L	100	110	110		0	
TPH-Motor Oil	µg/L	200	ND	ND		0	
TPH-Gasoline	µg/L	250	ND	ND		0	
Benzene	µg/L	1	13	13	0%		
			721-MW5-15-101514	721-MW25-15-101514			
Lead, Dissolved	µg/L	0.1	0.3	0.1		0.2	
TPH-Diesel	µg/L	100	ND	ND		0	
TPH-Motor Oil	µg/L	200	ND	ND		0	
TPH-Gasoline	µg/L	250	890	910	2%	20	
1,2,4-Trimethylbenzene	µg/L	1	1.2	1.6		0.4	
Benzene	µg/L	1	8.4	8.9	6%		
<i>cis</i> -1,2-Dichloroethene	µg/L	1	4.8	5.1		0.3	
Ethylbenzene	µg/L	1	6.6	8.3	23%		
Isopropylbenzene	µg/L	1	9.4	10	6%		
<i>m,p</i> -Xylenes	µg/L	2	7.6	8	5%		
<i>n</i> -Butylbenzene	µg/L	1	1.3	1.3		0	

Analytes	Unit	MRL	Sample ID & Results		RPD	Difference	Data Qualifier
<i>n</i> -Propylbenzene	µg/L	1	10	11	10%		
<i>o</i> -Xylene	µg/L	1	1.5	1.8		0.3	
sec-Butylbenzene	µg/L	1	1.8	1.8		0	
Toluene	µg/L	1	1.3	1.4		0.1	
<i>trans</i> -1,2-Dichloroethene	µg/L	1	5.2	5.8	11%		
Trichloroethene	µg/L	1	5.2	6.4	21%		
Vinyl chloride	µg/L	1	2.2	2.6		0.4	

Notes:

RPD - Relative percent difference

Difference - Concentration difference between the field replicates

MRL - Method reporting limit

µg/L - micrograms per liter

Data Validation Report

Port of Tacoma Alexander Avenue Petroleum Tank Facilities Site RI/FS
Tacoma, Washington

July 2014 Geo-probes Seep and Sediment Samples

Laboratory SDGs:

YR33, YT59, YU06, YV64

Prepared for:

Aspect Consulting LLC.

401 Second Ave South, Suite 201
Seattle, WA 98014

Prepared by:

Pyron Environmental, Inc.

3530 32nd Way, NW
Olympia, WA 98502

ACRONYMS

%D	percent difference
%D_f	percent drift
%R	percent recovery
%RSD	percent relative standard deviation
ARI	Analytical Resources, Inc. - Tukwila, Washington
BFB	bromofluorobenzene
CCV	continuing calibration verification
CF	calibration factor
CLP	U.S. EPA Contract Laboratory Program
COC	chain-of-custody
EPA	U.S. Environmental Protection Agency
GC/FID	gas chromatography/flame ionization detector
GC/MS	gas chromatograph/mass spectrometer
ICAL	initial calibration
ICV	initial calibration verification
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MDL	method detection limit
µg/kg	microgram per kilogram
µg/L	microgram per liter
mg/kg	milligram per kilogram
mg/L	milligram per liter
MS	matrix spike
MSD	matrix spike duplicate
NFGs	CLP National Functional Guidelines for Data Review (EPA 2014)
PAHs	polycyclic aromatic hydrocarbons
PSEP	Puget Sound Estuary Program
QA/QC	quality assurance/quality control
RF	response factor
RL	reporting limit
RPD	relative percent difference
RRT	relative retention time
SDG	sample delivery group
SIM	selective ion monitoring

TOC total organic carbon
TPH total petroleum hydrocarbon
TS total solids
VOCs volatile organic compounds

INTRODUCTION

This report presents and discusses findings of the data validation performed on analytical data for water and sediment samples collected during July 2014 for the referenced project. The laboratory reports validated herein were submitted by Analytical Resources, Inc. (ARI) in Tukwila, Washington.

A level III data validation was performed on this laboratory report. The validation followed the procedures specified in USEPA CLP Functional Guidelines ([NFGs], EPA 2014), with modifications to accommodate project and analytical method requirements. The numerical quality assurance/quality control (QA/QC) criteria applied to the validation were in accordance with those specified in the quality assurance project plans ([QAPPs], Aspect 2014) and the current performance-based control limits established by the laboratory (laboratory control limits). Instrument calibration, frequency of QC analyses, and analytical sequence requirements were evaluated against the respective analytical methods.

Validation findings are discussed in each section pertinent to the QC parameter for each type of analysis. Qualified data with applied data qualifiers are summarized in the **Summary** section at the end of this report.

Samples and the associated analyses validated herein are summarized as follows:

Field Sample ID	Laboratory Sample ID	Sampling Date	Matrix	Analysis				
				VOC	PAH	TPH-Gx	TPH-Dx	Conventional
SP-101-071114	YR33A	07/11/14	W	X		X	X	
SP-500-071114	YR33B	07/11/14	W	X		X	X	
TripBlanks-071114	YR33C	07/11/14	W	X		X		
SS-101-20140724	YT59A	07/24/14	SD	X	X	X	X	X
SS-102-20140724	YT59B	07/24/14	SD	X	X	X	X	X
SS-103-20140724	YT59C	07/24/14	SD	X	X	X	X	X
SS-104-20140724	YT59D	07/24/14	SD	X	X	X	X	X
SS-105-20140724	YT59F	07/24/14	SD	X	X	X	X	X
SS-109-20140724	YT59G	07/24/14	SD	X	X	X	X	X
SS-110-20140724	YT59H	07/24/14	SD	X	X	X	X	X
SS-111-20140724	YT59I	07/24/14	SD	X	X	X	X	X
TripBlanks-072414	YT59J	07/24/14	W	X		X		
SS-106-20140725	YU06A	07/25/14	SD	X	X	X	X	X
SS-108-20140725	YU06B	07/25/14	SD	X	X	X	X	X
SS-112-20140725	YU06C	07/25/14	SD	X	X	X	X	X
SS-107-20140725	YU06D	07/25/14	SD	X	X	X	X	X

Field Sample ID	Laboratory Sample ID	Sampling Date	Matrix	Analysis				
				VOC	PAH	TPH-Gx	TPH-Dx	Conventional
SS-BACKGROUND-1-20140725	YU06E	07/25/14	SD	X	X	X	X	X
SS-BACKGROUND-2-20140725	YU06F	07/25/14	SD	X	X	X	X	X
SS-BACKGROUND-2C-20140725	YU06G	07/25/14	SD	X		X		
TripBlanks-072514	YU06H	07/25/14	W	X		X		
SP102-080814	YV64A	08/08/14	W	X		X	X	
TripBlanks-080814	YV64B	08/08/14	W	X		X		

Notes:

- Conventional - Total organic carbon (TOC), total solids (TS), and grain size.
- PAH - Polycyclic aromatic hydrocarbon
- SD - Sediment
- TPH-Dx - Diesel and motor oil range total petroleum hydrocarbon
- TPH-Gx - Gasoline range total petroleum hydrocarbon
- VOC - Volatile organic compound
- W - Water
- X - The analysis was requested and performed on the sample.

The analytical parameters requested for the samples, the respective analytical methods, and the analytical laboratories are summarized below:

Parameter	Analytical Method	Analytical Laboratory
VOCs	SW846 Method 8260C	Analytical Resources, Inc. Tukwila, Washington
PAHs	SW846 Method 8270D-SIM	
TPH - Gasoline Range	NWTPH-Gx	
TPH - Diesel & Motor Oil Range	NWTPH-Dx	
TS	SM 2540G	
TOC	PSEP Protocols (Plumb, 1981)	
Grain Size	PSEP Protocols	

Notes:

1. SW846 - USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Third Edition, December 1996.
2. NWTPH Methods – Washington State Department of Ecology, Analytical Methods for Petroleum Hydrocarbons, Publication No. ECY 97-602, June 1997.
3. PSEP Protocols - Recommended Protocols for Measuring Conventional Sediment Variables in Puget Sound, Puget Sound Water Quality Authority, March 1986.
4. Plumb 1981 - Procedures for Handling and Chemical Analysis of Sediment and Water Samples. Technical Report, EPA/CE-B1-1. U.S. Army Corps of Engineers. Plumb, R.H. 1981.
5. SM – Standard Methods for the Examination of Water and Wastewater, American Public Health Association, 20th Edition, 1995.
6. SIM - Selective ion monitoring

DATA VALIDATION FINDINGS

1. VOCs by GC/MS (EPA Method SW8260C)

1.1 Sample Management and Holding Time

Samples were received in the laboratory intact and in consistence with the accompanying chain-of-custody (COC) documentation. The temperature of the coolers for SDGs: YR33 and YV64 was measured at 17.9°C and 9.8°C, respectively, at the laboratory. The samples were hand-delivered to the laboratory soon after the collection. The higher cooler temperature had no adverse effects on data quality; no action was necessary. No other anomalies were identified in relation to sample preservation, handling, and transport.

Soil and water samples should be preserved at the time of collection, and analyzed within 14 days of collection. All samples were preserved as required and analyzed within the required holding times.

1.2 GC/MS Instrument Performance Check

The method require that (1) gas chromatograph/mass spectrometer (GC/MS) tuning analysis be performed, using bromofluorobenzene (BFB), at the beginning of each 12-hour period prior to any analysis, and (2) specific mass ions meet the criteria provided in the method. All instrument performance checks met the requirements.

1.3 Initial Calibration (ICAL)

The ICAL criteria require that (1) if linear average RFs is chosen as the quantitation option, at least five standards at different concentrations should be analyzed and the percent relative standard deviation (%RSD) of response factors (RFs) be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be >0.995 , and (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be >0.99 . ICALs either met the requirements or the outliers had no adverse effects on data usability (*e.g.*, %RSD $>20\%$ for a compound not detected in samples).

An initial calibration verification (ICV) standard (second source standard) was analyzed to verify the calibration curve. Percent difference (%D) values were either within $\pm 30\%$, or the exceedance had no adverse effects on data usability (*e.g.*, biased high ICV recovery for a compound not detected in samples).

1.4 Calibration Verification (CCV)

The CCV criteria requires that (1) continuing calibrations be analyzed at the beginning of each 12-hour analysis period prior to the analysis of method blank and samples, and (2) the %D value be within $\pm 20\%$.

Calibration verifications either met the requirements, or the exceedance had no adverse effects on data usability (e.g., biased high CCV recovery for a compound not detected in samples), except for the following:

SDG	CCV ID	Compound	%D	Bias	Affected Sample	Data Qualifier
YR33	Instrument: NT3 7/15/14, 10:01	Acrolein Vinyl chloride Chloroethane 1,1-Dichloroethene 1,1,2,2-Tetrachloroethane	-37.1% -24.5% -22.8% -21.8% -23.1%	Low	SP-101-071114 SP-500-071114 TripBlanks-071114	UJ
YS58	Instrument: NT5 7/29/14, 9:35	Bromomethane	-54.4%	Low	SS-101-20140724 SS-102-20140724 SS-103-20140724 SS-104-20140724 SS-105-20140724 SS-109-20140724 SS-110-20140724 SS-111-20140724	UJ
YS58	Instrument: NT5 7/29/14, 9:35	Carbon Disulfide	21.9%	High	SS-101-20140724 SS-102-20140724 SS-103-20140724 SS-104-20140724 SS-105-20140724 SS-109-20140724 SS-110-20140724 SS-111-20140724	J
YU06	Instrument: NT5 7/31/14, 11:28	Bromomethane	-71.1%	Low	SS-106-20140725 SS-108-20140725 SS-112-20140725 SS-107-20140725 SS-BACKGROUND-1-20140725 SS-BACKGROUND-2-20140725 SS-BACKGROUND-2C-20140725	UJ

1.5 Blanks

Method Blanks: Method blanks were prepared and analyzed as required. Target compounds were not detected at or above the method detection limits (MDLs) in method blanks, except for the following:

SDG	Blank ID	Compound	Blank	Affected Sample	Original Result	Adjusted Result	Unit
YT59	14-15004-YT59MB	Methylene Chloride	0.8	SS-101-20140724 SS-103-20140724 SS-105-20140724	0.0023 0.0048 0.0039	0.0023 U 0.0048 U 0.0039 U	mg/kg
YU06	14-15356-YU06MB	Methylene Chloride	1.3	SS-106-20140725 SS-107-20140725 SS-112-20140725 SS-BACKGROUND-1-20140725 SS-BACKGROUND-2-20140725 SS-BACKGROUND-2C-20140725	0.002 0.0023 0.0032 0.0007 0.001 0.0014	0.0022 U 0.0023 U 0.0032 U 0.0009 U 0.0018 U 0.0015 U	mg/kg
YU06	14-15356-YU06MB	Naphthalene	1	SS-BACKGROUND-2C-20140725	0.0013	0.0037 U	mg/kg

Trip Blanks: Samples TripBlanks-071114, TripBlanks-072214, TripBlanks-072514, and TripBlanks-080814 were trip blanks. Low-level (less than or slightly greater than the reporting limits [RLs]) carbon disulfide and acetone were detected in TripBlanks-072214; and chloromethane in TripBlanks-072514. Acetone, carbon disulfide, and chloromethane are common field and/or laboratory artifacts; the presence of these compounds in trip blanks indicates that samples may have been affected by the same factors. The trip blank results were therefore used to evaluate all water and sediment samples as a whole, based on the levels found in the samples and the corresponding sample-specific RLs. The detections of these compounds in samples were in general significantly greater than 5x their RLs. Since the extend of the effects caused by the field/laboratory procedures was not certain, the detections of carbon disulfide, acetone, and chloromethane in filed samples were qualified (J) as estimated, as summarized in section **SUMMARY, Table II.**

1.6 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and LCSD were prepared and analyzed as required by the method. Percent recovery (%R) and relative percent difference (RPD) values met the project control limits.

1.7 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were within the project control limits.

1.8 Matrix Spike (MS) and MS Duplicate (MSD)

MS and MSD analyses were not performed on project samples in these SDGs.

1.9 Internal Standards

The method requires that (1) internal standard retention time be within ± 30 seconds from that of the associated 12-hour calibration standard, and (2) the area counts of all internal standards be within -50% to $+100\%$ of the associated 12-hour calibration standard. All internal standards in the sample and associated QC analyses met the criteria.

1.10 Reporting Limit and Target Compound Quantitation

RLs were supported with adequate initial calibration concentrations. Due to high levels of selected target compounds in sample SS-106-20140725 (SDG: YU06), RLs were elevated for all compounds in these samples, including those potentially at levels less than the original RLs. The raised RLs were limited to sample matrices; the reported RLs were considered the best-possible quantitation limits for the samples. No further action was required.

1.11 Field Duplicates

Field duplicates were submitted for VOCs analyses. Field duplicate results for detected target compounds, RPD (or concentration difference) values, and data qualification were presented in **Appendix A**.

1.12 Overall Assessment of VOCs Data Usability

Naphthalene was also analyzed and reported via the PAHs analyses (SW846 Method 8270D-SM) for sediment samples. Naphthalene results were to be reported from the PAHs analyses for sediment samples; the 8270C results were qualified (DNR) as summarized in **SUMMARY, Table I**.

VOCs data are of known quality and acceptable for use, as qualified.

2. PAHs by GC/MS - SIM (EPA Method SW8270D-SIM)

2.1 Sample Management and Holding Times

No anomalies were identified in relation to sample preservation, handling, and transport unless discussed in Section 1.1.

Soil samples should be extracted within 14 days of collection. Extracts should be analyzed within 40 days of extraction. All samples were extracted and analyzed within the required holding times.

2.2 GC/MS Instrument Performance Check

DFTPP tuning was performed within each 12-hour interval. All required ion abundance ratios met the method requirements.

2.3 Initial Calibration (ICAL)

The ICAL criteria require that (1) if linear average RFs is chosen as the quantitation option, at least five standards at different concentrations should be analyzed and the %RSD of RFs be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be >0.995 , and (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be >0.99 . All ICALs met the requirements.

An ICV standard (second source standard) was analyzed to verify the calibration curve. %D values were either within $\pm 30\%$, or the exceedance had no adverse effects on data usability (*e.g.*, biased high ICV recovery for a compound not detected in samples).

2.4 Calibration Verification (CCV)

The analytical method requires that (1) continuing calibration verifications be analyzed at the beginning of each 12-hour analysis period prior to the analysis of method blank and samples, and (2) the %D be within $\pm 20\%$. The CCVs met the requirements.

2.5 Method Blanks

Method blanks were prepared and analyzed as required. Target compounds were not detected at or above the MDLs in the method blanks.

2.6 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were within the project control limits.

2.7 Matrix Spike (MS) and MS Duplicate (MSD)

MS and MSD analyses were performed on project and batch QC samples at the proper frequency ($\geq 5\%$ of samples analyzed). All %R and RPD values met the project control criteria, except for the following:

SDG	Parent Sample ID	Analyte	MS %R	MSD %R	Control Limit	RPD	Data Qualifier
YT59	SS-109-20140724	Fluoranthene	49%	33%	46-120%	9.6%	J

Note: RPD control criteria = $\pm 20\%$

2.8 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and LCSD analyses were performed as required by the method. All %R and RPD values were within the project control limits.

2.9 Internal Standards

The method requires that (1) internal standard retention time be within ± 30 seconds from that of the associated 12-hour calibration standard, and (2) the area counts of all internal standards be within -50% to $+100\%$ of the associated 12-hour calibration standard. All internal standards in the sample and associated QC analyses met the criteria.

2.10 Reporting Limits and Target Compound Quantitation

Sample-specific RLs were supported with adequate initial calibration concentrations. In some cases samples required dilution for definitive quantitation of target compounds; the RLs were raised accordingly, and the compounds reported from the dilution analysis. The remaining (un-diluted) target compounds were to be reported from the initial analysis for the lower detection limits.

2.11 Field Duplicates

Field duplicates were submitted for PAHs analyses. Field duplicate results for detected target compounds, RPD (or concentration difference) values, and data qualification were presented in **Appendix A**.

2.12 Overall Assessment of PAHs Data Usability

PAHs data are of known quality and acceptable for use, as qualified.

3. TPH-Gasoline by GC/FID (Method NWTPH-Gx)

3.1 Sample Management and Holding Times

No anomalies were identified in relation to sample preservation, handling, and transport as discussed in Section 1.1.

Soil and water samples should be preserved at the time of collection, and analyzed within 14 days of collection. All samples were preserved as required and analyzed within the required holding times.

3.2 Initial Calibration (ICAL)

The method criteria require that (1) if linear average RFs is chosen as the quantitation option, the %RSD of RFs be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be ≥ 0.995 , (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be ≥ 0.990 , and (4) the back-calculated %D value for each calibration standard be within $\pm 15\%$. Initial calibration met the criteria for all target compounds.

An ICV (second source) standard was analyzed to verify the calibration curve. %D values were within $\pm 20\%$.

3.3 Calibration Verification

Continuing calibration verification (CCV) analyses were performed at the required frequency for all analytical sequences as required by the method. The %D values for all CCVs met the method criterion ($\pm 20\%$).

3.4 Blanks

Method Blanks: Method blanks were prepared and analyzed as required. TPH-Gasoline was not detected at or above the MDLs in the method blanks.

Trip Blanks: Trip Blanks: Samples TripBlanks-071114, TripBlanks-072214, TripBlanks-072514, and TripBlanks-080814 were trip blanks. TPH-Gasoline was not detected at or above the MDLs in trip blanks.

3.5 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were within the project control limits.

3.6 Matrix Spike and Matrix Spike Duplicate

MS/MSD analyses were performed on project samples at the adequate frequency. The %R and RPD values met the laboratory control criteria.

3.7 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and LCSD analyses were performed as required by the method. All %R and RPD values were within the laboratory control limits.

3.8 Reporting Limits and Target Compound Quantitation

Sample-specific RLs were supported with adequate initial calibration concentrations.

3.9 Field Duplicates

Field duplicates were submitted for TPH-Gasoline analyses. Field duplicate results for detected target compounds, RPD (or concentration difference) values, and data qualification were presented in **Appendix A**.

3.10 Overall Assessment of TPH-Gasoline Data Usability

TPH-Gasoline data are of known quality and acceptable for use.

4. TPH-Diesel & Motor Oil by GC/FID (Method NWTPH-Dx)

4.1 Holding Time

No anomalies were identified in relation to sample preservation, handling, and transport as discussed in Section 1.1.

Soil and acid-preserved water samples should be extracted within 14 days of collection. Extracts should be analyzed within 40 days of extraction. All samples were extracted and analyzed within the recommended holding times.

4.2 Initial Calibration

The method criteria require that (1) if linear average RFs is chosen as the quantitation option, the %RSD of RFs be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be ≥ 0.995 , (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2)

be ≥ 0.990 , and (4) the back-calculated %D value for each calibration standard be within $\pm 15\%$. Initial calibration met the criteria for all target compounds.

An ICV (second source) standard was analyzed to verify the calibration curve. %D values were within $\pm 20\%$.

4.3 Calibration Verification

The method requires that (1) a mid-range check standard be analyzed prior to and after each analytical batch, and (2) the percent drift (%D) value be within $\pm 20\%$ of the true value.

Calibration verification was performed at required frequency. The %D values were either within the $\pm 20\%$ criterion or at levels that had no adverse effects on data quality (e.g., high-bias %D value where the target compound was not detected in associated sample).

4.4 Method Blanks

Method blanks were prepared and analyzed as required. TPH-Diesel and TPH-Motor Oil were not detected at or above the MDLs in the method blanks.

4.5 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were within the project control limits.

4.6 Matrix Spike (MS) and MS Duplicate (MSD)

MS and MSD analyses were performed on project and batch QC samples at the proper frequency. The %R and RPD values either met the laboratory control criteria, or the analyte concentrations in parent samples were greater than 4x the spiking levels and not applicable for matrix effect evaluation. No data qualifying action was taken in these cases.

4.7 Laboratory Control Sample (LCS) and LCSD Duplicate (LCSD)

LCS and LCSD analyses were performed as required by the method. All %R and RPD values were within the laboratory control limits.

4.8 Reporting Limits and Target Compound Quantitation

The reported RLs were supported with adequate ICAL concentrations, and met the project requirements.

4.9 Field Duplicates

Field duplicates were submitted for TPH-Diesel and TPH-Motor Oil analyses. Field duplicate results, RPD (or concentration difference) values, and data qualification for detected TPH-Diesel or Motor Oil were presented in **Appendix A**.

4.10 Overall Assessment of TPH-Diesel and Motor Oil Data Usability

TPH-Diesel and TPH-Motor Oil data are of known quality and acceptable for use.

5. Total Organic Carbon (TOC), Total Solids (TS), and Grain Size

5.1 Holding Times

Sediment samples should be analyzed within 28 days of collection for TOC and 6 months for TS and grain size. All samples were analyzed within the required holding times.

5.2 Initial Calibration

ICALs were performed as required for TOC analysis. The linear regression correlation coefficients (r) were >0.995 for all ICAL curves.

5.3 Calibration Verification

ICV and CCV analyses were performed at the required frequency for TOC analyses. All %R values were within the control limits of 90 – 110%.

5.4 Blanks

Method Blanks: Method blanks were analyzed at the required frequency for TOC and TS. TOC and TS were not detected at or above the RLs in the method blanks.

5.5 Replicate Analysis

Triplicate analyses were performed for TOC and TS on project samples and grain size on a project sample. All %RSD values were within the acceptance criterion (20%).

5.6 Laboratory Control Samples

The LCS analysis for TOC was performed as required by the method. The %R value was within the laboratory control limits.

5.7 Standard Reference Material (SRM)

SRM analyses were performed for TOC in association with the sediment samples. The SRM %R values met the laboratory control limits (80 – 120%).

5.8 Matrix Spike (MS)

TOC matrix spike analysis was performed on project samples at the required frequency. The %R values met the laboratory control criterion (75 – 125).

5.9 Recovery QA

The recovery QA value for the grain size analysis was calculated for each sample to compare the sample weight prior to and after the analysis. The recoveries for all samples were within the laboratory control limits of 95 – 105%.

5.10 Reporting Limits

The RLs met the quantitation limit goals specified in the SAP for TOC, TS, and grain size.

5.11 Overall Assessment of TOC, TS, and Grain Size Data Usability

Based on the information submitted by the laboratory; TOC, TS, and grain size data are acceptable for use.

SUMMARY

Table I. Data Affected by QC Anomalies:

Laboratory ID	Sample ID	Analyte	Qualifier	Qualified Reason
YR33A YR33B YR33C	SP-101-071114 SP-500-071114 TripBlanks-071114	1,1,2,2-Tetrachloroethane 1,1-Dichloroethene Acrolein Chloroethane Vinyl chloride	UJ	CCV %D<LCL
YT59A YT59B YT59C YT59D YT59E YT59F YT59G YT59H YT59I	SS-101-20140724 SS-102-20140724 SS-103-20140724 SS-104-20140724 SS-154-20140724 SS-105-20140724 SS-109-20140724 SS-110-20140724 SS-111-20140724	Bromomethane	UJ	CCV %D<LCL
YU06H	TripBlanks-072514	Vinyl Acetate	UJ	CCV %D<LCL
YT59A YT59B YT59C YT59D YT59E YT59F YT59G YT59H YT59I YU06A YU06B YU06C YU06D YU06E YU06F	SS-101-20140724 SS-102-20140724 SS-103-20140724 SS-104-20140724 SS-154-20140724 SS-105-20140724 SS-109-20140724 SS-110-20140724 SS-111-20140724 SS-106-20140725 SS-108-20140725 SS-112-20140725 SS-107-20140725 SS-BACKGROUND-1-20140725 SS-BACKGROUND-2-20140725	Naphthalene (SW8260C)	DNR	Report from SW8270-SIM
YT59A YT59B YT59C YT59D YT59E YT59F YT59G YT59H YT59I YU06A YU06B YU06C YU06D YU06E YU06F YU06G	SS-101-20140724 SS-102-20140724 SS-103-20140724 SS-104-20140724 SS-154-20140724 SS-105-20140724 SS-109-20140724 SS-110-20140724 SS-111-20140724 SS-106-20140725 SS-108-20140725 SS-112-20140725 SS-107-20140725 SS-BACKGROUND-1-20140725 SS-BACKGROUND-2-20140725 SS-BACKGROUND-2C-20140725	Acetone	J	Suspected affected by field/laboratory artifact

Laboratory ID	Sample ID	Analyte	Qualifier	Qualified Reason
YU06A YU06B YU06C YU06D YU06E YU06F YU06G	SS-106-20140725 SS-108-20140725 SS-112-20140725 SS-107-20140725 SS-BACKGROUND-1-20140725 SS-BACKGROUND-2-20140725 SS-BACKGROUND-2C-20140725	Carbon Disulfide	J	Suspected affected by field/laboratory artifact
YT59D YT59E YU06A YU06F YU06G YV64A	SS-104-20140724 SS-154-20140724 SS-106-20140725 SS-BACKGROUND-2-20140725 SS-BACKGROUND-2C-20140725 SP102-080814	Chloromethane	J	Suspected affected by field/laboratory artifact
YT59A YT59B YT59C YT59D YT59E YT59F YT59G YT59H YT59I	SS-101-20140724 SS-102-20140724 SS-103-20140724 SS-104-20140724 SS-154-20140724 SS-105-20140724 SS-109-20140724 SS-110-20140724 SS-111-20140724	Carbon Disulfide	J	Suspected affected by field/laboratory artifact; CCV %D >UCL
YT59G	SS-109-20140724	Fluoranthene	J	The MSD %R value was <LCL

Notes:

%D - Percent difference
%R - Percent recovery
CCV - Continuing calibration verification
LCL - Lower control limit
RPD - Relative percent difference
UCL - Upper control limit

Table II. Sample Results Adjusted for Detections in Blanks

Laboratory ID	Sample ID	Analyte	Original Result	Adjusted Result	Unit	Report Section
YT59A YT59C YT59F YU06A YU06C YU06D YU06E YU06F YU06G	SS-101-20140724 SS-103-20140724 SS-105-20140724 SS-106-20140725 SS-112-20140725 SS-107-20140725 SS-BACKGROUND-1-20140725 SS-BACKGROUND-2-20140725 SS-BACKGROUND-2C-20140725	Methylene Chloride	0.0023 0.0048 0.0039 0.002 0.0023 0.0032 0.0007 J 0.001 J 0.0014 J	0.0023 U 0.0048 U 0.0039 U 0.002 U 0.0023 U 0.0032 U 0.0009 U 0.0018 U 0.0015 U	mg/kg	1.5 Method Blank
YU06G	SS-BACKGROUND-2C-20140725	Naphthalene (SW8260C)	0.0013 J	0.0037 U	mg/kg	1.5 Method Blank

Table III. Data Qualifiers Definition

Data Qualifier	Definition
DNR	The result should be reported from an alternative analysis.
J	The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.
U	The analyte was analyzed for, but was considered not detected at the reporting limit or reported value.
UJ	The analyte was analyzed for, and the associated quantitation limit was an estimated value.

Approved By: 
Mingta Lin, Senior Project Chemist

Date: 12/13/2014

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Appendix A

Field duplicate RPD is indicative of field and laboratory precision and sample homogeneity in combination. The CLP National Functional Guidelines or *Work Plan* do not specify criteria for field duplicate evaluation. An advisory criterion of 35% for water and 50% for soil was applied to evaluating the RPD values of field duplicate results that are $\geq 5 \times \text{RL}$. For results that are $< 5 \times \text{RL}$, an advisory criterion of $\pm 2 \text{RL}$ was applied to evaluating the concentration differences. The RPD (or concentration difference as applicable) values and data qualification for detected compounds in field duplicates are presented as follows:

Analyte	Units	RL	Parent & Field Duplicate Sample Result		RPD	Delta	Data Qualifier
			SP-101-071114	SP-500-071114			
TPH-Diesel	µg/L	100	ND	ND		0	
TPH- Motor Oil	µg/L	200	ND	ND		0	
TPH-Gasoline	µg/L	250	320	330		10	
<i>tert</i> -Butylbenzene	µg/L	0.2	0.28	0.3		0.02	
			SS-104-20140724	SS-154-20140724			
Gravel	%	0.1	19.2	6.5	99%		(A)
Phi Size > 10	%	0.1	7.3	10.2	33%		(A)
Phi Size 0 to 1	%	0.1	2.5	1.9	27%		(A)
Phi Size -1 to 0	%	0.1	3.4	2.1	47%		(A)
Phi Size 1 to 2	%	0.1	4.9	4.4	11%		(A)
Phi Size 2 to 3	%	0.1	12.4	13.4	8%		(A)
Phi Size 3 to 4	%	0.1	11.9	12.4	4%		(A)
Phi Size 4 To 5	%	0.1	7	8.1	15%		(A)
Phi Size 5 to 6	%	0.1	9	11.1	21%		(A)
Phi Size 6 to 7	%	0.1	8.8	10.5	18%		(A)
Phi Size 7 to 8	%	0.1	5.9	8.1	31%		(A)
Phi Size 8 to 9 Clay	%	0.1	4.3	6.2	36%		(A)
Phi Size 9 to 10 Clay	%	0.1	3.6	5	33%		(A)
Total Fines	%	0.1	45.9	59.4	26%		(A)
TPH-Diesel	mg/kg	8.6	44	44	0%		
TPH-Motor Oil	mg/kg	17	94	94	0%		
Total Organic Carbon	%	0.02	1.14	1.07	6%		
Total Solids	%	0.01	57.65	56.88	1%		
2-Butanone	mg/kg	0.0046	0.01	0.012	18%		
Acetone	mg/kg	0.0046	0.069	0.071	3%		

Analyte	Units	RL	Parent & Field Duplicate		RPD	Delta	Data Qualifier
			Sample Result				
Carbon disulfide	mg/kg	0.0009	0.017	0.016	6%		
Chloromethane	mg/kg	0.0009	0.0045	0.005	11%		
2-Methylnaphthalene	mg/kg	0.048	0.04	0.031		0.009	
Acenaphthylene	mg/kg	0.048	0.026	ND		0.026	
Anthracene	mg/kg	0.048	0.083	0.082		0.001	
Benz(a)anthracene	mg/kg	0.048	0.14	0.14	0%		
Benzo(a)pyrene	mg/kg	0.048	0.16	0.16	0%		
Benzo(b)fluoranthene	mg/kg	0.048	0.22	0.22	0%		
Benzo(g,h,i)perylene	mg/kg	0.048	0.13	0.12	8%		
Benzo(k)fluoranthene	mg/kg	0.048	0.1	0.11	10%		
Chrysene	mg/kg	0.048	0.27	0.3	11%		
Dibenzo(a,h)anthracene	mg/kg	0.048	0.03	0.033		0.003	
Fluoranthene	mg/kg	0.048	0.25	0.3	18%		
Fluorene	mg/kg	0.048	0.026	0.031		0.005	
Indeno(1,2,3-cd)pyrene	mg/kg	0.048	0.1	0.097		0.003	
Naphthalene	mg/kg	0.048	0.047	0.051		0.004	
Phenanthrene	mg/kg	0.048	0.13	0.14		0.01	
Pyrene	mg/kg	0.048	0.53	0.55	4%		
Total Benzofluoranthenes	mg/kg	0.048	0.43	0.44		0.01	
Total cPAHs TEQ	mg/kg	0.336	0.222	0.223		0.001	

Notes:

^(A) - The field duplicate variability of grain size was evaluated based on overall particle size distribution as a whole and data were not qualified on individual size fractions.

% - Percent

Delta – Concentration difference between the parent sample and its field duplicate

mg/kg – milligram per kilogram

µg/L – microgram per liter

ND – The analyte was not detected at or above the RL.

RL – Reporting limit

RPD – Relative percent difference

Data Validation Report

Port of Tacoma Alexander Avenue Petroleum Tank Facilities Site
Tacoma, Washington

January 2015 Groundwater Monitoring

Laboratory SDG: **ZU40**

Prepared for:

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Prepared by:

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ACRONYMS

%D	percent difference
%D_f	percent drift
%R	percent recovery
%RSD	percent relative standard deviation
ARI	Analytical Resources, Inc. - Tukwila, Washington
BFB	bromofluorobenzene
CCB	continuing calibration blank
CCV	continuing calibration verification
CF	calibration factor
CLP	U.S. EPA Contract Laboratory Program
COC	chain-of-custody
EPA	U.S. Environmental Protection Agency
GC/FID	gas chromatography/flame ionization detector
GC/MS	gas chromatograph/mass spectrometer
ICAL	initial calibration
ICV	initial calibration verification
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MDL	method detection limit
µg/L	microgram per liter
mg/L	milligram per liter
MS	matrix spike
MSD	matrix spike duplicate
NFGs	CLP National Functional Guidelines for Data Review (EPA 2014)
QA/QC	quality assurance/quality control
RF	response factor
RL	reporting limit
RPD	relative percent difference
RRT	relative retention time
SDG	sample delivery group
VOCs	volatile organic compounds

INTRODUCTION

This report presents and discusses findings of the data validation performed on analytical data for water samples collected during January 2015 for the referenced project. The laboratory report validated herein was submitted by Analytical Resources, Inc. (ARI) in Tukwila, Washington.

A level III (or Stage 2B as defined in EPA 2009) data validation was performed on this laboratory report. The validation followed the procedures specified in USEPA CLP Functional Guidelines ([NFGs], EPA 2014a and 2014b), with modifications to accommodate project and analytical method requirements. The numerical quality assurance/quality control (QA/QC) criteria applied to the validation were in accordance with those specified in the quality assurance project plans ([QAPPs], Aspect 2014) and the current performance-based control limits established by the laboratory (laboratory control limits). Instrument calibration, frequency of QC analyses, and analytical sequence requirements were evaluated against the respective analytical methods.

Validation findings are discussed in each section pertinent to the QC parameter for each type of analysis. Qualified data with applied data qualifiers are summarized in the **Summary** section at the end of this report. Samples and the associated analyses validated herein are summarized as follows:

Field Sample ID	Laboratory Sample ID	Sampling Date	Matrix	Analysis	TPH-Gx	TPH-Dx
				VOCs		
721-MW9-15-012715	ZU40A	01/27/15	Water	X	X	X
MW-102-25-012615	ZU40B	01/26/15	Water	X	X	X
MW110-25-012615	ZU40C	01/26/15	Water	X	X	X
95-15-012715	ZU40D	01/27/15	Water	X	X	X
MW104-15-012615	ZU40E	01/26/15	Water	X	X	X
MW104-25-012615	ZU40F	01/26/15	Water	X	X	X
95C-25-012715	ZU40G	01/27/15	Water	X	X	X
MW-137-25-012715	ZU40H	01/27/15	Water	X	X	X
MW-130-15-012715	ZU40I	01/27/15	Water	X	X	X
MW-110-15-012615	ZU40J	01/26/15	Water	X	X	X
721-MW10-15-012615	ZU40K	01/26/15	Water	X	X	X
721-MW10-25-012615	ZU40L	01/26/15	Water	X	X	X
MW-105-25-012615	ZU40M	01/26/15	Water	X	X	X
MW-FD-012615	ZU40N	01/26/15	Water	X	X	X
HC-N11-6-012715	ZU40O	01/27/15	Water			X
Trip Blank 1 ZU40 012615	ZU40P	01/26/15	Water	X	X	
Trip Blank 2 ZU40 012615	ZU40Q	01/26/15	Water	X	X	

Field Sample ID	Laboratory Sample ID	Sampling Date	Matrix	Analysis		
				VOCs	TPH-Gx	TPH-Dx
721-MW3-012615	ZU40R	01/26/15	Water			x
721-MW12-15-012715	ZU40S	01/27/15	Water			X
MW109-15-012715	ZU40T	01/27/15	Water			X
95-15-012715	ZU40U	01/27/15	Water			X
MW104-15-012615	ZU40V	01/26/15	Water			X
HC-N11-6-012715	ZU40W	01/27/15	Water			X
721-MW3-012615	ZU40X	01/26/15	Water			X
721-MW12-15-012715	ZU40Y	01/27/15	Water			X
MW109-15-012715	ZU40Z	01/27/15	Water			X

Notes:

TPH-Dx - Diesel and motor oil range total petroleum hydrocarbon
 TPH-Gx - Gasoline range total petroleum hydrocarbon
 VOCs - Volatile organic compounds
 X - The analysis was requested and performed on the sample.

The analytical parameters requested for the samples, the respective analytical methods, and the analytical laboratories are summarized below:

Parameter	Analytical Method	Analytical Laboratory
Volatile Organic Compounds (VOCs)	SW846 Method 8260C	Analytical Resources, Inc. Tukwila, Washington
TPH - Gasoline Range	NWTPH-Gx	
TPH - Diesel & Motor Oil Range	NWTPH-Dx	

Notes:

1. SW846 - USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Third Edition, December 1996.
2. NWTPH Methods – Washington State Department of Ecology, Analytical Methods for Petroleum Hydrocarbons, Publication No. ECY 97-602, June 1997.

DATA VALIDATION FINDINGS

1. VOCs by GC/MS (EPA Method SW8260C)

1.1 Sample Management and Holding Time

Samples were received in the laboratory intact and in consistence with the accompanying chain-of-custody (COC) documentation. No anomalies were identified in relation to sample preservation, handling, and transport.

Water samples should be preserved (pH <2) at the time of collection, and analyzed within 14 days of collection. All samples were preserved and analyzed within the required holding time.

1.2 GC/MS Instrument Performance Check

The method require that (1) gas chromatograph/mass spectrometer (GC/MS) tuning analysis be performed, using bromofluorobenzene (BFB), at the beginning of each 12-hour period prior to any analysis, and (2) specific mass ions meet the criteria provided in the method. All instrument performance checks met the requirements.

1.3 Initial Calibration (ICAL)

The ICAL criteria require that (1) if linear average RFs is chosen as the quantitation option, at least five standards at different concentrations should be analyzed and the percent relative standard deviation (%RSD) of response factors (RFs) be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be >0.995 , and (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be >0.99 . ICALs either met the requirements or the outliers had no adverse effects on data usability (*e.g.*, %RSD $>20\%$ for a compound not detected in samples).

An initial calibration verification (ICV) standard (second source standard) was analyzed to verify the calibration curve. Percent difference (%D) values were either within $\pm 30\%$, or the exceedance had no adverse effects on data usability (*e.g.*, biased high ICV recovery for a compound not detected in samples).

1.4 Calibration Verification (CCV)

The CCV criteria requires that (1) continuing calibrations be analyzed at the beginning of each 12-hour analysis period prior to the analysis of method blank and samples, and (2) the %D value be within $\pm 20\%$.

Calibration verifications either met the requirements, or the exceedance had no adverse effects on data usability (*e.g.*, biased high CCV recovery for a compound not detected in samples), except for the following:

CCV ID	Compound	%D	Bias	Affected Sample	Data Qualifier
Instrument: NT2 2/3/15, 14:35	Acrylonitrile Acrolein Bromoform Carbon disulfide	-24.8% -27.4% -23.6% -25.3%	Low	721-MW10-15-012615 721-MW10-25-012615 721-MW9-15-012715 95-15-012715 95C-25-012715 MW-102-25-012615 MW104-15-012615 MW104-25-012615 MW-105-25-012615 MW-110-15-012615 MW-130-15-012715 MW-137-25-012715 MW-FD-012615 Trip Blank 1 ZU40 012615 Trip Blank 2 ZU40 012615	J/UJ
Instrument: NT2 2/3/15, 14:35	<i>n</i> -Butylbenzene	24.1%	High	721-MW9-15-012715 95-15-012715 721-MW10-15-012615	J
Instrument: NT2 2/3/15, 14:35	<i>sec</i> -Butylbenzene	20.5%	High	721-MW9-15-012715 95-15-012715 95C-25-012715 MW-130-15-012715 MW-110-15-012615 721-MW10-15-012615	J

Note: J/UJ – Detects were qualified (J) and non-detects qualified (UJ)

1.5 Blanks

Method Blanks: Method blanks were prepared and analyzed as required. Target compounds were not detected at or above the method detection limits (MDLs) in method blanks, except methylene chloride in two of the method blanks.

Trip Blanks: Two trip blanks were submitted for VOCs analyses. Target compounds were not detected at or above the MDLs in these samples.

1.6 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and LCSD were prepared and analyzed as required by the method. Percent recovery (%R) and relative percent difference (RPD) values either met the project control limits, or the outliers had no adverse effects on data usability (*e.g.*, biased high recovery for a compound not detected in samples).

%R values for selected compounds in LCS 15-1579-ZU40 and LCSD 15-1579-ZU40 were outside the laboratory control limits. These compounds had %D values outside the method control criteria in the associated CCVs (see Section 1.4) and the results were qualified accordingly. No further data qualifying actions were taken based on the LCS and LCSD results.

1.7 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were either within the project control limits, or the outliers had no adverse effects on data quality (e.g., biased high recovery and associated compounds not detected in the sample).

1.8 Matrix Spike (MS) and MS Duplicate (MSD)

MS and MSD analyses were performed on sample MW-130-15-012715 as requested. All %R and RPD values were within the laboratory control limits, except for the following:

Parent Sample ID	Analyte	MS %R	MSD %R	Control Limit	Data Qualifier
MW-130-15-012715	<i>n</i> -Propylbenzene 1,1-Dichloropropene	70.0% 73.9%	73.0% 76.6%	80-120%	J UJ

The %R values (25.3% and 26.2%) for 2-chlorovinylethre in the MS/MSD analyses performed on MW-130-15-012715 were significantly less than the lower control limit (62-130%). This compound was known to break down in acid preservation. Results of 2-chlorovinylether results in all acid preserved VOCs samples were to be qualified (R) and rejected.

1.9 Internal Standards

The method requires that (1) internal standard retention time be within ± 30 seconds from that of the associated 12-hour calibration standard, and (2) the area counts of all internal standards be within -50% to +100% of the associated 12-hour calibration standard. All internal standards in the sample and associated QC analyses met the criteria.

1.10 Reporting Limit and Target Compound Quantitation

RLs were supported with adequate initial calibration concentrations. Due to high levels of selected target compounds in a number of samples, the analyses were performed on the methanol-preserved vials or samples were diluted for analysis. As a consequence, RLs were elevated for all compounds in these samples, including those potentially at levels

less than the original RLs. The raised RLs were limited to sample matrices; the reported RLs were considered the best-possible quantitation limits for the samples. No further action was required.

1.11 Field Duplicates

One field duplicate pair was submitted for VOCs analyses. Sample results, RPD (or concentration difference) values, and data qualification for detected analytes were presented in **Appendix A**.

1.12 Overall Assessment of VOCs Data Usability

VOCs data are of known quality and acceptable for use, as qualified.

2. TPH-Gasoline by GC/FID (Method NWTPH-Gx)

2.1 Sample Management and Holding Times

No anomalies were identified in relation to sample preservation, handling, and transport as discussed in Section 1.1.

Water samples should be preserved at the time of collection, and analyzed within 14 days of collection. All samples were preserved as required and analyzed within the required holding times.

2.2 Initial Calibration (ICAL)

The method criteria require that (1) if linear average RFs is chosen as the quantitation option, the %RSD of RFs be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be ≥ 0.995 , (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be ≥ 0.990 , and (4) the back-calculated %D value for each calibration standard be within $\pm 15\%$. Initial calibration met the criteria for all target compounds.

An ICV (second source) standard was analyzed to verify the calibration curve. %D values were within $\pm 20\%$.

2.3 Calibration Verification

Continuing calibration verification (CCV) analyses were performed at the required frequency for all analytical sequences as required by the method. The %D values for all CCVs met the method criterion ($\pm 20\%$).

2.4 Blanks

Method Blanks: Method blanks were prepared and analyzed as required. TPH-Gasoline was not detected at or above the MDLs in the method blanks.

Trip Blanks: Two trip blanks were submitted for TPH-Gasoline analyses. Target compounds were not detected at or above the MDLs in these samples.

2.5 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were within the project control limits.

2.6 Matrix Spike and Matrix Spike Duplicate

MS and MSD analyses were performed on sample MW-130-15-012715 as requested. All %R and RPD values were within the laboratory control limits.

2.7 Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

LCS and LCSD analyses were performed as required by the method. All %R and RPD values were within the laboratory control limits.

2.8 Reporting Limits and Target Compound Quantitation

Sample-specific RLs were supported with adequate initial calibration concentrations.

2.9 Field Duplicates

One field duplicate pair was submitted for TPH-Gasoline analyses. Sample results, RPD (or concentration difference) values, and data qualification were presented in **Appendix A**.

2.10 Overall Assessment of TPH-Gasoline Data Usability

TPH-Gasoline data are of known quality and acceptable for use.

3. TPH-Diesel & Motor Oil by GC/FID (Method NWTPH-Dx)

3.1 Holding Time

No anomalies were identified in relation to sample preservation, handling, and transport as discussed in Section 1.1.

Acid-preserved water samples should be extracted within 14 days of collection. Extracts should be analyzed within 40 days of extraction. All samples were extracted and analyzed within the recommended holding times.

3.2 Initial Calibration

The method criteria require that (1) if linear average RFs is chosen as the quantitation option, the %RSD of RFs be $\leq 20\%$ for the analyte, (2) if least-square linear regression is chosen for quantitation, the correlation coefficient (r) be ≥ 0.995 , (3) if six-point non-linear (quadratic) curve is chosen for quantitation, the coefficient of determination (r^2) be ≥ 0.990 , and (4) the back-calculated %D value for each calibration standard be within $\pm 15\%$. Initial calibration met the criteria for all target compounds.

An ICV (second source) standard was analyzed to verify the calibration curve. %D values were within $\pm 20\%$.

3.3 Calibration Verification

The method requires that (1) a mid-range check standard be analyzed prior to and after each analytical batch, and (2) the percent drift (%D) value be within $\pm 20\%$ of the true value.

Calibration verification was performed at required frequency. The %D values were within the $\pm 20\%$ criterion.

3.4 Method Blanks

Method blanks were prepared and analyzed as required. TPH-Diesel and TPH-Motor Oil were not detected at or above the MDLs in the method blank.

3.5 Surrogate Spikes

Surrogate spikes were added to all samples as required by the method. All surrogate spike %R values were within the laboratory control limits.

3.6 Matrix Spike (MS) and MS Duplicate (MSD)

MS and MSD analyses were performed on sample MW-130-15-012715 as requested. All %R and RPD values were within the laboratory control limits.

3.7 Laboratory Control Sample (LCS) and LCSD Duplicate (LCSD)

LCS and LCSD analyses were performed as required by the method. All %R and RPD values were within the laboratory control limits.

3.8 Reporting Limits and Target Compound Quantitation

The reported RLs were supported with adequate ICAL concentrations, and met the project requirements.

3.9 Field Duplicates

One field duplicate pair was submitted for TPH-Diesel and TPH-Motor Oil analyses. Sample results, RPD (or concentration difference) values, and data qualification were presented in **Appendix A**.

3.10 Overall Assessment of TPH-Diesel and Motor Oil Data Usability

TPH-Diesel and TPH-Motor Oil data are of known quality and acceptable for use.

SUMMARY

Table I. Data Affected by QC Anomalies:


Laboratory Sample ID	Field Sample ID	Analyte	Qualifier	Qualified Reason
ZU40A ZU40B ZU40D ZU40E ZU40F ZU40G ZU40H ZU40I ZU40J ZU40K ZU40L ZU40M ZU40N ZU40P ZU40Q	721-MW9-15-012715 MW-102-25-012615 95-15-012715 MW104-15-012615 MW104-25-012615 95C-25-012715 MW-137-25-012715 MW-130-15-012715 MW-110-15-012615 721-MW10-15-012615 721-MW10-25-012615 MW-105-25-012615 MW-FD-012615 Trip Blank 1 ZU40 012615 Trip Blank 2 ZU40 012615	Acrylonitrile Acrolein Bromoform Carbon Disulfide	J/UJ	CCV %D value was <LCL.
ZU40A ZU40D ZU40K	721-MW9-15-012715 95-15-012715 721-MW10-15-012615	n-Butylbenzene	J	CCV %D value was >UCL.
ZU40A ZU40D ZU40G ZU40I ZU40J ZU40K	721-MW9-15-012715 95-15-012715 95C-25-012715 MW-130-15-012715 MW-110-15-012615 721-MW10-15-012615	sec-Butylbenzene	J	CCV %D value was >UCL.
ZU40I	MW-130-15-012715	n-Propylbenzene 1,1-Dichloropropene	J UJ	MS/MSD %R value was <LCL
-	All samples analyzed for VOCs	2-Chlorovinylether	R	Compound breaks down in acid preservation.

Notes:

%D - Percent difference
 CCV - Continuing calibration verification
 J/UJ – Detects were qualified (J) and non-detects qualified (UJ)
 LCL - Lower control limit
 RPD - Relative percent difference
 UCL – Upper control limit

Table II. Data Qualifiers are defined as follows:

Data Qualifier	Definition
J	The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.
R	The result was rejected.
U	The analyte was analyzed for, but was considered not detected at the reporting limit or reported value.
UJ	The analyte was analyzed for, and the associated quantitation limit was an estimated value.

Approved By:  Date: 3/21/2015
Mingta Lin, Senior Project Chemist

REFERENCES

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- Ecology (Washington State Department of). 1997. *Analytical Methods for Petroleum Hydrocarbons*. Publication No.: ECY 97-602. June 1997.
- Port of Tacoma. 2014. *Work Plan for Alexander Avenue Petroleum Tank Facilities Site RI/FS Tacoma, Washington. Appendix A: Sampling and Analysis Plan*. Aspect Consulting, LLC. June 2014.

Appendix A

Field duplicate RPD is indicative of field and laboratory precision and sample homogeneity in combination. The EPA *CLP National Functional Guidelines or Sampling and Analysis Plan* do not specify criteria for field duplicate evaluation. An advisory criterion of 30% was applied to evaluating the RPD values of field duplicate results that are $\geq 5 \times \text{RL}$. For results that are $< 5 \times \text{RL}$, an advisory criterion of $\pm 2 \times \text{RL}$ was applied to evaluating the concentration differences. The RPD (or concentration difference as applicable) values and data qualification for detected compounds in field duplicates are presented as follows:

Analytes	Unit	RL	Sample ID & Results		RPD	Difference	Data Qualifier
			MW-105-25-012615	MW-FD-012615			
TPH-Motor Oil	mg/L	0.2	ND	ND		0	
TPH-Diesel	mg/L	0.1	ND	ND		0	
TPH-Gasoline	mg/L	0.25	ND	ND		0	
Benzene	$\mu\text{g/L}$	2	170	160	6%		
Carbon Disulfide	$\mu\text{g/L}$	0.2	0.2	ND		0.2	
Ethylbenzene	$\mu\text{g/L}$	0.2	1.4	1.3	7%		
<i>m,p</i> -Xylenes	$\mu\text{g/L}$	0.4	2.1	2.0	5%		
<i>o</i> -Xylene	$\mu\text{g/L}$	0.2	1.1	1.0	10%		
Toluene	$\mu\text{g/L}$	0.2	1.2	1.2	0%		

Notes:

RPD - Relative percent difference

Difference - Concentration difference between the field replicates

$\mu\text{g/L}$ - micrograms per liter

mg/L – milligram per liter

ND – Not detected at or above the method detection limit

RL - Reporting limit

APPENDIX F - Simplified TEE



Voluntary Cleanup Program

Washington State Department of Ecology Toxics Cleanup Program

TERRESTRIAL ECOLOGICAL EVALUATION FORM

Under the Model Toxics Control Act (MTCA), a terrestrial ecological evaluation is necessary if hazardous substances are released into the soils at a Site. In the event of such a release, you must take one of the following three actions as part of your investigation and cleanup of the Site:

1. Document an exclusion from further evaluation using the criteria in WAC 173-340-7491.
2. Conduct a simplified evaluation as set forth in WAC 173-340-7492.
3. Conduct a site-specific evaluation as set forth in WAC 173-340-7493.

When requesting a written opinion under the Voluntary Cleanup Program (VCP), you must complete this form and submit it to the Department of Ecology (Ecology). The form documents the type and results of your evaluation.

Completion of this form is not sufficient to document your evaluation. You still need to document your analysis and the basis for your conclusion in your cleanup plan or report.

If you have questions about how to conduct a terrestrial ecological evaluation, please contact the Ecology site manager assigned to your Site. For additional guidance, please refer to www.ecy.wa.gov/programs/tcp/policies/terrestrial/TEEHome.htm.

Step 1: IDENTIFY HAZARDOUS WASTE SITE

Please identify below the hazardous waste site for which you are documenting an evaluation.

Facility/Site Name: Alexander Avenue Petroleum Tank Facilities Site

Facility/Site Address: 709, 901, and 1001 Alexander Avenue, Tacoma, WA

Facility/Site No: 1377

Cleanup Site No.: 743

Step 2: IDENTIFY EVALUATOR

Please identify below the person who conducted the evaluation and their contact information.

Name: Amy Tice

Title: Senior Staff Geologist

Organization: Aspect Consulting, LLC

Mailing address: 401 2nd Avenue South, Suite 201

City: Seattle

State: WA

Zip code: 98104

Phone: 206-838-6585

Fax: 206-838-5853

E-mail: atices@aspectconsulting.com

Step 3: DOCUMENT EVALUATION TYPE AND RESULTS

A. Exclusion from further evaluation.

1. Does the Site qualify for an exclusion from further evaluation?

- Yes *If you answered "YES," then answer **Question 2**.*
- No or Unknown *If you answered "NO" or "UNKNOWN," then skip to **Step 3B** of this form.*

2. What is the basis for the exclusion? Check all that apply. Then skip to **Step 4** of this form.

Point of Compliance: WAC 173-340-7491(1)(a)

- All soil contamination is, or will be,* at least 15 feet below the surface.
- All soil contamination is, or will be,* at least 6 feet below the surface (or alternative depth if approved by Ecology), and institutional controls are used to manage remaining contamination.

Barriers to Exposure: WAC 173-340-7491(1)(b)

- All contaminated soil, is or will be,* covered by physical barriers (such as buildings or paved roads) that prevent exposure to plants and wildlife, and institutional controls are used to manage remaining contamination.

Undeveloped Land: WAC 173-340-7491(1)(c)

- There is less than 0.25 acres of contiguous# undeveloped± land on or within 500 feet of any area of the Site and any of the following chemicals is present: chlorinated dioxins or furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, heptachlor epoxide, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, or pentachlorobenzene.
- For sites not containing any of the chemicals mentioned above, there is less than 1.5 acres of contiguous# undeveloped± land on or within 500 feet of any area of the Site.

Background Concentrations: WAC 173-340-7491(1)(d)

- Concentrations of hazardous substances in soil do not exceed natural background levels as described in WAC 173-340-200 and 173-340-709.

* An exclusion based on future land use must have a completion date for future development that is acceptable to Ecology.

± "Undeveloped land" is land that is not covered by building, roads, paved areas, or other barriers that would prevent wildlife from feeding on plants, earthworms, insects, or other food in or on the soil.

"Contiguous" undeveloped land is an area of undeveloped land that is not divided into smaller areas of highways, extensive paving, or similar structures that are likely to reduce the potential use of the overall area by wildlife.

B. Simplified evaluation.

1. Does the Site qualify for a simplified evaluation?

- Yes *If you answered "YES," then answer **Question 2** below.*
- No or Unknown *If you answered "NO" or "UNKNOWN," then skip to **Step 3C** of this form.*

2. Did you conduct a simplified evaluation?

- Yes *If you answered "YES," then answer **Question 3** below.*
- No *If you answered "NO," then skip to **Step 3C** of this form.*

3. Was further evaluation necessary?

- Yes *If you answered "YES," then answer **Question 4** below.*
- No *If you answered "NO," then answer **Question 5** below.*

4. If further evaluation was necessary, what did you do?

- Used the concentrations listed in Table 749-2 as cleanup levels. *If so, then skip to **Step 4** of this form.*
- Conducted a site-specific evaluation. *If so, then skip to **Step 3C** of this form.*

5. If no further evaluation was necessary, what was the reason? Check all that apply. Then skip to **Step 4** of this form.

Exposure Analysis: WAC 173-340-7492(2)(a)

- Area of soil contamination at the Site is not more than 350 square feet.
- Current or planned land use makes wildlife exposure unlikely. Used Table 749-1.

Pathway Analysis: WAC 173-340-7492(2)(b)

- No potential exposure pathways from soil contamination to ecological receptors.

Contaminant Analysis: WAC 173-340-7492(2)(c)

- No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations that exceed the values listed in Table 749-2.
- No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations that exceed the values listed in Table 749-2, and institutional controls are used to manage remaining contamination.
- No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays.
- No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays, and institutional controls are used to manage remaining contamination.

C. Site-specific evaluation. A site-specific evaluation process consists of two parts: (1) formulating the problem, and (2) selecting the methods for addressing the identified problem. Both steps require consultation with and approval by Ecology. See WAC 173-340-7493(1)(c).

1. Was there a problem? See WAC 173-340-7493(2).

- Yes *If you answered "YES," then answer **Question 2** below.*
- No *If you answered "NO," then identify the reason here and then skip to **Question 5** below:*
- No issues were identified during the problem formulation step.
 - While issues were identified, those issues were addressed by the cleanup actions for protecting human health.

2. What did you do to resolve the problem? See WAC 173-340-7493(3).

- Used the concentrations listed in Table 749-3 as cleanup levels. *If so, then skip to **Question 5** below.*
- Used one or more of the methods listed in WAC 173-340-7493(3) to evaluate and address the identified problem. *If so, then answer **Questions 3 and 4** below.*

3. If you conducted further site-specific evaluations, what methods did you use?

Check all that apply. See WAC 173-340-7493(3).

- Literature surveys.
- Soil bioassays.
- Wildlife exposure model.
- Biomarkers.
- Site-specific field studies.
- Weight of evidence.
- Other methods approved by Ecology. If so, please specify:

4. What was the result of those evaluations?

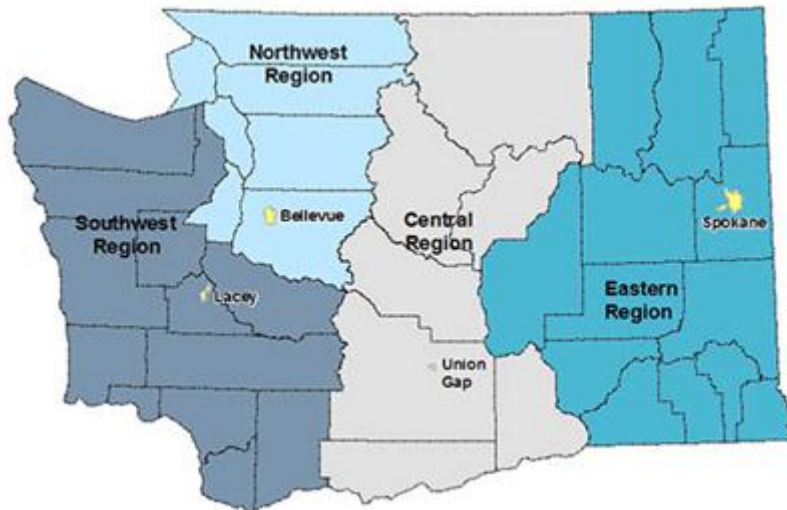
- Confirmed there was no problem.
- Confirmed there was a problem and established site-specific cleanup levels.

5. Have you already obtained Ecology's approval of both your problem formulation and problem resolution steps?

- Yes If so, please identify the Ecology staff who approved those steps:
- No

Step 4: SUBMITTAL

Please mail your completed form to the Ecology site manager assigned to your Site. If a site manager has not yet been assigned, please mail your completed form to the Ecology regional office for the County in which your Site is located.




Northwest Region: Attn: VCP Coordinator 3190 160 th Ave. SE Bellevue, WA 98008-5452	Central Region: Attn: VCP Coordinator 1250 West Alder St. Union Gap, WA 98903-0009
Southwest Region: Attn: VCP Coordinator P.O. Box 47775 Olympia, WA 98504-7775	Eastern Region: Attn: VCP Coordinator N. 4601 Monroe Spokane WA 99205-1295

If you need this publication in an alternate format, please call the Toxics Cleanup Program at 360-407-7170. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

Table 749-1

Simplified Terrestrial Ecological Evaluation-Exposure Analysis Procedure

Estimate the area of contiguous (connected) <u>undeveloped land</u> on the site or within 500 feet of any area of the site to the nearest 1/2 acre (1/4 acre if the area is less than 0.5 acre).																						
1) From the table below, find the number of points corresponding to the area and enter this number in the field to the right.																						
	<table border="1"> <thead> <tr> <th style="text-align: center;">Area (acres)</th> <th style="text-align: center;">Points</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">0.25 or less</td><td style="text-align: center;">4</td></tr> <tr><td style="text-align: center;">0.5</td><td style="text-align: center;">5</td></tr> <tr><td style="text-align: center;">1.0</td><td style="text-align: center;">6</td></tr> <tr><td style="text-align: center;">1.5</td><td style="text-align: center;">7</td></tr> <tr><td style="text-align: center;">2.0</td><td style="text-align: center;">8</td></tr> <tr><td style="text-align: center;">2.5</td><td style="text-align: center;">9</td></tr> <tr><td style="text-align: center;">3.0</td><td style="text-align: center;">10</td></tr> <tr><td style="text-align: center;">3.5</td><td style="text-align: center;">11</td></tr> <tr><td style="text-align: center;">4.0 or more</td><td style="text-align: center;">12</td></tr> </tbody> </table>	Area (acres)	Points	0.25 or less	4	0.5	5	1.0	6	1.5	7	2.0	8	2.5	9	3.0	10	3.5	11	4.0 or more	12	<div style="border: 1px solid red; padding: 5px; display: inline-block;"> <p style="color: red; margin: 0;">Approximate area of unpaved portions of 709 Property</p> </div> 
Area (acres)	Points																					
0.25 or less	4																					
0.5	5																					
1.0	6																					
1.5	7																					
2.0	8																					
2.5	9																					
3.0	10																					
3.5	11																					
4.0 or more	12																					
2) Is this an <u>industrial</u> or <u>commercial</u> property? If yes, enter a score of 3. If no, enter a score of 1		3																				
3) ^a Enter a score in the box to the right for the habitat quality of the site, using the following rating system ^b . High=1, Intermediate=2, Low=3		3																				
4) Is the undeveloped land likely to attract wildlife? If yes, enter a score of 1 in the box to the right. If no, enter a score of 2. ^c		1																				
5) Are there any of the following soil contaminants present: Chlorinated dioxins/furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, pentachlorobenzene? If yes, enter a score of 1 in the box to the right. If no, enter a score of 4.		4																				
6) Add the numbers in the boxes on lines 2-5 and enter this number in the box to the right. If this number is larger than the number in the box on line 1, the simplified evaluation may be ended.		11																				

Notes for Table 749-1

^a It is expected that this habitat evaluation will be undertaken by an experienced field biologist. If this is not the case, enter a conservative score of (1) for questions 3 and 4.

^b **Habitat rating system.** Rate the quality of the habitat as high, intermediate or low based on your professional judgment as a field biologist. The following are suggested factors to consider in making this evaluation:

Low: Early successional vegetative stands; vegetation predominantly noxious, nonnative, exotic plant species or weeds. Areas severely disturbed by human activity, including intensively cultivated croplands. Areas isolated from other habitat used by wildlife.

High: Area is ecologically significant for one or more of the following reasons: Late-[successional](#) native plant communities present; relatively high species diversity; used by an uncommon or rare species; [priority habitat](#) (as defined by the Washington Department of fish and Wildlife); part of a larger area of habitat where size or fragmentation may be important for the retention of some species.

Intermediate: Area does not rate as either high or low.

^c Indicate "yes" if the area attracts wildlife or is likely to do so. Examples: Birds frequently visit the area to feed; evidence of high use b mammals (tracks, scat, etc.); habitat "island" in an industrial area; unusual features of an area that make it important for feeding animals; heavy use during seasonal migrations.

[\[Area Calculation Aid\]](#) [\[Aerial Photo with Area Designations\]](#) [TEE Table 749-1] [\[Index of Tables\]](#)

[\[Exclusions Main\]](#) [\[TEE Definitions\]](#) [\[Simplified or Site-Specific?\]](#) [\[Simplified Ecological Evaluation\]](#) [\[Site-Specific Ecological Evaluation\]](#) [\[WAC 173-340-7493\]](#)

[\[TEE Home\]](#)

APPENDIX G

Estimate of Contaminant Mass Calculation Methods

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G. Estimate of Contaminant Mass Calculation Methods

G.1. Introduction

This appendix provides information regarding the calculation of contaminant mass estimates at the Alexander Avenue site. These calculations are based on soil data from 2000-2014.

G.2. Calculation of Contaminated Soil Volume and Contaminated Soil Mass

The volume and mass of soil contaminated with gasoline-range TPH, diesel- + oil-range TPH, and benzene at the Alexander Avenue Site was calculated for three depth intervals: 0-5 feet, 5-15 feet, and 15-30 feet below ground surface.

The volume of soil was obtained by creating Thiessen polygons in ArcGIS and multiplying the individual polygon area by the depth interval thickness. The volume of contaminated soil per depth interval was calculated from the sum of the polygon volume at each boring that had a maximum detected analyte concentration above the screening level. The depth interval volumes were added together to calculate the total volume of contaminated soil per analyte.

The mass of soil at each polygon was calculated from the volume using the following soil density ($\rho_{\text{soil}} = 1.6 \text{ tons/yd}^3$).

The mass of contaminated soil per depth interval was calculated from the sum of polygon mass at each boring that had a maximum detected analyte concentration above the screening level. The depth interval masses were added together to calculate the total mass of contaminated soil per analyte.

Sample calculation for 709-BH-05 polygon, 0-5 ft zone:

$$\begin{aligned} \text{Mass of gasoline-range TPH contaminated soil} &= \text{Thiessen polygon area} \times \text{interval} \\ &\text{thickness} \times \text{unit conversion factor} \times \rho_{\text{soil}} \\ &= 17670 \text{ ft}^2 \times 5 \text{ ft} \times 1/27 \text{ yd}^3/\text{ft} \times 1.6 \text{ tons/yd}^3 \\ &= 5200 \text{ tons (rounded to two significant figures)} \end{aligned}$$

The total contaminated soil volume and soil mass for each analyte are summarized in Table G-1. These estimates are likely conservative because sampling generally targeted soils exhibiting the greatest evidence of contamination in each interval.

G.3. Calculation of LNAPL Volumes

The mass of LNAPL was estimated using the API Interactive LNAPL Guide software (API, 2006), which estimates LNAPL mass based on the LNAPL saturation versus depth in different soil types. LNAPL measurements from 709-MW21-15, 721-MW1, 721-MW14-15, 721-MW2, 721-MW4, and 721MW15-15 collected on October 1, 2014 were used in the calculation. The software inputs were determined as follows:

- The soil type in the smear zone is medium sand.
- The average LNAPL thickness in the smear zone (0.31 ft) and the average depth to LNAPL (7.32 ft) were calculated from field measurements made at six monitoring wells with LNAPL at the Alexander Avenue Site.
- The area of the LNAPL zone (46831 ft²) was calculated from the sum of the Thiessen polygons where the monitoring wells with LNAPL were located.

The API Interactive LNAPL Guide software estimated the total mass of LNAPL in the smear zone to be 46 pounds. Based on historical data, the LNAPL was assumed to be 2/3 diesel and 1/3 gasoline, which is 31 pounds and 15 pounds, respectively. Based on the ratio of benzene to gasoline-range TPH total mass estimates in soil, the LNAPL was assumed to be 1/385 benzene, which is 0.12 pounds.

G.4. Calculation of Total Contaminant Mass

The mass of contaminants was calculated by multiplying the average detected analyte concentration per boring by the tons of soil per polygon determined in section G.2. However, for the 5 to 15-foot depth interval, the contaminant mass was multiplied by a factor of 20% assuming that the majority of mass is contained in a 2-foot interval within the zone. This is calculated from the average depth of highly contaminated soil (the 'smear zone', which is based on the average thickness exhibiting evidence of LNAPL (product and/or sheen) from the RI boring logs (Table G-2). This adjustment was made because analytical sampling targeted the zone of highest contamination based on field screening, and assuming the entire 5- to 15-foot depth interval is as contaminated as the smear zone would result in an overly conservative estimate of contaminant mass.

Sample calculation for 709-BH-05, 0-5 ft interval:

$$\begin{aligned} \text{Mass of contaminants} &= \text{Mass of contaminated soil} \times \text{average detected concentration} \\ &\text{in ppm} \times \text{conversion factor} \\ &= 5200 \text{ tons} \times 2200 \text{ ppm} \times 1 \times 10^{-6} \\ &= 12 \text{ tons} \end{aligned}$$

The total pounds of contaminant mass were calculated by adding the contaminant mass from each depth interval plus the estimated LNAPL per analyte from section G.3 (Table G-1).

Sample calculation for gasoline range organics was as follows:

Total gasoline-range TPH mass = mass of gasoline-range TPH (0-5 foot interval) + mass of gasoline-range TPH (5-15 foot interval) + mass of gasoline-range TPH (15-30 foot interval) + mass of gasoline-range TPH in LNAPL

= 89647 lbs + 223038 lbs +1930 lbs +15 lbs

=310,000 lbs (rounded to two significant figures)

The total contaminant masses are estimated as follows:

- 310,000 lbs gasoline-range TPH;
- 820 lbs benzene; and
- 1,600,000 lbs diesel- + oil-range TPH.

References for Appendix G

API Interactive LNAPL Guide Version 2.0.4." American Petroleum Institute, Feb. 2006. Web. 14 Aug. 2015. <<http://www.api.org/environment-health-and-safety/clean-water/ground-water/lnapl/api-interactive-lnapl-guide>>.

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TABLES

Table G-1 - Mass Calculation Summary

Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Analyte	Interval (ft)	Pounds of Contaminant Mass	Cubic Yards of Contaminated Soil	Tons of Contaminated Soil
Benzene	0-5	95	17722	28355
Benzene	5-15	338	71510	114416
Benzene	15-30	384	207134	331414
	LNAPL	0.12		
Totals		820	300,000	470,000
Diesel- + Oil-range TPH	0-5	715310	26683	42693
Diesel- + Oil-range TPH	5-15	842610	102108	163373
Diesel- + Oil-range TPH	15-30	29700	0	0
	LNAPL	31		
Totals		1,600,000	130,000	210,000
Gasoline-range TPH	0-5	89847	26123	41797
Gasoline-range TPH	5-15	223038	113250	181199
Gasoline-range TPH	15-30	1930	5919	9470
	LNAPL	15		
Totals		310,000	150,000	230,000

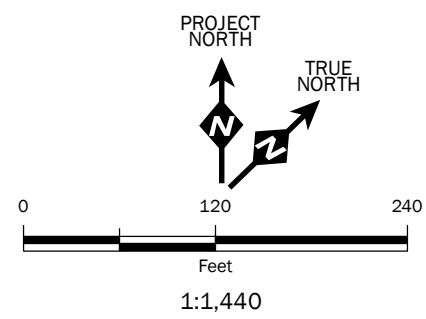
Table G-2 - Smear Zone Thickness Estimate

Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

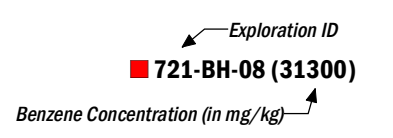
Boring	LNAPL indicators	LNAPL yes/no	Smear Zone Depth Interval in Feet
B-101		No	
B-102		No	
B-103		No	
B-104		No	
B-105	Sheen, odor	Yes	7-7.5
B-106		No	
B-107		No	
B-108	Product	Yes	6-7
B-109	Product	Yes	6-8
B-110	Sheen, odor	Yes	10-15
B-111	Sheen, odor	Yes	7.5-13
B-112		No	
B-113		No	
B-114		No	
B-115		No	
B-116		No	
B-117		No	
B-118		No	
B-119		No	
B-120	Sheen	Yes	13
B-121	Product	Yes	6-7
B-122		No	
B-123		No	
B-124		No	
B-125		No	
B-126		No	
B-127		No	
B-128		No	
B-129		No	
B-130		No	
B-131		No	
B-132		No	
B-133		No	
B-134		No	
B-135		No	
B-136		No	
B-137		No	
B-138		No	
B-139		No	

Average Smear-Zone Depth Interval (ft):	8 - 10
---	--------

FIGURES



- Tax Parcel Boundary
 - Former Parcel Line
 - Historical Building/Tank/Structure
 - Existing Building/Dock
 - Former Railroad Spur
 - Shoreline/Hylebos Waterway
- Thiessen Polygons**
- Exceeds 10x Cleanup Level
 - Exceeds 1x Cleanup Level
 - No Cleanup Level Exceedance/Non-Detect
- 0.02 mg/kg Soil Benzene Isoconcentration Line
- 0.2 mg/kg Soil Benzene Isoconcentration Line
- Soil Sample Locations**
- Maximum Benzene Concentration in Interval
- Non-Detect
 - Detected, No Exceedance of Screening Level
 - Above Screening Level (0.02 mg/kg) but Less than 10x Screening Level (0.2 mg/kg)
 - Above 10x Screening Level (0.2 mg/kg)



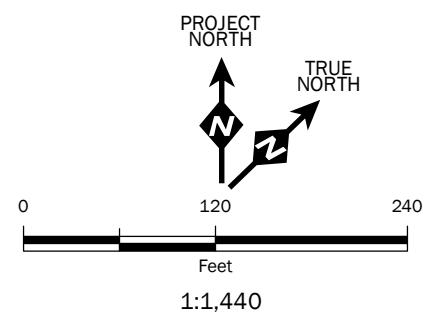
Note: Displayed concentrations represent the maximum detected at each exploration location in the indicated depth interval. Only data collected since 2000 are displayed. Screening level 0.02 mg/kg is based on groundwater protection.

Extent of Benzene in Soil Unsaturated Zone (0 - 5' bgs)

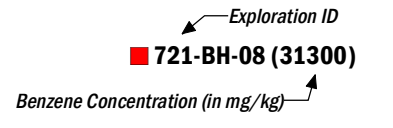
Alexander Avenue Petroleum Tank Facilities Site
Port of Tacoma, Washington

	MAR-2016	BY: DFR / PPW	FIGURE NO. G-1
	PROJECT NO. 130097-01B	REVISED BY: RAP / DIM	

GIS Path: T:\projects_8\Port of Tacoma\AlexanderAve_130097\Delivered\RemedialInvestigation\Report\Appendix G\Mass Estimate\G-1 Thiessen Polygons Soil Benzene 0-5.mxd | Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet | Date Saved: 3/31/2016 | User: dholich | Print Date: 3/31/2016



- Tax Parcel Boundary
 - Former Parcel Line
 - Historical Building/Tank/Structure
 - Existing Building/Dock
 - Former Railroad Spur
 - Shoreline/Hylebos Waterway
- Thiessen Polygons**
- Exceeds 10x Cleanup Level
 - Exceeds 1x Cleanup Level
 - No Cleanup Level Exceedance/Non-Detect
- 0.02 mg/kg Soil Benzene Isoconcentration Line
- 0.2 mg/kg Soil Benzene Isoconcentration Line
- Soil Sample Locations**
- Maximum Benzene Concentration in Interval
- Non-Detect
 - Detected, No Exceedance of Screening Level
 - Above Screening Level (0.02 mg/kg) but Less than 10x Screening Level (0.2 mg/kg)
 - Above 10x Screening Level (0.2 mg/kg)



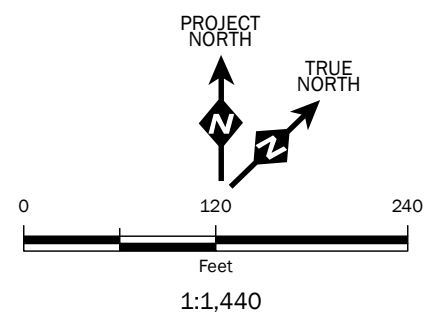
Note: Displayed concentrations represent the maximum detected at each exploration location in the indicated depth interval. Only data collected since 2000 are displayed. Screening level 0.02 mg/kg is based on groundwater protection.

Extent of Benzene in Soil Saturated Zone (5 - 15' bgs)

Alexander Avenue Petroleum Tank Facilities Site
Port of Tacoma, Washington

	MAR-2016	BY: DFR / PPW	FIGURE NO. G-2
	PROJECT NO. 130097-01D	REVISED BY: RAP / DIM	

GIS Path: T:\projects_8\Port of Tacoma\AlexanderAve_130097\Delivered\RemedialInvestigationReport\Appendix G\Mass Estimate\G-2 Thiessen Polygons Soil Benzene 5-15.mxd | Coordinate System: NAD 1983 State Plane Washington South FIPS 4602 Feet | Date Saved: 3/23/2016 | User: dtabish | Print Date: 3/23/2016



- Tax Parcel Boundary
 - Former Parcel Line
 - Historical Building/Tank/Structure
 - Existing Building/Dock
 - Former Railroad Spur
 - Shoreline/Hylebos Waterway
- Thiessen Polygons**
- Exceeds 10x Cleanup Level
 - Exceeds 1x Cleanup Level
 - No Cleanup Level Exceedance/Non-Detect
- 0.02 mg/kg Soil Benzene Isoconcentration Line
- 0.2 mg/kg Soil Benzene Isoconcentration Line
- Soil Sample Locations**
- Maximum Benzene Concentration in Interval
- Non-Detect
 - Detected, No Exceedance of Screening Level
 - Above Screening Level (0.02 mg/kg) but Less than 10x Screening Level (0.2 mg/kg)
 - Above 10x Screening Level (0.2 mg/kg)

Exploration ID
721-BH-08 (31300)
 Benzene Concentration (in mg/kg)

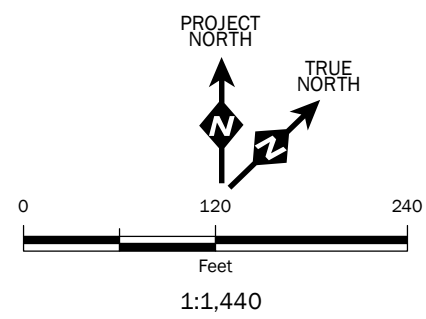
Note: Displayed concentrations represent the maximum detected at each exploration location in the indicated depth interval. Only data collected since 2000 are displayed. Screening level 0.02 mg/kg is based on groundwater protection.

Extent of Benzene in Soil Saturated Zone (15 - 30' bgs)

Alexander Avenue Petroleum Tank Facilities Site
 Port of Tacoma, Washington

	DEC-2016	BY: DFR / PPW	FIGURE NO. G-3
	PROJECT NO. 130097-01D	REVISED BY: RAP / DIM	

GIS Path: T:\Projects_8\Port of Tacoma\Alexander Ave - 130097\Deliverables\Investigation\Report\Appendix G\Map Estimates\G3 Thiessen Polygons Soil Benzene 15-30.mxd | Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet | Data Source: 12/14/2016 | User: j.papin | Print Date: 12/14/2016



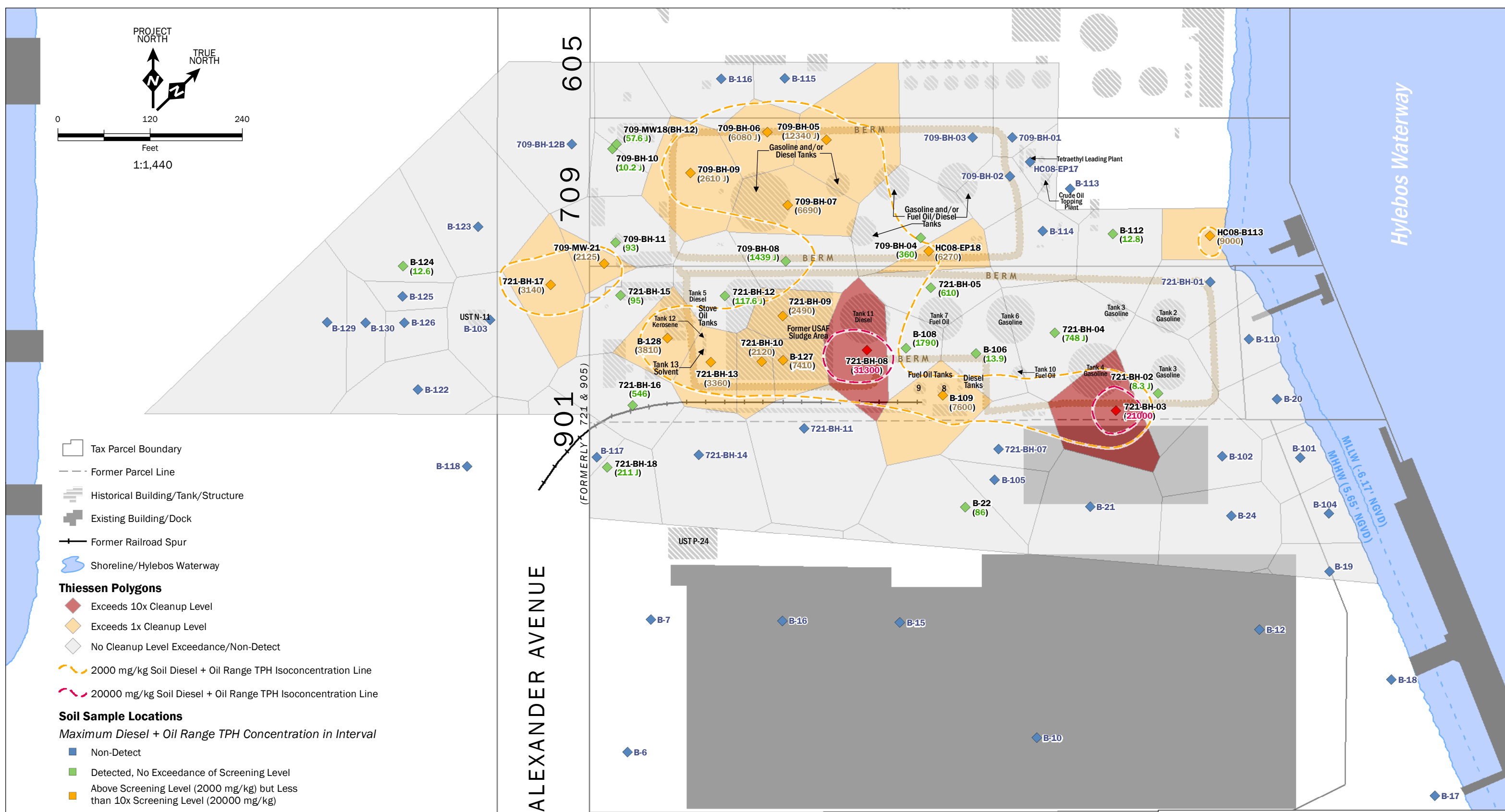
- Tax Parcel Boundary
 - Former Parcel Line
 - Historical Building/Tank/Structure
 - Existing Building/Dock
 - Former Railroad Spur
 - Shoreline/Hylebos Waterway
- Thiessen Polygons**
- Exceeds 10x Cleanup Level
 - Exceeds 1x Cleanup Level
 - No Cleanup Level Exceedance/Non-Detect
- 2000 mg/kg Soil Diesel + Oil Range TPH Isoconcentration Line
- 20000 mg/kg Soil Diesel + Oil Range TPH Isoconcentration Line
- Soil Sample Locations**
- Maximum Diesel + Oil Range TPH Concentration in Interval
- Non-Detect
 - Detected, No Exceedance of Screening Level
 - Above Screening Level (2000 mg/kg) but Less than 10x Screening Level (20000 mg/kg)
 - Above 10x Screening Level (20000 mg/kg)

Exploration ID
721-BH-08 (31300)
 Diesel + Oil Range TPH Concentration (in mg/kg)

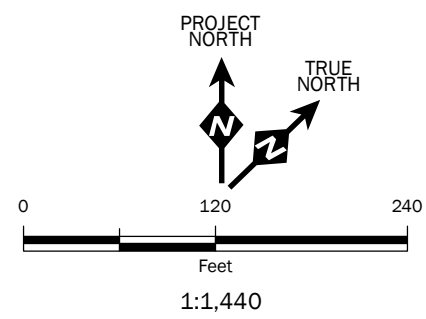
Note: Displayed concentrations represent the maximum detected at each exploration location in the indicated depth interval. Only data collected since 2000 are displayed. Screening level 2000 mg/kg is based on groundwater protection.

Extent of Diesel + Oil Range TPH in Soil Unsaturated Zone (0 - 5' bgs)
 Alexander Avenue Petroleum Tank Facilities Site
 Port of Tacoma, Washington

	MAR-2016	BY: DFR / PPW	FIGURE NO. G-4
	PROJECT NO. 130097-01D	REVISED BY: RAP / DIM	



GIS Path: \Projects & Port of Tacoma Alexander Ave - 130097\Alexander Remediation\Site\Reports\Appendix G Mass Estimate G-4 Thiessen Polygons Soil Diesel and Oil Range TPH 0-5.mxd | Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet | Date Saved: 3/21/2016 | User: rrobison | Print Date: 3/21/2016



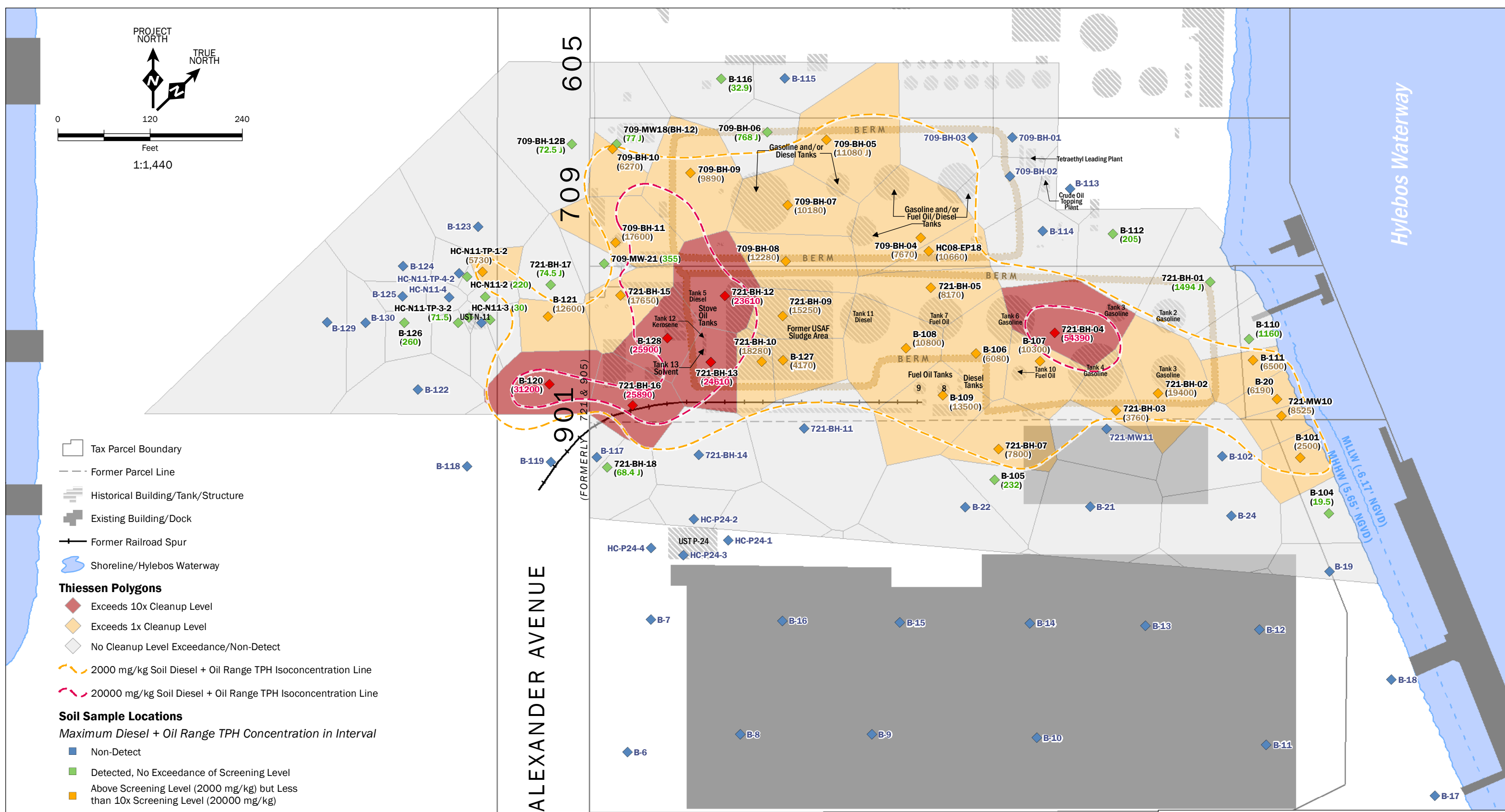
- Tax Parcel Boundary
 - Former Parcel Line
 - Historical Building/Tank/Structure
 - Existing Building/Dock
 - Former Railroad Spur
 - Shoreline/Hylebos Waterway
- Thiessen Polygons**
- Exceeds 10x Cleanup Level
 - Exceeds 1x Cleanup Level
 - No Cleanup Level Exceedance/Non-Detect
- 2000 mg/kg Soil Diesel + Oil Range TPH Isoconcentration Line
- 20000 mg/kg Soil Diesel + Oil Range TPH Isoconcentration Line
- Soil Sample Locations**
- Maximum Diesel + Oil Range TPH Concentration in Interval
- Non-Detect
 - Detected, No Exceedance of Screening Level
 - Above Screening Level (2000 mg/kg) but Less than 10x Screening Level (20000 mg/kg)
 - Above 10x Screening Level (20000 mg/kg)

Exploration ID
721-BH-08 (31300)
 Diesel + Oil Range TPH Concentration (in mg/kg)

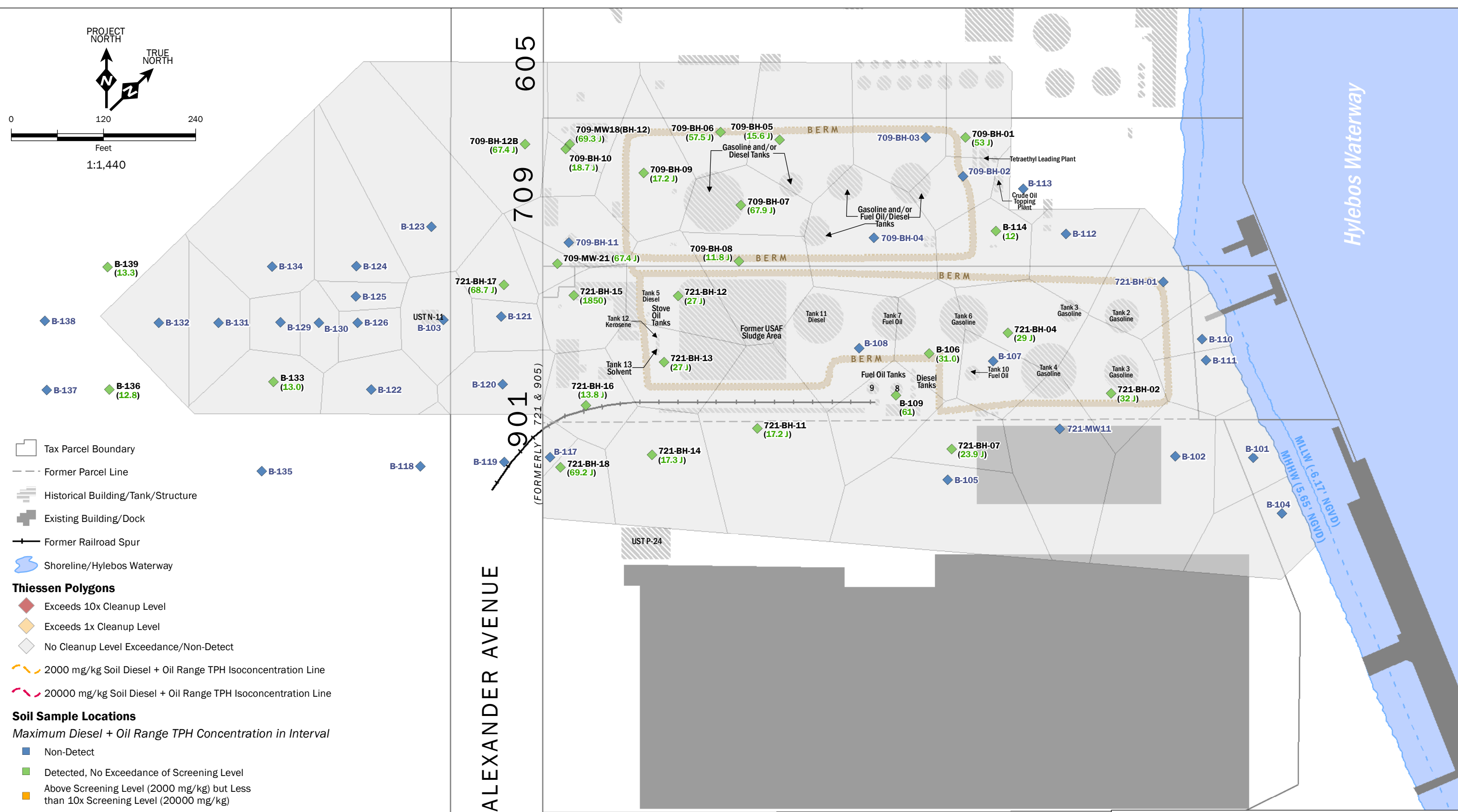
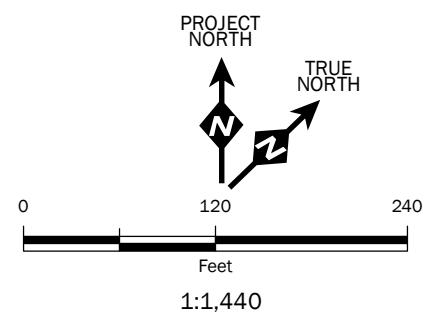
Note: Displayed concentrations represent the maximum detected at each exploration location in the indicated depth interval. Only data collected since 2000 are displayed. Screening level 2000 mg/kg is based on groundwater protection.

Extent of Diesel + Oil Range TPH in Soil Saturated Zone (5 - 15' bgs)
 Alexander Avenue Petroleum Tank Facilities Site
 Port of Tacoma, Washington

	MAR-2016	BY: DFR / PPW	FIGURE NO. G-5
	PROJECT NO. 130097-01D	REVISED BY: RAP / DIM	



GIS Path: \Projects\Port of Tacoma\Alexander Avenue Remediation\Site Investigation\Appendix G Mass Estimate of 5 Thiessen Polygons Soil Diesel and Oil Range TPH 5-15' bgs | Coordinate System: NAD 1983 StatePlane Washington South FIPS 4902 Feet | Date Saved: 3/31/2016 | User: dholton | Print Date: 3/31/2016



- Tax Parcel Boundary
 - Former Parcel Line
 - Historical Building/Tank/Structure
 - Existing Building/Dock
 - Former Railroad Spur
 - Shoreline/Hylebos Waterway
- Thiessen Polygons**
- Exceeds 10x Cleanup Level
 - Exceeds 1x Cleanup Level
 - No Cleanup Level Exceedance/Non-Detect
- 2000 mg/kg Soil Diesel + Oil Range TPH Isoconcentration Line
 - 20000 mg/kg Soil Diesel + Oil Range TPH Isoconcentration Line
- Soil Sample Locations**
- Maximum Diesel + Oil Range TPH Concentration in Interval
- Non-Detect
 - Detected, No Exceedance of Screening Level
 - Above Screening Level (2000 mg/kg) but Less than 10x Screening Level (20000 mg/kg)
 - Above 10x Screening Level (20000 mg/kg)

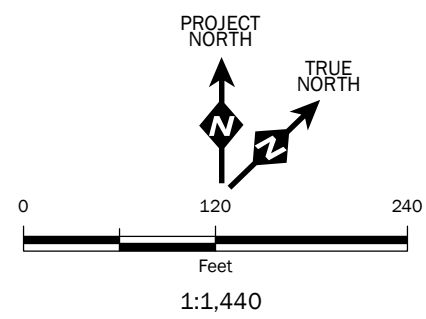
Exploration ID
721-BH-08 (31300)
 Diesel + Oil Range TPH Concentration (in mg/kg)

Note: Displayed concentrations represent the maximum detected at each exploration location in the indicated depth interval. Only data collected since 2000 are displayed. Screening level 2000 mg/kg is based on groundwater protection.

Extent of Diesel + Oil Range TPH in Soil Saturated Zone (15 - 30' bgs)
 Alexander Avenue Petroleum Tank Facilities Site
 Port of Tacoma, Washington

	MAR-2016	BY: DFR / PPW	FIGURE NO. G-6
	PROJECT NO. 130097-01D	REVISED BY: RAP / DIM	

GIS Path: \Projects & Port of Tacoma Alexander Ave - 130097\Alexander Remediation\Site Investigation\Appendix G Mass Estimate G-6 Thiessen Polygons Soil Diesel and Oil Range TPH 15-30.mxd | Coordinate System: NAD 1983 StatePlane Washington South FIPS 4902 Feet | Date Saved: 3/31/2016 | User: mjohn | Print Date: 3/31/2016



- Tax Parcel Boundary
 - Former Parcel Line
 - Historical Building/Tank/Structure
 - Existing Building/Dock
 - Former Railroad Spur
 - Shoreline/Hylebos Waterway
- Thiessen Polygons**
- Exceeds 10x Cleanup Level
 - Exceeds 1x Cleanup Level
 - No Cleanup Level Exceedance/Non-Detect
- 30 mg/kg Soil Gasoline Range TPH Isoconcentration Line
- 300 mg/kg Soil Gasoline Range TPH Isoconcentration Line
- Soil Sample Locations**
- Maximum Gasoline Range TPH Concentration in Interval*
- Non-Detect
 - Detected, No Exceedance of Screening Level
 - Above Screening Level (30 mg/kg) but Less than 10x Screening Level (300 mg/kg)
 - Above 10x Screening Level (300 mg/kg)

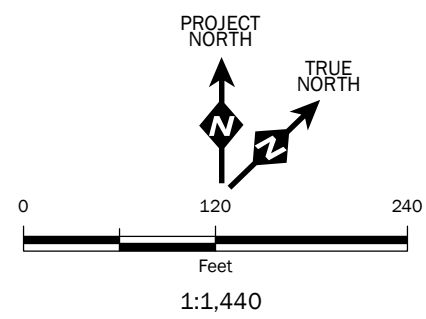
Exploration ID
721-BH-08 (31300)
 Gasoline Range TPH Concentration (in mg/kg)

Note: Displayed concentrations represent the maximum detected at each exploration location in the indicated depth interval. Only data collected since 2000 are displayed. Screening level 30 mg/kg is based on groundwater protection.

Extent of Gasoline Range TPH in Soil Unsaturated Zone (0 - 5' bgs)
 Alexander Avenue Petroleum Tank Facilities Site
 Port of Tacoma, Washington

	MAR-2016	BY: DFR / PPW	FIGURE NO. G-7
	PROJECT NO. 130097-01D	REVISED BY: RAP / DIM	

GIS Path: \Projects & Port of Tacoma\Alexander Avenue Remediation\GIS\Reports\Appendix G Mass Estimate G-7 Thiessen Polygons Soil Gasoline Range TPH 0-5.mxd | Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet | Date Saved: 3/31/2016 | User: rsmith | Print Date: 3/31/2016



- Tax Parcel Boundary
 - Former Parcel Line
 - Historical Building/Tank/Structure
 - Existing Building/Dock
 - Former Railroad Spur
 - Shoreline/Hylebos Waterway
- Thiessen Polygons**
- Exceeds 10x Cleanup Level
 - Exceeds 1x Cleanup Level
 - No Cleanup Level Exceedance/Non-Detect
- 30 mg/kg Soil Gasoline Range TPH Isoconcentration Line
- 300 mg/kg Soil Gasoline Range TPH Isoconcentration Line
- Soil Sample Locations**
- Maximum Gasoline Range TPH Concentration in Interval
- Non-Detect
 - Detected, No Exceedance of Screening Level
 - Above Screening Level (30 mg/kg) but Less than 10x Screening Level (300 mg/kg)
 - Above 10x Screening Level (300 mg/kg)

Exploration ID
721-BH-08 (31300)
 Gasoline Range TPH Concentration (in mg/kg)

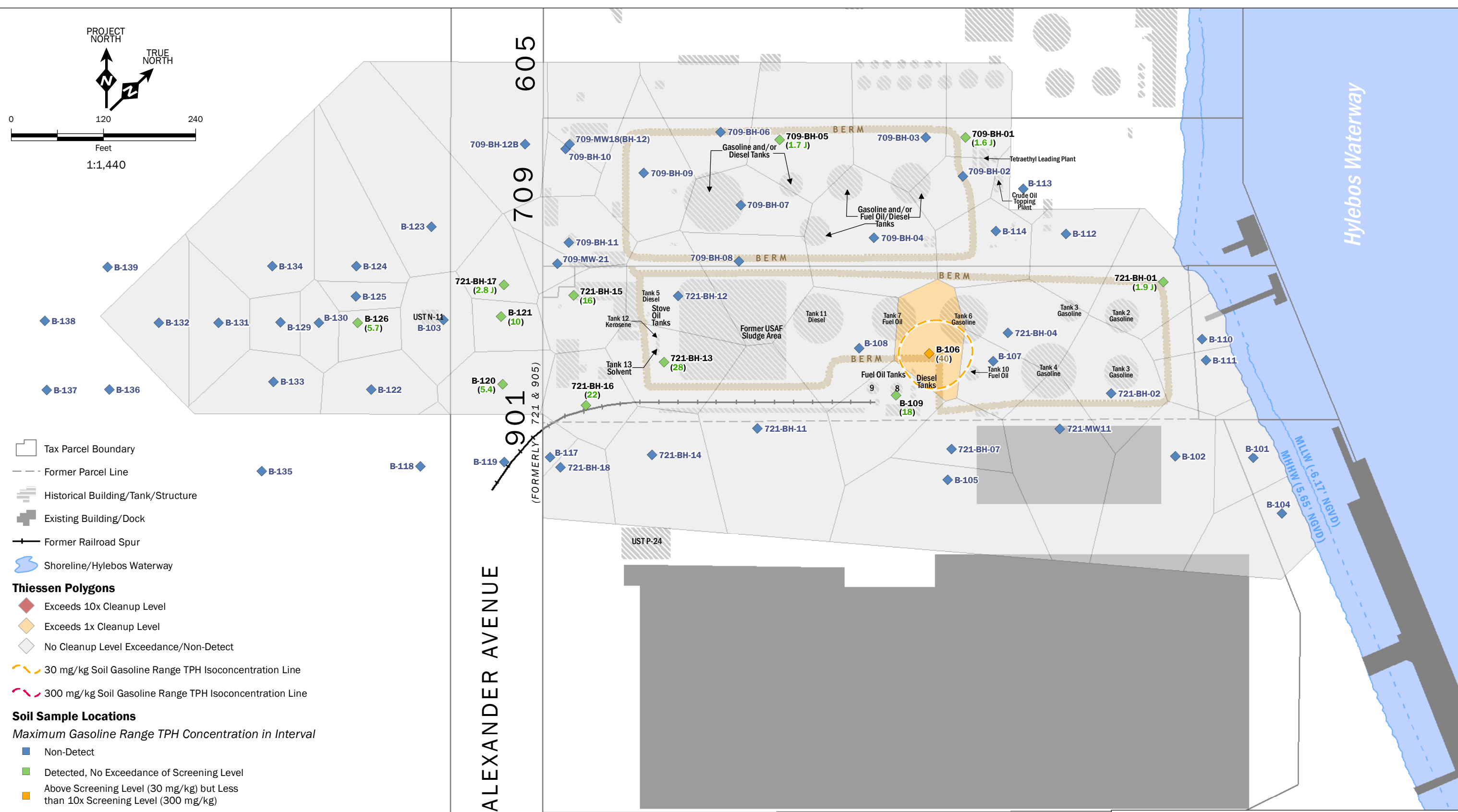
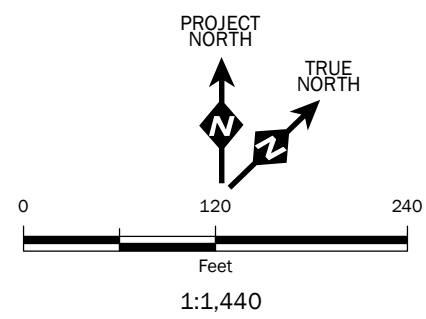
Note: Displayed concentrations represent the maximum detected at each exploration location in the indicated depth interval. Only data collected since 2000 are displayed. Screening level 30 mg/kg is based on groundwater protection.

Extent of Gasoline Range TPH in Soil Saturated Zone (5 - 15' bgs)

Alexander Avenue Petroleum Tank Facilities Site
 Port of Tacoma, Washington

	MAR-2016	BY: DFR / PPW	FIGURE NO. G-8
	PROJECT NO. 130097-01D	REVISED BY: RAP / DIM	

GIS Path: \Projects\Port of Tacoma\Alexander Avenue Remediation\GIS\Reports\Appendix G-8 Thiessen Polygons Soil Gasoline Range TPH 5-15.mxd | Coordinate System: NAD 1983 StatePlane Washington South FIPS 5002 Feet | Date Saved: 3/21/2016 | User: rchubb



- Tax Parcel Boundary
 - Former Parcel Line
 - Historical Building/Tank/Structure
 - Existing Building/Dock
 - Former Railroad Spur
 - Shoreline/Hylebos Waterway
- Thiessen Polygons**
- Exceeds 10x Cleanup Level
 - Exceeds 1x Cleanup Level
 - No Cleanup Level Exceedance/Non-Detect
- 30 mg/kg Soil Gasoline Range TPH Isoconcentration Line
 - 300 mg/kg Soil Gasoline Range TPH Isoconcentration Line
- Soil Sample Locations**
- Maximum Gasoline Range TPH Concentration in Interval
- Non-Detect
 - Detected, No Exceedance of Screening Level
 - Above Screening Level (30 mg/kg) but Less than 10x Screening Level (300 mg/kg)
 - Above 10x Screening Level (300 mg/kg)

Exploration ID
721-BH-08 (31300)
 Gasoline Range TPH Concentration (in mg/kg)

Note: Displayed concentrations represent the maximum detected at each exploration location in the indicated depth interval. Only data collected since 2000 are displayed. Screening level 30 mg/kg is based on groundwater protection.

Extent of Gasoline Range TPH in Soil Saturated Zone (15 - 30' bgs)
 Alexander Avenue Petroleum Tank Facilities Site
 Port of Tacoma, Washington

	MAR-2016	BY: DFR / PPW	FIGURE NO. G-9
	PROJECT NO. 130097-01D	REVISED BY: RAP / DIM	

GIS Data: Thiessen Polygons & Port of Tacoma Alexander Avenue - 130097-01D Revised Remedial Investigation Report Appendix G Mass Estimate G-9 Thiessen Polygons Soil Gasoline Range TPH 15-30' bgs | Coordinate System: NAD 83 Spheroid: Whittaker South FIPS 4602 Feet | Date Stored: 3/31/2016 | User: rcohen | Print Date: 3/31/2016

**APPENDIX H - LNAPL
Recoverability Testing Memo**

Table H-1 - LNAPL measurements

Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

Exploration Name	Date	Depth to LNAPL	Depth to Water	LNAPL Thickness
29-14	12/8/2015	ND	5.48	ND
709-MW9-15	10/9/2014	TR	9.42	TR
709-MW9-25	10/16/2014	ND	9.13	ND
709-MW11-15	10/1/2014	ND	7.98	ND
	10/9/2014	ND	10.83	ND
	10/17/2014	TR	10.84	TR
	5/19/2015	9.88	10.01	0.13
	8/28/2015	TR	8.84	TR
12/8/2015	8.59	8.61	0.02	
709-MW11-25	10/9/2014	ND	7.98	ND
709-MW14-15	10/1/2014	ND	7.31	ND
	10/16/2014	ND	7.32	ND
	5/19/2015	ND	6.4	ND
	8/28/2015	TR	7.45	TR
709-MW17-15	12/8/2015	7.84	7.86	0.02
709-MW18-15	12/8/2015	ND	8.24	ND
709-MW21-15	10/1/2014	7.54	7.6	0.06
	10/17/2014	7.62	7.66	0.04
	5/19/2015	6.75	6.76	0.01
	8/28/2015	7.67	7.66	0.01
709-MW21-25	10/17/2014	TR	9.04	TR
721-MW1	10/1/2014	7.13	7.14	0.01
	5/20/2015	TR	6.34	TR
	8/28/2015	7.24	7.25	0.01
721-MW2	10/10/2014	7.25	8.01	0.76
	10/16/2014	7.27	8.08	0.81
	5/20/2015	6.54	6.8	0.26
	8/28/2015	7.27	8.2	0.93
	12/9/2015	ND	5.9	ND
721-MW3	10/1/2014	ND	7.3	ND
	10/16/2014	TR	7.37	TR
	1/26/2015	ND	6.1	ND
	5/20/2015	TR	6.1	TR
	8/28/2015	TR	7.39	TR
12/9/2015	ND	6.1	ND	
721-MW4	10/2/2014	6.89	7.72	0.83
	5/19/2015	6.23	6.31	0.08
	8/28/2015	6.89	8.08	1.19
721-MW5-15	10/9/2014	ND	7.1	ND
721-MW6-15	10/1/2014	TR	7.14	TR
	10/17/2014	7.09	7.1	0.01
	5/19/2015	TR	6.53	TR
	8/28/2016	TR	7.18	TR
	12/9/2015	ND	5.9	ND

Table H-1 - LNAPL measurements

Port of Tacoma - Alexander Avenue Petroleum Tank Facilities

721-MW7-15	10/9/2014	ND	6.94	ND
721-MW8-15	10/9/2014	TR	6.85	TR
721-MW9-15	10/9/2014	ND	7.43	ND
	12/9/2015	TR	6.42	TR
721-MW9-25	10/16/2014	TR	11.92	TR
721-MW10-15	10/9/2014	ND	6.58	ND
721-MW10-25	10/15/2014	TR	13.11	TR
721-MW11-15	10/9/2014	TR	7.14	TR
	10/14/2014	ND	7.08	ND
	5/19/2015	ND	6.72	ND
	8/28/2015	ND	7.29	ND
	12/9/2015	TR	4.18	TR
721-MW11-25	10/14/2014	ND	7.55	ND
721-MW12-15	10/1/2014	TR	6.93	TR
	10/16/2014	TR	6.99	TR
	1/27/2015	ND	5.35	ND
	5/19/2015	ND	6.07	ND
	8/28/2015	TR	6.79	TR
	12/9/2015	ND	5.2	ND
721-MW13-25	10/17/2014	ND	8.19	ND
721-MW14-15	10/1/2014	7.11	7.14	0.03
	10/17/2014	5.54	7.27	1.73
	8/28/2015	7.18	7.45	0.27
	12/9/2015	TR	5.34	TR
721-MW14-25	5/20/2015	TR	6.33	TR
721-MW15-15	10/1/2014	7.97	8.14	0.17
	5/19/2015	6.27	7.3	1.03
	12/9/2015	5.84	5.96	0.12
721-MW15-25	10/17/2015	TR	8.42	TR
HC-N11-5	10/8/2014	ND	8.07	ND
HC-N11-6	10/8/2014	ND	7.37	ND
	12/8/2015	6.4	6.49	0.09
MW-102-25	10/16/2014	TR	11.65	TR
MW-104-25	10/15/2014	TR	12.22	TR
MW-106-15	10/1/2014	ND	6.96	ND
	10/16/2014	ND	6.93	ND
	5/19/2015	ND	6.24	ND
	8/28/2015	TR	6.99	TR
	12/9/2015	ND	5.5	ND
MW-109-15	10/1/2014	ND	7.23	ND
	10/16/2014	ND	7.23	ND
	1/27/2015	ND	5.91	ND
	5/19/2015	ND	6.52	ND
	8/28/2015	TR	7.26	TR
	12/9/2015	ND	16.1	ND
MW-110-15	10/9/2014	ND	6.78	ND
MW-112-25	10/16/2014	TR	8.96	TR
MW-137-25	10/15/2014	ND	13.02	ND

Notes:

TR - Trace thickness less than 0.01 ft.

ND- Product not detected

MEMORANDUM

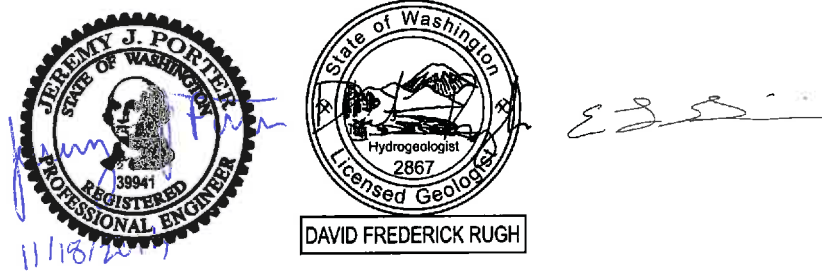
Project No.: 130097-01C

November 18, 2014

To: Joyce Mercuri, Washington State Department of Ecology

cc: Ryan Shatt, Port of Tacoma
Clint Babcock, Mariana Properties, Inc.

From:



Jeremy Porter, PE; Dave Rugh, LHG; and Eric Geissinger, EIT

Re: LNAPL Recoverability Testing

This memorandum has been prepared to document the light non-aqueous phase liquid (LNAPL) recoverability testing at the Alexander Avenue Petroleum Tank Facilities Site (Site) located in Tacoma, Washington. The Site is currently being evaluated to determine the source areas and extent of contamination, the need for further cleanup actions, and to develop and evaluate cleanup action alternatives for petroleum-related contamination under Agreed Order DE 9835 (AO) between the Washington Department of Ecology (Ecology), the Port of Tacoma, and Mariana Properties, Inc. This memorandum fulfills Remedial Investigation/Feasibility Study schedule item C.11 as described in the *Work Plan for Remedial Investigation/Feasibility Study (Work Plan)* (Aspect, 2014).

Testing Locations

LNAPL gauging was conducted between October 2 and October 8, 2014 at 14 monitoring wells in areas that were known or suspected to contain LNAPL¹. Of the 14 monitoring wells that were gauged for LNAPL, three wells with sufficient product thickness ($>0.10'$) were chosen for recoverability testing (see Figure 1). The wells chosen for testing were 721-MW2, 721-MW4, and 721-MW15-15.

Methods

Testing was performed in accordance with the ASTM E2856-13 *Standard Guide for Estimation of LNAPL Transmissivity* (2013). The guidelines for performing field LNAPL transmissivity testing are included as Attachment A. The testing was performed between October 27, 2014 and October 29, 2014.

¹ Other Site wells that were sampled as part of the RI field program during the week of October 14, 2014 were also monitored for LNAPL. No LNAPL was observed at those wells.

November 18, 2014

The ASTM guide provides two test methods for LNAPL Transmissivity based on the amount of LNAPL present in the monitoring well. The baildown test is appropriate when LNAPL thickness is greater than 0.5 ft, and the manual skimming test is appropriate for any measureable LNAPL thickness. Based on the LNAPL thickness measurements conducted at wells 721-MW2, 721-MW4, and 721-MW15-15², the baildown test was chosen for each well.

Following the initial LNAPL thickness measurements, LNAPL was purged from each well and measured in a graduated cylinder. Care was taken to minimize the amount of water removed from each well. LNAPL thickness measurements were initially collected each minute and subsequently timed to capture changes in LNAPL thickness of no more than 5 percent of the initial thickness. Because the LNAPL thickness did not recover in a single day, additional LNAPL thickness measurements were collected the following day. LNAPL thickness measurements 10 days after the baildown test was initiated indicated that LNAPL thicknesses did not recover to their initial levels, likely due to a rise in water level during the same period. These data are included in Table 1 but not included in the Bouwer and Rice analysis.

The Bouwer and Rice analysis method was used to calculate the transmissivity for 721-MW-2 and 721-MW-4. MW-15-15 did not recover sufficiently to apply the Bouwer and Rice analysis. The analysis was performed utilizing the draft American Petroleum Institute (API) LNAPL transmissivity spreadsheet as described in ASTM E2856-13.

Results

Initial product thickness, volume of LNAPL removed, and thickness measurements over time for each well are shown in Table 1. Transmissivity curves for each well is shown in Figure 2. The transmissivity at 721-MW2 and 721-MW4 was calculated as 0.34 ft²/d (2.54gpd/ft) and 0.76ft²/d (5.68gpd/ft) respectively. LNAPL thickness at MW15-15 did not recover sufficiently and the data collected was therefore not suitable for analysis. The initial product thickness observed on October 27, 2014 within 721-MW15-15 may have been an anomaly caused by a rising water table prior to the test.

Conclusions

LNAPL recovery is relatively impractical at transmissivities between 0.1 and 0.8 ft²/day or lower (ITRC, 2009). The transmissivities measured during this test are within the practical lower limits of recoverability. Because of the slow recovery, testing took several days to complete. The Work Plan called for repeating the recovery tests; however, the results of the two tests that were completed were relatively consistent. Monitoring subsequent to the test indicated that water levels have risen and product thicknesses have dropped significantly to below the threshold for baildown testing. Therefore, it is not recommended that LNAPL recovery testing be repeated at this time. The LNAPL transmissivity measurements collected are sufficient for development and evaluation of remedial alternatives in the Remedial Investigation/Feasibility Study.

² The thickness of LNAPL measured at 721-MW15-15 on October 2, 2014 was only 0.17 foot, as indicated on Figure 1, and the well was originally targeted for skimming testing. However, The LNAPL thickness measured at the start of the recovery test on October 27, 2014 was 0.9 feet, so the baildown test was applied instead.

November 18, 2014

Attachments

Table 1 – LNAPL Baildown Test Results

Figure 1 – LNAPL Occurrences (October 2-8, 2014)

Figure 2 – LNAPL Transmissivity Curves

Attachment A – Summary of LNAPL Recovery Testing per ASTM E2856

References

Aspect, 2014, Work Plan for Remedial Investigation/Feasibility Study - Alexander Avenue Petroleum Tank Facilities Site, June 18, 2014.

ASTM E2856-13, Standard Guide for Estimation of LNAPL Transmissivity, ASTM International, West Conshohocken, PA, 2013, www.astm.org

Interstate Technology & Regulatory Council (ITRC), 2009, Evaluating LNAPL Remedial Technologies for Achieving Project Goals, December 2009.

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Table 1 - LNAPL Baildown Test Results

130097-1C Alexander Avenue Petroleum Tank Facilities Site, Port of Tacoma, Washington

MW-2		
Initial Thickness (ft):		0.50
LNAPL Volume Removed (ml):		850
Test Measurements:		
Date/Time of Measurement	Elapsed Time (min)	LNAPL Thickness (ft)
10/27/14 10:32	0	0.00
10/27/14 10:33	1	0.00
10/27/14 10:34	2	0.01
10/27/14 10:36	4	0.02
10/27/14 10:38	6	0.03
10/27/14 10:42	10	0.04
10/27/14 10:48	16	0.05
10/27/14 11:03	31	0.07
10/27/14 11:23	51	0.09
10/27/14 12:00	88	0.11
10/27/14 12:49	137	0.12
10/27/14 13:49	197	0.15
10/27/14 14:49	257	0.17
10/27/14 15:49	317	0.19
10/27/14 16:49	377	0.21
10/28/14 07:42	1270	0.38
10/29/14 14:58	3146	0.43
Post Test Measurements:		
11/05/14 15:57	13285	0.17

MW-4		
Initial Thickness (ft):		0.64
LNAPL Volume Removed (ml):		1160
Test Measurements:		
Date/Time of Measurement	Elapsed Time (min)	LNAPL Thickness (ft)
10/27/14 09:06	0	0.00
10/27/14 09:07	1	0.00
10/27/14 09:08	2	0.01
10/27/14 09:09	3	0.03
10/27/14 09:10	4	0.04
10/27/14 09:11	5	0.06
10/27/14 09:12	6	0.07
10/27/14 09:14	8	0.08
10/27/14 09:16	10	0.09
10/27/14 09:22	16	0.11
10/27/14 09:32	26	0.13
10/27/14 09:44	38	0.15
10/27/14 10:04	58	0.17
10/27/14 10:44	98	0.20
10/27/14 11:44	158	0.23
10/27/14 12:44	218	0.25
10/27/14 13:44	278	0.28
10/27/14 14:44	338	0.31
10/27/14 15:44	398	0.34
10/27/14 16:44	458	0.35
10/28/14 07:38	1352	0.48
10/29/14 14:52	3226	0.51
Post Test Measurements:		
11/05/14 11:47	13121	0.19

MW-15-15		
Initial Thickness (ft):		0.91
LNAPL Volume Removed (ml):		1880
Test Measurements:		
Date/Time of Measurement	Elapsed Time (min)	LNAPL Thickness (ft)
10/27/14 12:04	0	0.00
10/27/14 12:05	1	0.01
10/27/14 12:06	2	0.02
10/27/14 12:07	3	0.03
10/27/14 12:12	8	0.04
10/27/14 12:32	28	0.07
10/27/14 13:12	68	0.08
10/27/14 13:52	108	0.08
10/27/14 14:52	168	0.09
10/27/14 15:52	228	0.09
10/27/14 16:52	288	0.08
10/28/14 07:45	1181	0.10
10/29/14 14:48	3044	0.10
Post Test Measurements:		
11/05/14 11:53	12949	0.08

Aspect Consulting

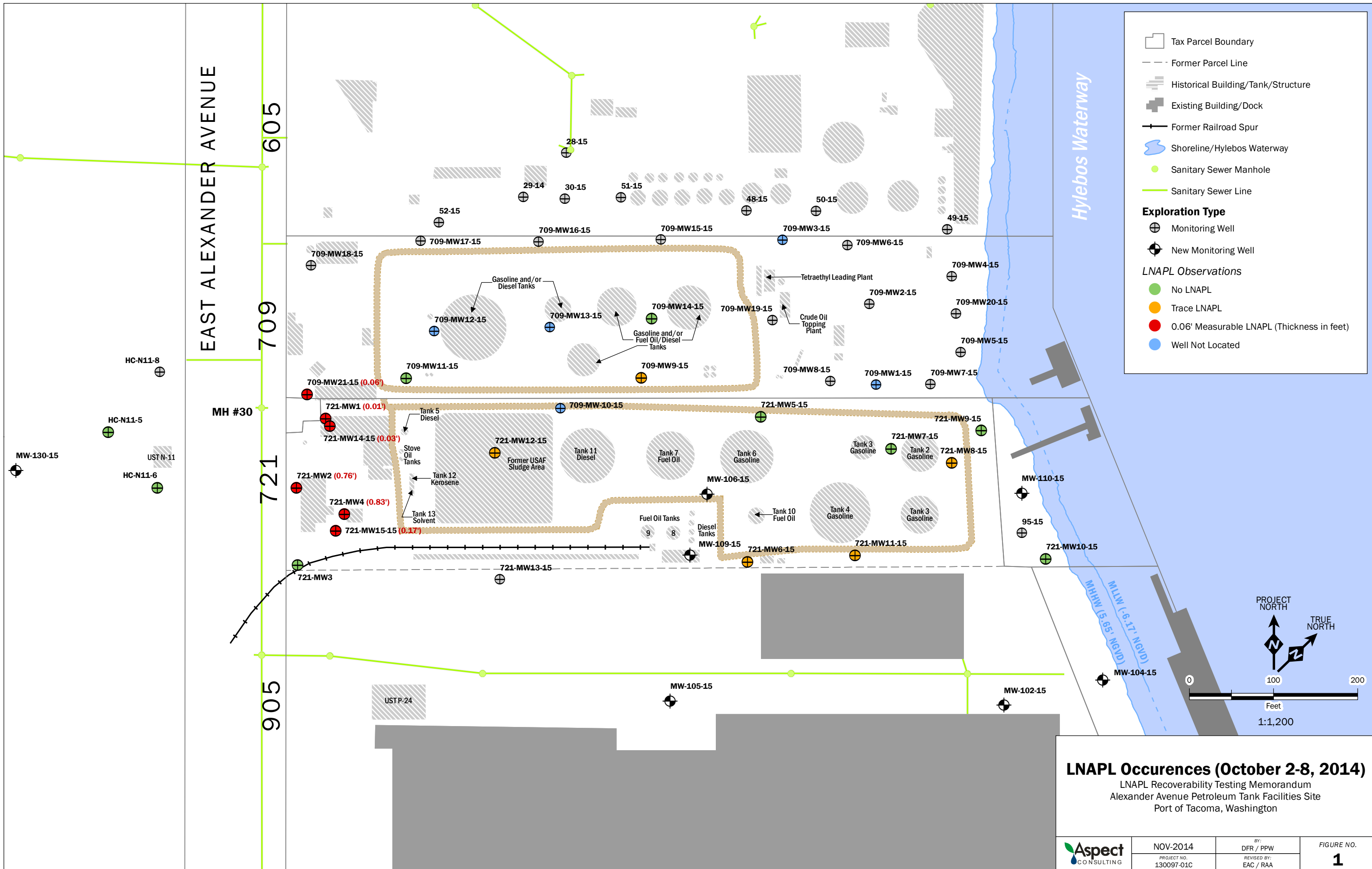
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Table 1

LNAPL Recoverability Results Memo

Page 1 of 1



Legend

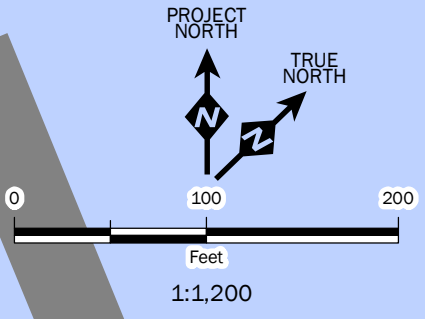
- Tax Parcel Boundary
- Former Parcel Line
- Historical Building/Tank/Structure
- Existing Building/Dock
- Former Railroad Spur
- Shoreline/Hylebos Waterway
- Sanitary Sewer Manhole
- Sanitary Sewer Line

Exploration Type

- Monitoring Well
- New Monitoring Well

LNAPL Observations

- No LNAPL
- Trace LNAPL
- 0.06' Measurable LNAPL (Thickness in feet)
- Well Not Located



LNAPL Occurrences (October 2-8, 2014)
 LNAPL Recoverability Testing Memorandum
 Alexander Avenue Petroleum Tank Facilities Site
 Port of Tacoma, Washington

	NOV-2014	BY: DFR / PPW	FIGURE NO. 1
	PROJECT NO. 130097-01C	REVISED BY: EAC / RAA	

GIS Path: T:\Projects_8\Port of Tacoma\Alexander Ave - 130097\Delivered\LNAPL Recoverability - Testing Memo\LNAPL Occurrences Oct 2-8 2014.mxd | Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet | Date Saved: 11/18/2014 | User: ecumbarber | Print Date: 11/18/2014

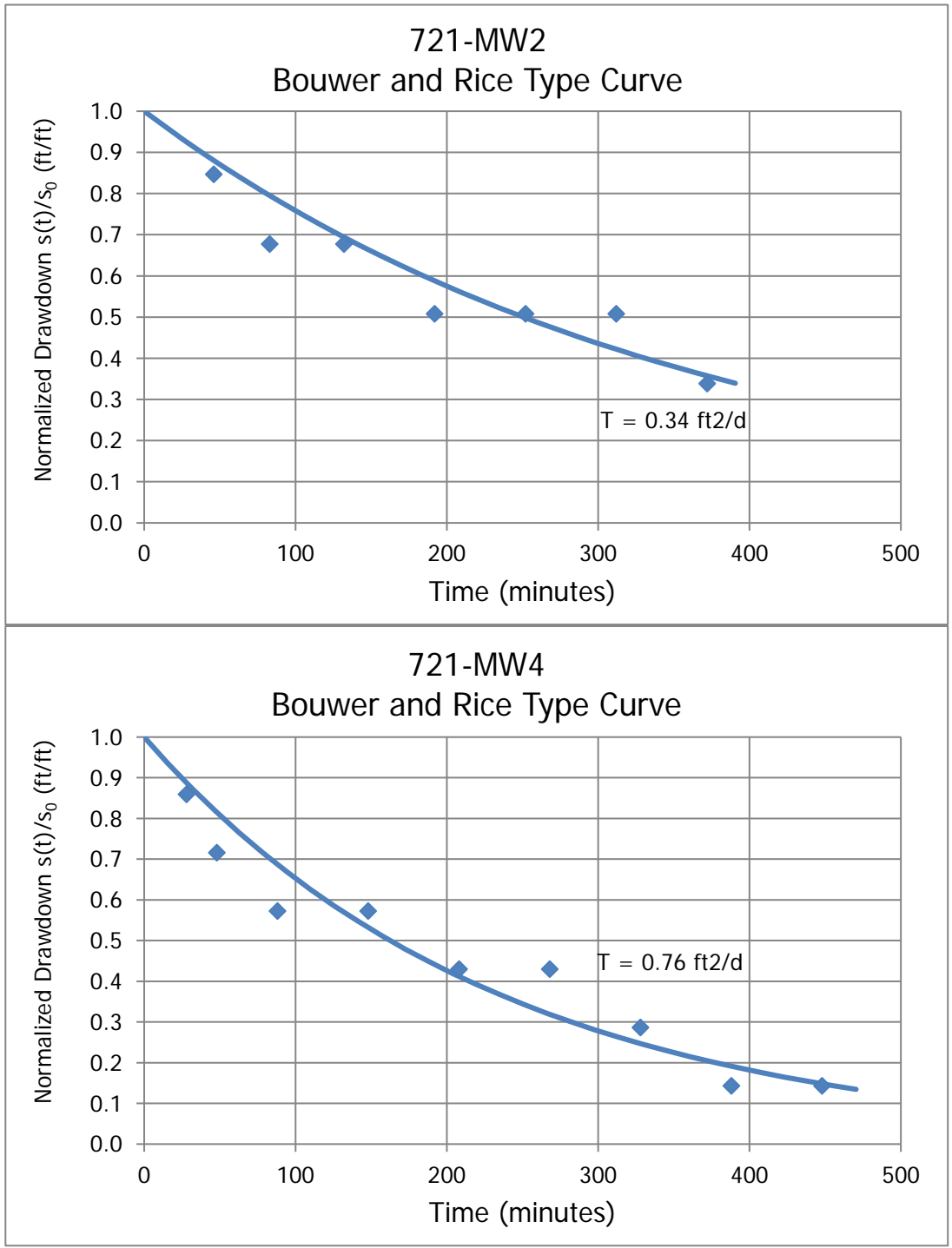


Figure 2

LNAPL Transmissivity Curves

Attachment A

Summary of LNAPL Recovery Testing per ASTM E2856

Required Equipment

Both tests require the following equipment:

- Peristaltic pump
- Interface probe
- Stopwatch
- Several 5-gallon buckets
- 1000-mL Graduated cylinder
- Disposable ¼" OD poly tubing, and ¼" ID silicon tubing
- Field test forms
- Decontamination equipment

Baildown Test

This test is appropriate for LNAPL thicknesses within wells of greater than 0.5ft. In some cases the peristaltic pump may not be able to remove LNAPL at a high enough rate to completely purge the control well. If this occurs, alternative methods must be employed.

Test should be administered as follows:

- Prior to the test, evacuate the LNAPL existing within the well so the LNAPL stays in communication with the formation. This should be performed with enough time to allow full recharge if no removal has occurred in at least 2 years.
- Determine the well casing diameter, borehole diameter, total depth, and screen length.
- Gauge the air/LNAPL and LNAPL/water interfaces using an interface probe.
- Verify that the air/LNAPL interface is below the top of screen.
- Calculate the volume of LNAPL to be removed based on the borehole diameter and gauged LNAPL thickness. (Includes both well volume and porous space of the filter pack surrounding well).
- Set the peristaltic pump tubing inlet at or near the LNAPL/water interface.
- Record the start time of removal.
- Capture the removed fluid in a graduated cylinder and record both the volume of LNAPL and the volume of water removed from the well. Remove a total volume

of LNAPL equal to the calculated amount above. Removal should be completed within 1/100th or less of the total test duration (15 minutes for a 1-day test.)

- Record the finish time of removal. If removal occurs over a relatively long period of time (>30 minutes), record several interim measurements of volume removed and time.
- Following LNAPL removal, begin recording time, date, and measuring the depth to air/LNAPL and depth to LNAPL/water interfaces. Initially fluid levels should be gauged every minute, and subsequent measurement times adjusted to capture changes in LNAPL thickness of 0.05ft or 5% of equilibrium LNAPL thickness, whichever is less.
- Gauge the LNAPL thickness until stabilized at the equilibrium thickness. If the test occurs over a long time period such that local water elevation may have changed, alternative graphical stabilization criteria will be used.
- OPTIONAL – A nearby well can be monitored for changes in water elevation due to tidal influence, etc.

Manual Skimming Test

This test is appropriate for any measurable LNAPL thickness within a well. In some cases the peristaltic pump will not be able to remove LNAPL at a high enough rate to completely purge the control well. If this occurs, alternative methods must be employed.

Test should be administered as follows:

- Prior to the test, evacuate the LNAPL existing within the well so the LNAPL stays in communication with the formation. This should be performed with enough time to allow full recharge if no removal has occurred in at least 2 years.
- Determine the well casing diameter, borehole diameter, total depth, screen length, and depth from top of casing to top of screen.
- Gauge the air/LNAPL and LNAPL/water interfaces using an interface probe.
- Verify that the air/LNAPL interface is below the top of screen.
- Set the peristaltic pump tubing inlet at or near the LNAPL/water interface.
- Record the start time of removal. Remove LNAPL until further LNAPL removal is not possible while minimizing the groundwater recovered.
- Capture the removed fluid in a graduated cylinder and record both the volume of LNAPL and the volume of water removed from the well.
- Record the finish time of removal. If removal occurs over a relatively long period of time (>30 minutes), record several interim measurements of volume removed and time.

- Following LNAPL removal, immediately begin recording time, date, and measuring the depth to air/LNAPL and depth to LNAPL/water interfaces. Calculate LNAPL thickness for each step.
- Once the well has recovered $\frac{1}{4}$ of the initial thickness, re-purge the LNAPL in the well as described above. Record the start and stop time of purging and the gauging data before and after each purging event. The time elapsed between the completion to the initial purge and the start time of the following purging event will provide an estimated return time for the next event.

The test is complete when three consecutive discharge rates are within 25% of each other and no consistently decreasing trend is observed.