APPENDIX A

Field Exploration Summary, Boring Logs, Cone Penetrometer Test Logs, Groundwater Data

Field Exploration Summary

Drilling Methods

The drill rigs used by the Geotechnical Division are manufactured by CME. Truck mounted, track mounted, and skid type drills are often used on the projects. The boring logs indicate what model of drill was used and the drilling method. Typically, wet rotary methods are used with water acting to remove cuttings, lubricate, and cool the bits. Depending on the soils encountered, polymer or bentonite slurry will be used to control caving and heave. In addition to wet rotary methods, hollow stem augers may be used.

Disturbed Sampling of Soil

Disturbed samples are generally taken at 5 foot intervals in the borings to provide a means to evaluate stratigraphy by visual examination and to obtain soil specimens for laboratory index testing. Disturbed samples are collected using split-barrel samplers following AASHTO T206 and ASTM D 1586 procedures for Standard Penetration Testing (SPT) of soil. The drill rigs used on this project were equipped with CME automatic hammers with a chain mounted "dog" that lifts and repeatedly drops the 140 pound hammer from a height of 30 inches during SPT testing. SPT tests were generally driven 18 inches in three successive 6 inch long increments. The initial 6-inch increment is considered a seating drive and is typically ignored. The blows required for the second and third 6 inch increments are totaled to provide blows/ft. This total is referred to as the SPT resistance or "N-value". The field recorded blow counts are summarized on the boring logs for the project and have not been corrected for overburden pressure, flexure of the rods, or silt content. Where the soils are very dense, the testing is terminated when the blows for a six inch increment exceed 50 bpf to avoid damaging the equipment. In this case, the blows are reported as 50 over the distance driven in 50 blows, such as 50/4".

Undisturbed Sampling of Soil

Undisturbed soil samples are taken for performing laboratory strength and consolidation testing on generally cohesive soils ranging from soft to stiff consistency. Thin-walled, 3-inch, Shelby tubes are preferred for obtaining relatively undisturbed samples of the soils. However, if the soils are too stiff, a Washington Undisturbed Sample will be taken. The Washington Undisturbed Sample is a 2.5 inch O.D. split barrel sampler that is lined with brass tubes 1.98 inches in diameter by 4 inches in height. The sampler is pushed, but may be driven, to retrieve the sample. The boring logs indicate the sampler type used.

Rock Coring

Four different types of core barrels are described in ASTM D 2113. The State uses Triple Tube type core barrels. The inner tube of the core barrel does not rotate during drilling, resulting in less disturbance and better recovery in weak and fractured rock. Wireline techniques are used since the production rates are higher and the method facilitates deeper sampling. The standard size rock core is HQ3 resulting in a core 2.4 inches in diameter. The boring logs indicate the core recovery and the rock quality designation (RQD).

Washington State
Department of Transportation

Test Boring Legend

	Standard Penetration Test
	Oversized Penetration Test (Dames & Moore, California)
	Shelby Tube
P	Piston Sample
	Washington Undisturbed
	Vane Shear Test
	Core
	Becker Hammer
B	Bag Sample

Well Symbols

	Cement Surface Seal
	Piezometer Pipe in Granular Bentonite Seal
	Piezometer Pipe in Sand
	Well Screen in Sand
	Granular Bentonite Bottom Seal
	Inclinometer Casing in Concrete Bentonite Grout

Laboratory Testing Codes

UU	Unconsolidated Undrained Triaxial
CU	Consolidated Undrained Triaxial
CD	Consolidated Drained Triaxial
UC	Unconfined Compression Test
DS	Direct Shear Test
CN	Consolidation Test
GS	Grain Size Distribution
MC	Moisture Content
SG	Specific Gravity
OR	Organic Content
DN	Density
AL	Atterberg Limits
PT	Point Load Compressive Test
SL	Slake Test
DG	Degradation
LA	LA Abrasion
HT	Hydrometer Test
RS	Ring Shear Test
LOI	Loss on Ignition
CSS	Cyclic Simple Shear
DSS	Direct Simple Shear
RSM	Resilient Modulus

Soil Density Modifiers

Gravel, Sand & Non-plastic Silt		Elastic Silts and Clay	
SPT Blows/ft	Density	SPT Blows/ft	Consistency
0-4	Very Loose	0-1	Very Soft
5-10	Loose	2-4	Soft
11-24	Medium Dense	5-8	Medium Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
(REF)	Refusal	31-60	Hard
		>60	Very Hard

Angularity of Gravel & Cobbles

Angular	Coarse particles have sharp edges and relatively plane sides with unpolished surfaces.
Subangular	Coarse grained particles are similar to angular but have rounded edges.
Subrounded	Coarse grained particles have nearly plane sides but have well rounded corners and edges.
Rounded	Coarse grained particles have smoothly curved sides and no edges.

Soil Moisture Modifiers

Dry	Absence of moisture; dusty, dry to touch
Moist	Damp but no visible water
Wet	Visible free water

Soil Structure

Stratified	Alternating layers of varying material or color at least 6mm thick; note thickness and inclination.
Laminated	Alternating layers of varying material or color less than 6mm thick; note thickness and inclination.
Fissured	Breaks along definite planes of fracture with little resistance to fracturing.
Slickensided	Fracture planes appear polished or glossy, sometimes striated.
Blocky	Cohesive soil that can be broken down into smaller angular lumps which resist further breakdown.
Disrupted	Soil structure is broken and mixed. Infers that material has moved substantially - landslide debris.
Homogeneous	Same color and appearance throughout.

HCL Reaction

No HCL Reaction	No visible reaction.
Weak HCL Reaction	Some reaction with bubbles forming slowly.
Strong HCL Reaction	Violent reaction with bubbles forming immediately.

Slightly Vesicular	5 to 10 percent of total
Moderately Vesicular	10 to 25 percent of total
Highly Vesicular	25 to 50 percent of total
Scoriaceous	Greater than 50 percent of total

GrfcText!BORLEGROCK 4/10/2012 11:52:03 AM

Washington State
Department of Transportation

Test Boring Legend

Grain Size

Fine Grained	< 0.04 in	Few crystal boundaries/grains are distinguishable in the field or with hand lens.
Medium Grained	0.04 to 0.2 in	Most crystal boundaries/grains are distinguishable with the aid of a hand lens.
Coarse Grained	> 0.2 in	Most crystal boundaries/grains are distinguishable with the naked eye.

Weathered State

Term	Description	Grade
Fresh	No visible sign of rock material weathering; perhaps slight discoloration in major discontinuity surfaces.	I
Slightly Weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker externally than its fresh condition.	II
Moderately Weathered	Less than half of the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as a continuous framework or as core stones.	III
Highly Weathered	More than half of the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as discontinuous framework or as core stone.	IV
Completely Weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.	V
Residual Soil	All rock material is converted to soil. The mass structure and material fabric is destroyed. There is a large change in volume, but the soil has not been significantly transported.	VI

Relative Rock Strength

Grade	Description	Field Identification	Uniaxial Compressive Strength approx
R1	Very Weak	Specimen crumbles under sharp blow from point of geological hammer, and can be cut with a pocket knife.	0.15 to 3.6 ksi
R2	Moderately Weak	Shallow cuts or scrapes can be made in a specimen with a pocket knife. Geological hammer point indents deeply with firm blow.	3.6 to 7.3 ksi
R3	Moderately Strong	Specimen cannot be scraped or cut with a pocket knife, shallow indentation can be made under firm blows from a hammer.	7.3 to 15 ksi
R4	Strong	Specimen breaks with one firm blow from the hammer end of a geological hammer.	15 to 29 ksi
R5	Very Strong	Specimen requires many blows of a geological hammer to break intact sample.	Greater than 29 ksi

Discontinuities

Spacing	
Very Widely	Greater than 10 ft
Widely	3 ft to 10 ft
Moderately	1 ft to 3 ft
Closely	2 inches to 12 inches
Very Closely	Less than 2 inches

RQD (%)

$$\frac{100(\text{length of core in pieces} > 100\text{mm})}{\text{Length of core run}}$$

Condition	
Excellent	Very rough surfaces, no separation, hard discontinuity wall
Good	Slightly rough surfaces, separation less than 0.05 in, hard discontinuity wall.
Fair	Slightly rough surfaces, separation greater than 0.05 in, soft discontinuity wall.
Poor	Slickensided surfaces, or soft gouge less than 0.2 in thick, or open discontinuities 0.05 to 0.2 in.
Very Poor	Soft gouge greater than 0.2 in thick, or open discontinuities greater than 0.2 in.

Fracture Frequency (FF) is the average number of fractures per 1 ft of core.
Does not include mechanical breaks caused by drilling or handling.

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LOG OF TEST BORING

Start Card RE-07053
HOLE No. BH-1p-12
Sheet 1 of 2

Job No. XL-4105-A SR 167 Elevation 44.5 ft

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)
Driller Henderson, Danny Lic# 2742

Component
Inspector Johnson, Vince #2532

Start May 10, 2012 Completion May 10, 2012 Well ID# BHM-722 Equipment CME 850

Station 39+48.17 Offset 81.1 feet left Hole Dia (Inches) 4.5 Method Wet Rotary

Northing 687418.10 Easting 1194419.34 Collected by Other Datum NAD 83_91(HARN) StatePlaneSouth(ft

Lat 47.2044286946933 Long -122.294428795676 Drill Fluid Water

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				0 3 3 4 (6)		D-1		SILT, dark grayish brown, moist, loose, stratified. HCl not tested. Recovered: 1.8 ft Retained: 1.8 ft		
				2 3 5 7 (8)		D-2		Sandy SILT, dark grayish brown, moist, loose, stratified. Recovered: ft Retained: ft		
	40.0			4 5 5 8 (10)		D-3	GS	SM Silty SAND, dark grayish brown, moist, loose, stratified. HCl not tested. Recovered: 2.0 ft Retained: 2.0 ft		
5				4 2 2 3 (4)		D-4	GS	ML Sandy SILT, dark grayish brown, moist, very loose, stratified. HCl not tested. Recovered: 1.7 ft Retained: 1.7 ft		
	35.0			3 3 4 5 (7)		D-5	GS	SM Silty SAND, dark grayish brown, moist, loose, stratified. HCl not tested. Recovered: 1.6 ft Retained: 1.6 ft		
10										
	30.0			2 3 4 5 (7)		D-6	GS	ML Sandy SILT, dark grayish brown, wet, loose, stratified. HCl not tested. Recovered: 1.6 ft Retained: 1.6 ft		
15										
	25.0			2 5		D-7	GS	SM Silty SAND, dark grayish brown, wet, medium dense,		
20										

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LOG OF TEST BORING

Job No. XL-4105-A SR 167 Elevation 44.5 ft HOLE No. BH-1p-12

Sheet 2 of 2

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E) Driller Henderson, Danny

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				6 7 (11)				stratified. HCl not tested. Recovered: 1.6 ft Retained: 1.6 ft		
								A standpipe was installed on this boring.		
25	20							The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Division and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
30	15							End of test hole boring at 21 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
35	10							Bail/Recharge test: Hole Diameter: 4.5in Depth of boring during bail test: 21ft Depth of casing during bail test: 19ft Bailed bore hole water level to 16.2ft Recharge after 5 minutes :15.1ft		
40	5									
45	0									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 32786

HOLE No. H-1-11

Sheet 1 of 3

Job No. XL-4105a SR 167 Elevation ft

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

Site Address SR-161 vic of Puyallup River Bridge

Inspector Cooper, Kerry #2552

Start August 31, 2011 Completion August 31, 2011 Well ID# Equipment CME 45 (9C4-2) - AH

Station Offset Hole Dia (inches) 4 Method Wet Rotary

Northing 77304.00 Easting 1277411.00 Collected by HQ Geotech Division Datum NAD 83_91(HARN) StatePlaneSouth(ft

County Pierce Subsection SW1/4 of SW1/4 Section 22 Range 4 ewm Township 20

◆ Field SPT (N) ✚ Moisture Content ▨ RQD

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
5				11 7 8 (15)		D-1	GS MC	GP, MC=2% Poorly graded GRAVEL with sand, sub-rounded, medium dense, gray, moist, homogeneous, HCl not tested. Length Recovered: 0.9 ft. Length Retained: 0.9 ft.		
10				6 6 7 (13)		D-2	GS MC	SP-SM, MC=13% Poorly graded SAND with silt and gravel, medium dense, black, moist, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
15				10 11 10 (21)		D-3		Well graded GRAVEL with sand, sub-rounded, medium dense, black, moist, homogeneous, HCl not tested. Length Recovered: 0.3 ft. Length Retained: 0.3 ft.		
20										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 32786

HOLE No. H-1-11

Job No. XL-4105a SR 167 Elevation ft

Sheet 2 of 3

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

◆ Field SPT (N)
✚ Moisture Content
▨ RQD

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
						S-4		No Recovery		
			◆✚	6 4 4 (8)		D-5	GS MC	SM, MC=14% Silty SAND with gravel, loose, gray, moist, homogeneous, HCl not tested. Length Recovered: 0.7 ft. Length Retained: 0.7 ft.		
25			◆	4 3 2 (5)		D-6		Well graded GRAVEL, sub-rounded, loose, gray, moist, homogeneous, HCl not tested. Length Recovered: 0.2 ft. Length Retained: 0.2 ft.		
30						S-7		No Recovery		
			◆	7 5 3 (8)		D-8		Silty SAND with gravel, loose, black, moist, homogeneous, HCl not tested. Length Recovered: 0.3 ft. Length Retained: 0.3 ft.		
35			✚	3 4 4 (8)		D-9	GS MC	GW-GM, MC=8% Well graded GRAVEL with silt and sand, loose, black, moist, homogeneous, HCl not tested. Length Recovered: 0.5 ft. Length Retained: 0.5 ft.		
40			◆	6 4 4 (8)		D-10		Silty SAND with gravel, loose, black, moist, homogeneous, HCl not tested. Length Recovered: 0.6 ft. Length Retained: 0.6 ft.		
45			◆✚							

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S 32786

HOLE No. H-1-11

Job No. XL-4105a SR 167 Elevation ft

Sheet 3 of 3

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20, 40, 60, 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				10 10 10 (20)		D-11	GS MC	ML, MC=28% Sandy SILT, medium dense, black, moist, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
50				10 16 30 (46)		D-12	GS MC	SP, MC=25% Poorly graded SAND, dense, black, moist, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
55				10 12 29 (41)		D-13		Poorly graded SAND, dense, black, moist, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
60				12 16 17 (33)		D-14		Poorly graded SAND, dense, black, moist, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
65								End of test hole boring at 61.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Division and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
70										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-32786

HOLE No. H-2-11

Sheet 1 of 3

Job No. XL-4105a SR 167 Elevation ft

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

Site Address SR-167 Meridian ST Bridge Replacement

Inspector Cooper, Kerry #2552

Start August 31, 2011 Completion August 31, 2011 Well ID# Equipment CME 45 (9C4-2) - AH

Station Offset Hole Dia (inches) 4 Method Wet Rotary

Northing 77436.00 Easting 1277395.00 Collected by HQ Geotech Division Datum NAD 83_91(HARN) StatePlaneSouth(ft

County Pierce Subsection SW1/4 of SW1/4 Section 22 Range 4ewm Township 20

Depth (ft)	Elevation (ft)	Profile	◆ Field SPT (N) ✚ Moisture Content ▨ RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			✚ ◆	13 8 6 (14)		D-1	GS MC	GW, MC=3% Well graded GRAVEL with sand, sub-rounded, medium dense, gray, moist, homogeneous, HCl not tested. Length Recovered: 0.5 ft. Length Retained: 0.5 ft.		
5										
			✚ ◆	10 9 10 (19)		D-2	GS MC	GP, MC=11% Poorly graded GRAVEL with sand, sub-rounded, medium dense, gray, moist, homogeneous, HCl not tested. Length Recovered: 0.8 ft. Length Retained: 0.8 ft.		
10										
			◆	4 4 4 (8)		D-3		Well graded GRAVEL with sand, sub-rounded, loose, gray, moist, homogeneous, HCl not tested. Length Recovered: 0.3 ft. Length Retained: 0.3 ft.		
15										
			◆	2 2 3 (5)		D-4		No Recovery		
20										

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LOG OF TEST BORING

Start Card S-32786

HOLE No. H-2-11

Job No. XL-4105a SR 167 Elevation ft

Sheet 2 of 3

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

◆ Field SPT (N) ✚ Moisture Content ▨ RQD

Depth (ft)	Elevation (ft)	Profile	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			2 3 3 (6)		D-5	GS MC	SM, MC=14% Silty SAND with gravel, loose, gray, moist, homogeneous, HCl not tested. Length Recovered: 0.6 ft. Length Retained: 0.6 ft.		
25									
			2 2 2 (4)		D-6		Sandy SILT with gravel, very loose, gray, moist, homogeneous, HCl not tested. Length Recovered: 0.3 ft. Length Retained: 0.3 ft.		
30									
			5 4 4 (8)		D-7		Sandy SILT with gravel, loose, gray, moist, homogeneous, HCl not tested. Length Recovered: 1.1 ft. Length Retained: 1.1 ft.		
35									
			5 4 5 (9)		D-8	GS MC	SM, MC=15% Silty SAND with gravel, loose, gray, moist, homogeneous, HCl not tested. Length Recovered: 1.1 ft. Length Retained: 1.1 ft.		
40									
			12 12 20 (32)		D-9	GS MC	SM, MC=21% Silty SAND with gravel, dense, black, moist, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
45									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-32786

HOLE No. H-2-11

Job No. XL-4105a SR 167 Elevation ft

Sheet 3 of 3

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

Depth (ft)	Elevation (ft)	Profile	◆ Field SPT (N) ✚ Moisture Content ▨ RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			◆	9 14 30 (44)		D-10		Poorly graded SAND, dense, black, moist, homogeneous, HCl not tested. Length Recovered: 1.2 ft. Length Retained: 1.2 ft.		
50										
			✚ ◆	9 18 34 (52)		D-11	GS MC	SP, MC=22% Poorly graded SAND, dense, black, moist, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
55										
			◆	10 16 29 (45)		D-12		Poorly graded SAND, dense, black, moist, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
60								End of test hole boring at 59.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
65								The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Division and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
70										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-77327

HOLE No. H-3p-11

Sheet 1 of 10

Job No. XL-4105a SR 167 Elevation 44.3 ft

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

Site Address SR-167 and Meridian

Inspector Cooper, Kerry #2552

Start October 9, 2011 Completion October 26, 2011 Well ID# BCA-182

Equipment CME 45 (9C4-2) - AH

Station 30+22.39 Offset 29.08ft Lt. Hole Dia (inches) 4

Method Mud Rotary

Northing 686487.05 Easting 1194432.33 Collected by Region Survey Crew

Datum NAD 83_91(HARN) StatePlaneSouth(ft

County Pierce Subsection SW1/4 of SW1/4 Section 22 Range 4 ewm Township 20-n

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	40.0									
5				0 1 1 (2)		D-1	GS MC	SM, MC=21% Silty SAND, very loose, brown, moist, homogeneous, HCl not tested. Length Recovered:0.5 ft. Length Retained:0.5 ft.		
	35.0			1 2 3 (5)		D-2		Poorly graded SAND, loose, brown, moist, homogeneous, HCl not tested. Length Recovered:1 ft. Length Retained:1 ft.		
10				3 3 3 (6)		D-3	GS MC	SP, MC=19% Poorly graded SAND, loose, dark gray, moist, homogeneous, HCl not tested. Length Recovered:0.9 ft. Length Retained:0.9 ft. 10/24/2011		
	30.0			3 7 5 (12)		D-4		Poorly graded SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
15				5 5 4 (9)		D-5	GS MC	SP, MC=16% Poorly graded SAND, loose, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft. 10/20/2011		
	25.0			2 3 3 (6)		D-6	GS MC	SW-SM, MC=18% Well graded SAND with silt and gravel, loose, dark gray, wet, stratified, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
20										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-77327

HOLE No. H-3p-11

Job No. XL-4105a SR 167 Elevation 44.3 ft

Sheet 2 of 10

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				10 12 17 (29)		D-7		Poorly graded SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	20			5 11 9 (20)		D-8	GS MC	SP, MC=20% Poorly graded SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
25				2 7 9 (16)		D-9		Poorly graded SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	15			4 4 5 (9)		D-10		Silty SAND, loose, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1 ft. Length Retained:1 ft.		
30				5 6 8 (14)		D-11	GS MC	SP-SM, MC=21% Poorly graded SAND with silt, medium dense, dark gray, wet, stratified, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	10			3 4 7 (11)		D-12		Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
35				5 5 7 (12)		D-13	GS MC	SM, MC=31% Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	5			4 6 5 (11)		D-14		Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
40				4 4 6 (10)		D-15		Silty SAND, loose, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	0			22 25 17 (42)		D-16	GS MC	GP, MC=5% Poorly graded GRAVEL with sand, sub-rounded, dense, dark gray, wet, stratified, HCl not tested. Length Recovered:1 ft. Length Retained:1 ft.		
45										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-77327

HOLE No. H-3p-11

Job No. XL-4105a SR 167 Elevation 44.3 ft

Sheet 3 of 10

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

◆ Field SPT (N) ✚ Moisture Content ▨ RQD

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		18 21 20 (41)		D-17	GS MC	SP-SM, MC=11% Poorly graded SAND with silt and gravel, dense, dark gray, wet, stratified, HCl not tested. Length Recovered:0.8 ft. Length Retained:0.8 ft.		
		15 18 20 (38)		D-18	GS MC	SM, MC=12% Silty SAND with gravel, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-5							
50		19 14 6 (20)		D-19		Well graded GRAVEL, sub-rounded, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:0.4 ft. Length Retained:0.4 ft.		
		4 4 5 (9)		D-20		No Recovery		
	-10							
55		2 3 3 (6)		D-21	GS MC	SM, MC=15% Silty SAND with gravel, loose, dark gray, wet, homogeneous, HCl not tested. Length Recovered:0.4 ft. Length Retained:0.4 ft.		
		5 5 2 (7)		D-22		Sandy SILT with gravel, loose, dark gray, wet, homogeneous, HCl not tested. Length Recovered:0.5 ft. Length Retained:0.5 ft.		
	-15							
60		5 3 4 (7)		D-23	GS MC	SM, MC=14% Silty SAND with gravel, loose, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
		5 8 10 (18)		D-24		Silty SAND with gravel, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:0.7 ft. Length Retained:0.7 ft.		
	-20							
65		8 10 7 (17)		D-25	GS MC	GM, MC=14% Silty GRAVEL, medium dense, dark gray, wet, stratified, HCl not tested. Length Recovered:0.4 ft. Length Retained:0.4 ft.		
		4 10 12 (22)		D-26	GS MC	SM, MC=20% Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-25							
70								

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-77327

HOLE No. H-3p-11

Job No. XL-4105a SR 167 Elevation 44.3 ft

Sheet 4 of 10

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

Field SPT (N) / Moisture Content / RQD

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material
		9 18 18 (36)		D-27		Sandy SILT with gravel, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.
	-30	13 22 26 (48)		D-28		Poorly graded SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.2 ft. Length Retained:1.2 ft.
75		16 25 30 (55)		D-29	GS MC	SP-SM, MC=23% Poorly graded SAND with silt, very dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1 ft. Length Retained:1 ft.
	-35					
80		10 15 16 (31)		D-30		Poorly graded SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.3 ft. Length Retained:1.3 ft.
	-40					
85		8 6 6 (12)		D-31	GS MC	ML, MC=39% SILT with sand and organics, medium dense, dark gray, wet, stratified, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.
	-45					
90		11 11 10 (21)		D-32	GS MC	SM, MC=20% Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.
	-50					
95						

Groundwater / Instrument

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-77327

HOLE No. H-3p-11

Job No. XL-4105a SR 167 Elevation 44.3 ft

Sheet 5 of 10

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

◆ Field SPT (N)
✚ Moisture Content
▨ RQD

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		10 22 26 (48)		D-33		Poorly graded SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-55							
100		13 25 29 (54)		D-34	GS MC	SP-SM, MC=25% Poorly graded SAND with silt, very dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.1 ft. Length Retained:1.1 ft.		
	-60							
105		10 20 26 (46)		D-35		Poorly graded SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1 ft. Length Retained:1 ft.		
	-65							
110		11 19 26 (45)		D-36		Poorly graded SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:0.9 ft. Length Retained:0.9 ft.		
	-70							
115		8 17 20 (37)		D-37	GS MC	SM, MC=31% Silty SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-75							
120								

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-77327

HOLE No. H-3p-11

Job No. XL-4105a SR 167 Elevation 44.3 ft

Sheet 6 of 10

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				10 13 15 (28)		D-38		Sandy SILT, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-80									
125				9 12 19 (31)		D-39		SILT with organics, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-85									
130				6 11 14 (25)		D-40	GS MC	ML, MC=45% SILT with organics, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-90									
135					P	PS-41		SILT, dark gray		
	-95									
140				3 5 8 (13)		D-42		Sandy SILT with organics, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-100									
145										

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HOLE No. H-3p-11

Job No. XL-4105a SR 167 Elevation 44.3 ft

Sheet 7 of 10

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20, 40, 60, 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				7 10 9 (19)		D-43	GS MC	ML, MC=34% Sandy SILT, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-105									
150				5 5 7 (12)		D-44		Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-110									
155				8 12 24 (36)		D-45	GS MC	ML, MC=24% Sandy SILT, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-115									
160				13 23 23 (46)		D-46		Poorly graded SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-120									
165				7 12 28 (40)		D-47	GS MC	ML, MC=31% Sandy SILT, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-125									
170										

Washington State Department of Transportation

LOG OF TEST BORING

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HOLE No. H-3p-11

Job No. XL-4105a SR 167 Elevation 44.3 ft

Sheet 8 of 10

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

◆ Field SPT (N) ✚ Moisture Content ▨ RQD

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		3 3 8 (11)		D-48	GS MC	ML, MC=48% Sandy SILT, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-130							
175		8 10 19 (29)		D-49	GS MC	SM, MC=17% Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-135							
180		11 11 16 (27)		D-50		Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-140							
185		13 18 21 (39)		D-51		Silty SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-145							
190		13 16 22 (38)		D-52		Silty SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-150							
195								

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HOLE No. H-3p-11

Job No. XL-4105a SR 167 Elevation 44.3 ft

Sheet 9 of 10

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

◆ Field SPT (N) ✚ Moisture Content ▨ RQD

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		14 20 25 (45)		D-53	GS MC	ML, MC=41% Sandy SILT, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-155							
200		10 18 23 (41)		D-54		Silty SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-160							
205		13 21 28 (49)		D-55	GS MC	SP-SM, MC=18% Poorly graded SAND with silt, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-165							
210		14 26 23 (49)		D-56		Poorly graded SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-170							
215		16 16 14 (30)		D-57		Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-175							
220								

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Department of Transportation

LOG OF TEST BORING

Start Card R-77327

HOLE No. H-3p-11

Job No. XL-4105a SR 167 Elevation 44.3 ft

Sheet 10 of 10

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

◆ Field SPT (N) ✚ Moisture Content ▨ RQD

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				6 12 17 (29)		D-58	GS MC	ML, MC=33% Sandy SILT, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-180									
225				4 4 5 (9)		D-59	GS MC	ML, MC=49% SILT, loose, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-185									
230				10 12 15 (27)		D-60	GS MC	SM, MC=54% Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
	-190									
235				7 9 23 (32)		D-61		Silty SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
								End of test hole boring at 236.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
	-195									
240								A flush mount monument was installed on this boring.		
	-200									
245										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-77327

HOLE No. H-4p-11

Sheet 1 of 6

Job No. XL-4105a SR 167 Elevation 44.8 ft

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E) Driller Nelson, Brad Lic# 2969

Site Address Vicinity of SR-167 and Meridian St. Inspector Fetterly, Jamie #2507

Start October 10, 2011 Completion October 12, 2011 Well ID# BCA-183 Equipment CME 55 (9C7-1) - AH

Station 28+15.39 Offset 3.73ft Lt. Hole Dia (inches) 5 Method Wet Rotary

Northing 686279.31 Easting 1194457.56 Collected by Region Survey Crew Datum NAD 83_91(HARN) StatePlaneSouth(ft

County Pierce Subsection SW1/4 of SW1/4 Section 22 Range 4 EWM Township 20 N

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				2 2 3 (5)		D-1	GS MC	SP-SM, MC=18% Poorly graded SAND with silt, loose, very dark brown, moist, homogeneous, HCl not tested. Length Recovered: 1.2 ft. Length Retained: 1.2 ft.		
5	40.0			1 2 3 (5)		D-2		Poorly graded SAND, stratified with silty sand, loose, very dark brown, moist, HCl not tested. Length Recovered: 1.3 ft. Length Retained: 1.3 ft.		
				2 2 3 (5)		D-3	GS MC	SP, MC=16% Poorly graded SAND, loose, very dark brown, moist, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
10	35.0			2 3 4 (7)		D-4		Poorly graded SAND with gravel, loose, very dark brown, moist, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
				2 3 4 (7)		D-5	GS MC	SP, MC=20% Poorly graded SAND, loose, very dark brown, moist, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
15	30.0			3 4 6 (10)		D-6		Poorly graded SAND, loose, very dark brown, moist, homogeneous, HCl not tested. Length Recovered: 0.9 ft. Length Retained: 0.9 ft. 10/11/2011 10/12/2011	▽ ▼	
				8 9 8 (17)		D-7		Silty GRAVEL with sand, sub-rounded, stratified with poorly graded sand, medium dense, dark brown, moist, HCl not tested. Length Recovered: 0.4 ft. Length Retained: 0.4 ft.		
20	25.0			5 5		D-8	GS MC	SP-SM, MC=11% Poorly graded SAND with silt and gravel, loose, dark		

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-77327

HOLE No. H-4p-11

Job No. XL-4105a SR 167 Elevation 44.8 ft

Sheet 2 of 6

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Nelson, Brad Lic# 2969

◆ Field SPT (N) ✚ Moisture Content ▨ RQD

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material
		4 (9)				brown, moist, homogeneous, HCl not tested. Length Recovered: 0.6 ft. Length Retained: 0.6 ft.
		3 5 8 (13)		D-9		Well graded SAND, stratified with dark gray, wet, poorly graded sand, medium dense, dark brown, wet, HCl not tested. Length Recovered: 0.9 ft. Length Retained: 0.9 ft.
25	20	6 9 12 (21)		D-10	GS MC	SW-SM, MC=13% Well graded SAND with silt, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.
		8 11 13 (24)		D-11	GS MC	GW, MC=5% Well graded GRAVEL with sand, sub-rounded, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 0.7 ft. Length Retained: 0.7 ft.
30	15	9 11 14 (25)		D-12		Silty GRAVEL with sand, sub-rounded, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 0.4 ft. Length Retained: 0.4 ft.
		6 11 12 (23)		D-13		Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.
35	10	5 8 9 (17)		D-14	GS MC	SP-SM, MC=25% Poorly graded SAND with silt, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.2 ft. Length Retained: 1.2 ft.
		5 7 11 (18)		D-15	GS MC	SP, MC=14% Poorly graded SAND with gravel, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 0.9 ft. Length Retained: 0.9 ft.
40	5	17 11 13 (24)		D-16		Silty GRAVEL with sand, sub-rounded, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 0.8 ft. Length Retained: 0.8 ft.
		10 8 3 (11)		D-17	GS MC	SM, MC=12% Silty SAND with gravel, sub-rounded, stratified with sandy silt with gravel, medium dense, dark gray, wet, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.
45	0	1 1		D-18	GS MC	SM, MC=13%, LL=21 Silty SAND with gravel, very loose, gray, wet,

Groundwater | Instrument

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-77327

HOLE No. H-4p-11

Job No. XL-4105a SR 167 Elevation 44.8 ft

Sheet 3 of 6

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Nelson, Brad Lic# 2969

Field SPT (N) / Moisture Content / RQD — 20 40 60 80

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material
		2 (3)			AL	homogeneous, HCl not tested. Length Recovered: 0.9 ft. Length Retained: 0.9 ft.
		0 1 2 (3)		D-19		Silty SAND with gravel, very loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 0.9 ft. Length Retained: 0.9 ft.
50	-5	0 3 3 (6)		D-20		Sandy SILT with gravel, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 0.8 ft. Length Retained: 0.8 ft.
		1 2 2 (4)		D-21		Sandy SILT with gravel, very loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.
55	-10	2 2 2 (4)		D-22		Sandy SILT with gravel, very loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.
		0 0 1 (1)		D-23		Sandy SILT with gravel, very loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 0.7 ft. Length Retained: 0.7 ft.
60	-15	2 2 2 (4)		D-24		Sandy SILT with gravel, very loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.2 ft. Length Retained: 1.2 ft.
		1 2 3 (5)		D-25	GS MC AL	SM, MC=16%, LL=NA, PL=NP Silty SAND with gravel, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 0.7 ft. Length Retained: 0.7 ft.
65	-20	0 1 2 (3)		D-26		Silty SAND with gravel, very loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 0.9 ft. Length Retained: 0.9 ft.
		3 4 5 (9)		D-27	GS MC AL	ML, MC=41%, LL=34 SILT, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.1 ft. Length Retained: 1.1 ft.
70	-25	2 7		D-28		SILT, stratified with sandy silt laminated with organics, medium dense, gray, wet, HCl not tested.

Groundwater / Instrument

SOILA_TEST XL-4105 SR161 VIC PUYALLUP RIVER BRIDGE.GPJ SOIL.GDT 6/7/12

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HOLE No. H-4p-11

Job No. XL-4105a SR 167 Elevation 44.8 ft

Sheet 4 of 6

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Nelson, Brad Lic# 2969

◆ Field SPT (N) ✚ Moisture Content ▨ RQD

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				13 (20)				Length Recovered: 1.4 ft. Length Retained: 1.4 ft.		
				11 14 19 (33)		D-29	GS MC	SM, MC=24% Silty SAND, dense, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
75	-30			9 19 15 (34)		D-30		Silty SAND, stratified with silt, dense, gray, wet, HCl not tested. Length Recovered: 1.3 ft. Length Retained: 1.3 ft.		
80	-35			2 3 5 (8)		D-31	GS MC AL	ML, MC=42%, LL=31 SILT, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
85	-40			2 3 4 (7)		D-32	GS MC	ML, MC=48% SILT, loose, grayish brown, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
90	-45			4 11 17 (28)		D-33	GS MC AL	ML, MC=30%, LL=NA, PL=NP Sandy SILT, stratified with gray silt, medium dense, grayish brown, wet, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
95	-50			4 7		D-34	GS MC	ML, MC=28% Sandy SILT, medium dense, grayish brown, wet,		

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Department of Transportation

LOG OF TEST BORING

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HOLE No. H-4p-11

Job No XL-4105a SR 167 Elevation 44.8 ft

Sheet 5 of 6

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Nelson, Brad Lic# 2969

◆ Field SPT (N)
✚ Moisture Content
▨ RQD

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material
		12 (19)				homogeneous, HCl not tested. Length Recovered: 1.3 ft. Length Retained: 1.3 ft.
100	-55	9 14 16 (30)		D-35	GS MC	SM, MC=24% Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.3 ft. Length Retained: 1.3 ft.
105	-60	10 17 18 (35)		D-36		Silty SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.
110	-65	12 10 6 (16)		D-37		Silty SAND, medium dense, very dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.
115	-70	5 7 8 (15)		D-38	GS MC AL	ML, MC=42%, LL=33 SILT with sand, with one sand lamination, medium dense, very dark gray, moist, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.
120	-75	19 17		D-39		Sandy SILT, medium dense, very dark gray, moist, homogeneous, HCl not tested.

Groundwater

Instrument

Washington State
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LOG OF TEST BORING

Start Card R-77327

HOLE No. H-4p-11

Job No. XL-4105a SR 167 Elevation 44.8 ft

Sheet 6 of 6

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Nelson, Brad Lic# 2969

Depth (ft)	Elevation (ft)	Profile	◆ Field SPT (N) ✚ Moisture Content ▨ RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				12 (29)				Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
			◆ ✚	5 9 14 (23)		D-40	GS MC AL	ML, MC=52%, LL=29 SILT with sand, stratified with silt, medium dense, dark gray, moist, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
125	-80									
								A flush mount monument was installed on this boring. The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Division and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew.		
130	-85							End of test hole boring at 125.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
135	-90									
140	-95									
145	-100									

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 77328

HOLE No. H-5p-11

Sheet 1 of 11

Job No. XL-4105a SR 167 Elevation 46.8 ft

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

Site Address Vic. SR-167 and Meridian St.

Inspector Cooper, Kerry #2552

Start October 10, 2011 Completion October 17, 2011 Well ID# BCA 190

Equipment CME 45 (9C4-2) - AH

Station 35+84.42 Offset 3.93ft Lt. Hole Dia (inches) 6

Method Wet Rotary

Northing 687048.55 Easting 1194467.83 Collected by Region Survey Crew

Datum NAD 83_91(HARN) StatePlaneSouth(ft

County Pierce Subsection SW1/4 of SW1/4 Section 22 Range 4 EWM Township 20N

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	45.0									
				6 14 21 (35)		D-1		Sitly SAND with grave, dense, brownish gray, moist, stratified, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
5				19 37 46 (83)		D-2	GS MC	SM, MC=2% Sitly SAND with gravel, very dense, brownish gray, moist, stratified, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
	40.0									
				12 15 15 (30)		D-3		Sitly SAND with grave, sub-rounded, medium dense, brown, moist, stratified, HCl not tested. Length Recovered: 0.5 ft. Length Retained: 0.5 ft.		
10				15 16 10 (26)		D-4	GS MC	GP-GM, MC=5% Poorly graded GRAVEL with silt and sand, sub-rounded, medium dense, brown, moist, stratified, HCl not tested. Length Recovered: 0.6 ft. Length Retained: 0.6 ft.		
	35.0									
				3 5 5 (10)		D-5	GS MC	SP-SM, MC=28% Poorly graded SAND with silt, loose, brown, moist, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
15				4 3 4 (7)		D-6		Poorly graded SAND with silt, loose, brown, moist, homogeneous, HCl not tested. Length Recovered: 1.2 ft. Length Retained: 1.2 ft.		
	30.0									
				4 4 5 (9)		D-7	GS MC	SP, MC=20% Poorly graded SAND, loose, brown, moist, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
20										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 77328

HOLE No. H-5p-11

Job No. XL-4105a SR 167 Elevation 46.8 ft

Sheet 2 of 11

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

◆ Field SPT (N) ✚ Moisture Content ▨ RQD

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		3 4 4 (8)		D-8		Poorly graded SAND, loose, brown, moist, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
	25							
		4 4 3 (7)		D-9	GS MC	SP, MC=27% Poorly graded SAND with gravel and some wood debris, loose, brown, moist, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
25		3 4 6 (10)		D-10		Poorly graded SAND with gravel and some wood debris, sub-rounded, loose, gray, moist, homogeneous, HCl not tested. Length Recovered: 0.3 ft. Length Retained: 0.3 ft.		
	20							
		5 8 15 (23)		D-11		Poorly graded SAND with gravel, medium dense, black, wet, stratified, HCl not tested. Length Recovered: 0.9 ft. Length Retained: 0.9 ft.		
30		7 9 16 (25)		D-12	GS MC	SP, MC=13% Poorly graded SAND with gravel, medium dense, black, wet, stratified, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
	15							
		12 11 11 (22)		D-13	GS MC	GW-GM, MC=8% Well graded GRAVEL with silt and sand, sub-rounded, medium dense, black, wet, stratified, HCl not tested. Length Recovered: 0.1 ft. Length Retained: 0.1 ft.		
35		10 10 13 (23)		D-14		Well graded GRAVEL with silt and sand, sub-rounded, medium dense, black, wet, stratified, HCl not tested. Length Recovered: 0.8 ft. Length Retained: 0.8 ft.		
	10							
		10 9 9 (18)		D-15	GS MC	SP-SM, MC=24% Poorly graded SAND with silt, medium dense, black, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
40		13 12 7 (19)		D-16	GS MC AL	SM, MC=16%, LL=22 Silty SAND, medium dense, gray, wet, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
	5							
		2 4 2 (6)		D-17		Silty SAND, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
45								

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 77328

HOLE No. H-5p-11

Job No. XL-4105a SR 167 Elevation 46.8 ft

Sheet 3 of 11

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

◆ Field SPT (N) ✚ Moisture Content ▨ RQD

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		3 1 3 (4)		D-18	GS MC AL	SM, MC=15%, LL=22 Silty SAND, very loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
	0							
		3 3 2 (5)		D-19		Silty SAND, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
50		2 3 3 (6)		D-20	GS MC AL	SM, MC=16%, LL=22 Silty SAND, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
	-5							
		2 3 2 (5)		D-21		Silty SAND, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
55		1 2 2 (4)		D-22	GS MC AL	SM, MC=17%, LL=22 Silty SAND with gravel, very loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
	-10							
			P	PS-23		Silty SAND with gravel, gray, homogeneous,		
60		2 3 3 (6)		D-24	GS MC AL	SM, MC=18%, LL=21 Silty SAND with gravel, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
	-15							
		1 3 2 (5)		D-25		Silty SAND with gravel, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
65			P	PS-26		Silty SAND with gravel, gray, homogeneous		
	-20							
		0 3 4 (7)		D-27	GS MC AL	SM, MC=18%, LL=21 Silty SAND with gravel, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
70								

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 77328

HOLE No. H-5p-11

Job No. XL-4105a SR 167 Elevation 46.8 ft

Sheet 4 of 11

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

◆ Field SPT (N) ✚ Moisture Content ▨ RQD

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		2 5 3 (8)		D-28		Silty SAND with gravel, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
	-25							
		8 12 21 (33)		D-29	GS MC	SM, MC=24% Silty SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
75		13 20 22 (42)		D-30		Silty SAND, dense, dark gray, moist, homogeneous, HCl not tested. Length Recovered: 1.3 ft. Length Retained: 1.3 ft.		
	-30							
80		10 16 21 (37)		D-31	GS MC	SP-SM, MC=22% Poorly graded SAND with silt, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 0.9 ft. Length Retained: 0.9 ft.		
	-35							
85		22 33 34 (67)		D-32		Poorly graded SAND with silt, very dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 0.6 ft. Length Retained: 0.6 ft.		
	-40							
90		9 15 22 (37)		D-33	GS MC	SP-SM, MC=18% Poorly graded SAND with silt, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
	-45							
95								

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 77328

HOLE No. H-5p-11

Job No. XL-4105a SR 167 Elevation 46.8 ft

Sheet 5 of 11

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

◆ Field SPT (N) ✚ Moisture Content ▨ RQD

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material
		10 13 14 (27)		D-34	GS MC	SW, MC=16% Well graded SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 0.4 ft. Length Retained: 0.4 ft.
100	-50	9 6 12 (18)		D-35	GS MC AL	ML, MC=36%, LL=1 SILT with sand, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.4 ft. Length Retained: 1.4 ft.
105	-55	24 35 36 (71)		D-36		No Recovery
110	-60	10 21 24 (45)		D-37	GS MC AL	SM, MC=28%, LL=1 Silty SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.
115	-65	7 15 20 (35)		D-38	GS MC AL	ML, MC=55%, PI=5 SILT with sand, dense, dark gray, moist, stratified, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.
120	-70					

Groundwater

Instrument

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 77328

HOLE No. H-5p-11

Job No. XL-4105a SR 167 Elevation 46.8 ft

Sheet 6 of 11

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

◆ Field SPT (N) ✚ Moisture Content ▨ RQD

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				3 3 6 (9)		D-39		SILT with sand, loose, gray, moist, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
	-75					S-40		SILT with sand, gray, stratified, the top was silt and the bottom was sand.		
125				5 5 11 (16)		D-41	GS MC AL	ML, MC=51%, PI=4 SILT with some brown organics, medium dense, gray, moist, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
	-80									
130				3 5 8 (13)		D-42	GS MC AL	ML, MC=41%, LL=1 SILT with sand and a trace of black organics, medium dense, gray, wet, stratified, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
	-85									
135				6 12 15 (27)		D-43	GS MC AL	SM, MC=43%, LL=1 Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.4 ft. Length Retained: 1.4 ft.		
	-90									
140				9 12 15 (27)		D-44	GS MC	SM, MC=26% Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.2 ft. Length Retained: 1.2 ft.		
	-95									
145										

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 77328

HOLE No. H-5p-11

Job No. XL-4105a SR 167 Elevation 46.8 ft

Sheet 7 of 11

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

◆ Field SPT (N)
✚ Moisture Content
▨ RQD

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		5 9 12 (21)		D-45	GS MC	SM, MC=27% Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
	-100							
150		5 6 8 (14)		D-46	GS MC AL	ML, MC=41%, LL=1 SILT with sand, medium dense, gray, wet, stratified, HCl not tested. Length Recovered: 1.4 ft. Length Retained: 1.4 ft.		
	-105							
155				S-47		SILT with sand, gray, homogeneous,		
	-110	13 10 21 (31)		D-48	GS MC AL	SM, MC=27%, LL=1 Silty SAND, dense, dark gray, moist, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
160		6 6 12 (18)		D-49		Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
	-115							
165		5 12 15 (27)		D-50	GS MC AL	SM, MC=33%, LL=1 Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.4 ft. Length Retained: 1.4 ft.		
	-120							
170								

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 77328

HOLE No. H-5p-11

Job No. XL-4105a SR 167 Elevation 46.8 ft

Sheet 8 of 11

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

◆ Field SPT (N)
✚ Moisture Content
▨ RQD

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	-125			5 7 11 0 (18)		D-51		Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
175	-130			4 10 14 (24)		D-52	GS MC	ML, MC=34% Sandy SILT, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
180	-135			14 19 27 (46)		D-53	GS MC	SP-SM, MC=22% Poorly graded SAND with silt, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.3 ft. Length Retained: 1.3 ft. NOTE: Encountered gravels at approximate 185ft		
185	-140			18 21 29 (50)		D-54	GS MC	SP-SM, MC=13% Poorly graded SAND with silt and gravel, very dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.2 ft. Length Retained: 1.2 ft.		
190	-145			42 37 21 (58)		D-55		Poorly graded SAND with silt and gravel, sub-rounded, very dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
195										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 77328

HOLE No. H-5p-11

Job No. XL-4105a SR 167 Elevation 46.8 ft

Sheet 9 of 11

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

◆ Field SPT (N) ✚ Moisture Content ▨ RQD

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		28 24 20 (44)		D-56		Poorly graded SAND with silt and gravel, sub-angular, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 0.8 ft. Length Retained: 0.8 ft.		
	-150							
200		25 22 18 (40)		D-57	GS MC	SW-SM, MC=21% Well graded SAND with silt and a trace of gravel, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.4 ft. Length Retained: 1.4 ft.		
	-155							
205		10 20 21 (41)		D-58	GS MC AL	SM, MC=29%, LL=1 Silty SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.3 ft. Length Retained: 1.3 ft.		
	-160							
210		4 5 7 (12)		D-59	GS MC AL	ML, MC=44%, PI=6 SILT, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
	-165							
215		19 18 25 (43)		D-60	GS MC AL	SM, MC=26%, LL=1 Silty SAND, dense, dark gray, wet, stratified, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft. NOTE: Sample was stratified with silty sand, silt and sandy silt. Also the top .2' was brown in color		
	-170							
220								

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 77328

HOLE No. H-5p-11

Job No. XL-4105a SR 167 Elevation 46.8 ft

Sheet 10 of 11

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

◆ Field SPT (N)
✚ Moisture Content
▨ RQD

Depth (ft)	Elevation (ft)	Profile	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			17 21 23 (44)		D-61	GS MC	SP-SM, MC=12% Poorly graded SAND with silt and gravel, dense, dark gray, wet, stratified, HCl not tested. Length Recovered: 1.1 ft. Length Retained: 1.1 ft.		
	-175								
225			20 19 24 (43)		D-62	GS MC	SP-SM, MC=14% Poorly graded SAND with silt and gravel, dense, dark gray, wet, stratified. Length Recovered: 1 ft. Length Retained: 1 ft.		
	-180								
230			18 21 24 (45)		D-63		No Recovery		
	-185								
235			22 25 27 (52)		D-64	GS MC	GM, MC=8% Silty GRAVEL with sand, very dense, dark gray, wet, stratified, HCl not tested. Length Recovered: 0.6 ft. Length Retained: 0.6 ft.		
	-190								
240			22 20 29 (49)		D-65	GS MC	SP-SM, MC=19% Poorly graded SAND with silt, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
	-195								
245									

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 77328

HOLE No. H-5p-11

Job No. XL-4105a SR 167 Elevation 46.8 ft

Sheet 11 of 11

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Wilson, Jamie Lic# 2941

Field SPT (N) / Moisture Content / RQD

Depth (ft)	Elevation (ft)	Profile	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			21 23 26 (49)		D-66		Poorly graded SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
	-200								
250			16 20 28 (48)		D-67	GS MC AL	ML, MC=34%, LL=1 SILT with sand, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
	-205						End of test hole boring at 251.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
255									
	-210						The implied accuracy of the borehole location information displayed on this boring log is typically sub-meter in (X,Y) when collected by the HQ Geotech Division and sub-centimeter in (X,Y,Z) when collected by the Region Survey Crew. A flush mount monument was installed on this boring.		
260									
	-215								
265									
	-220								
270									

SOILA_TEST XL-4105 SR161 VIC PUYALLUP RIVER BRIDGE.GPJ SOIL.GDT 6/7/12

Washington State
Department of Transportation

LOG OF CONE PENETROMETER TEST

Start Card S 42739/A 136751

HOLE No. CPT-1-11

Sheet 1 of 1

Job No. XL-4105a SR 167 Elevation 44.8 ft

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Hilts, Brian Lic# 2249

Site Address Vic. SR-167 and Meridian St.

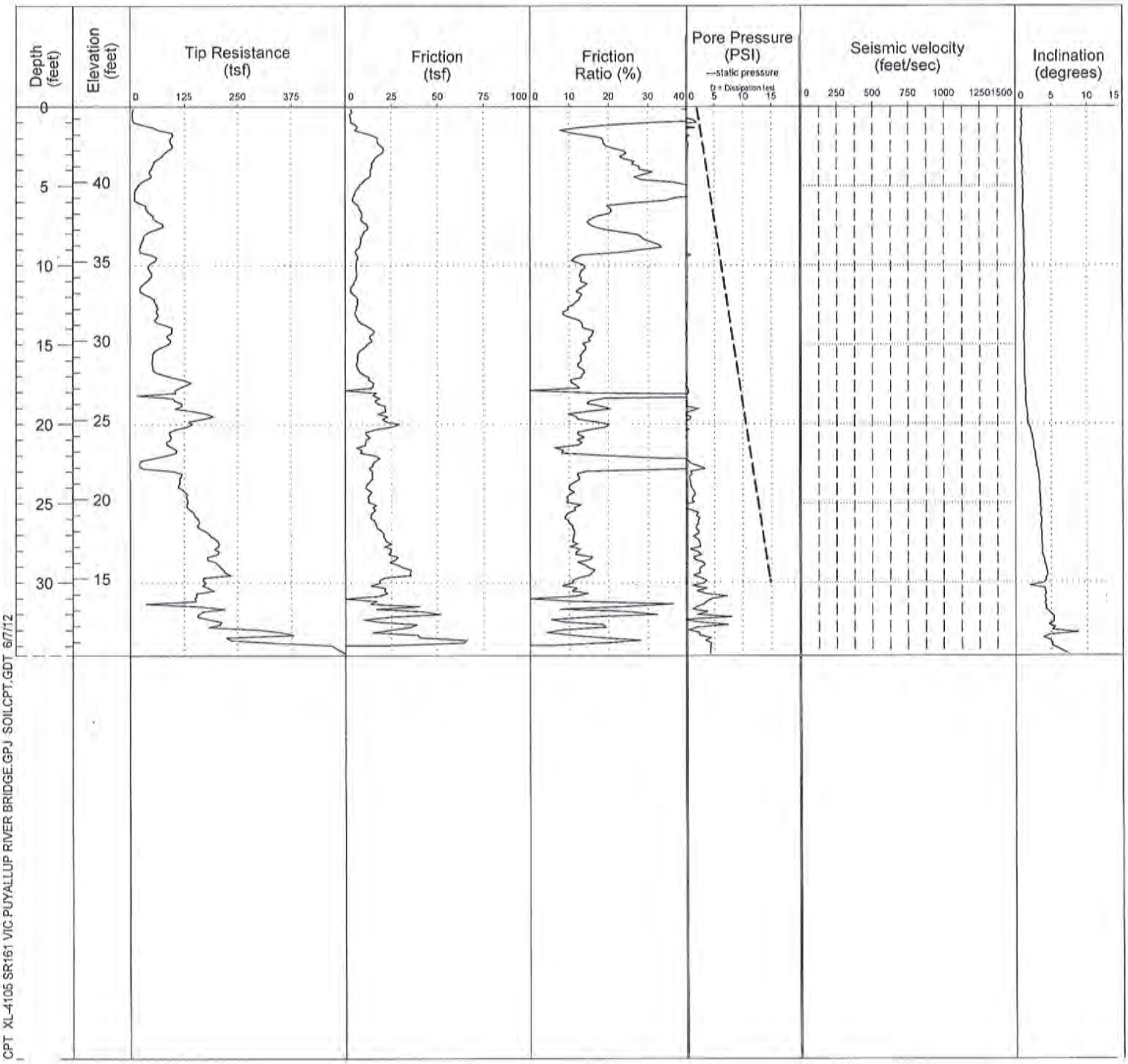
Inspector Hilts, Brian #2249

Start October 11, 2011 Completion October 11, 2011 Well ID# Equipment CPT (9C30-1) -

Station 29+19.06 Offset 10.31ft Lt. Hole Dia (inches) 2 Method

Northing 686383.32 Easting 1194449.20 Collected by Region Survey Crew Datum NAD 83_91(HARN) StatePlaneSouth(ft

County Pierce Subsection SW1/4 of SW1/4 Section 22 Range 4 EWM Township 20N



CPT XL-4105 SR161 VIC PUYALLUP RIVER BRIDGE.GPJ SOILCPT.GDT 6/7/12

Washington State
Department of Transportation

LOG OF CONE PENETROMETER TEST

Start Card S 42739/A 136751

HOLE No. CPT-2-11

Sheet 1 of 1

Job No. XL-4105a SR 167 Elevation 44.3 ft

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Hilts, Brian Lic# 2249

Site Address Vic. SR-167 and Meridian St.

Inspector Hilts, Brian #2249

Start October 12, 2011 Completion October 12, 2011 Well ID#

Equipment CPT (9C30-1) -

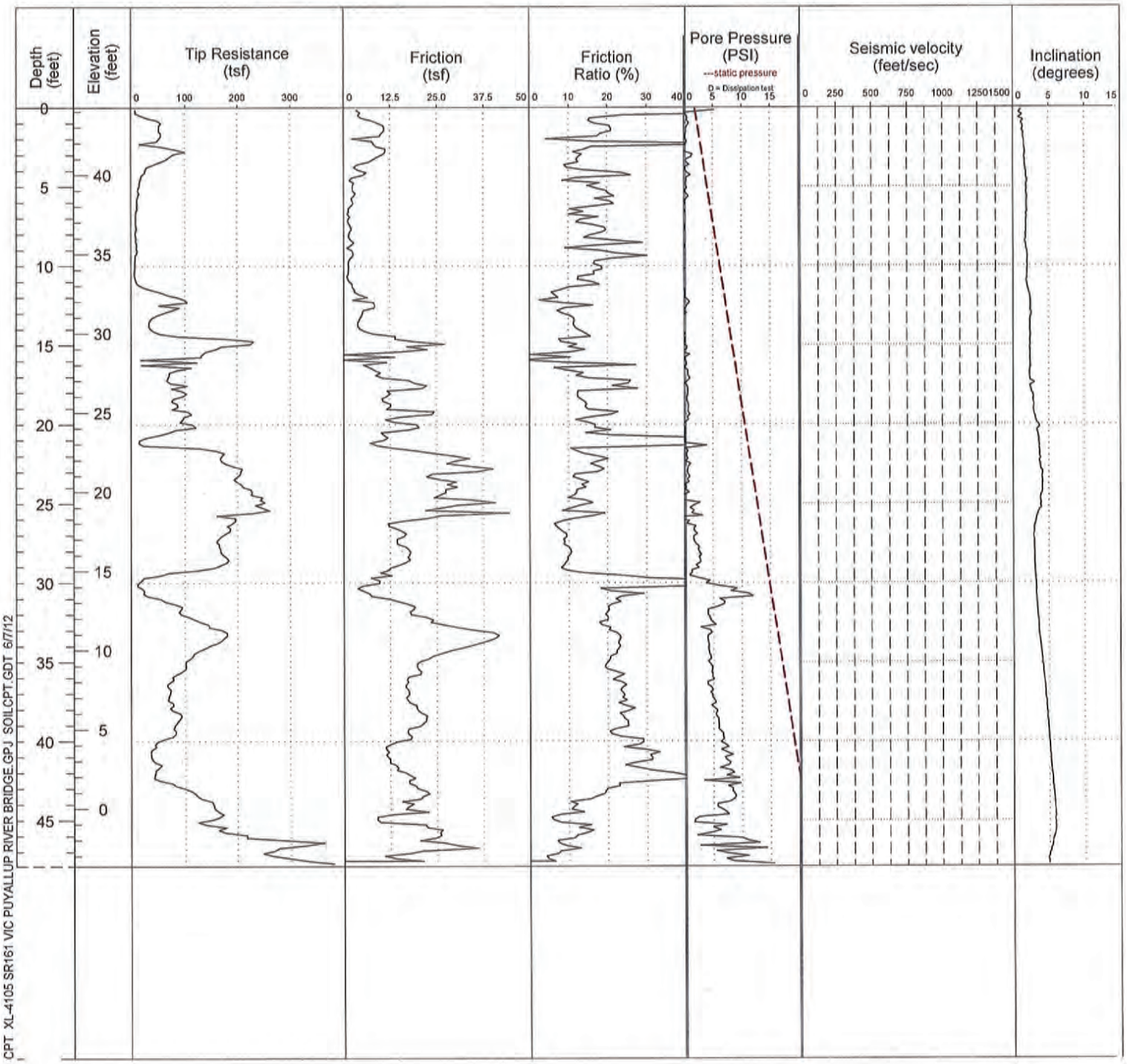
Station 30+25.43 Offset 20.30ft Lt. Hole Dia (inches) 2

Method

Northing 686489.93 Easting 1194441.17 Collected by Region Survey Crew

Datum NAD 83_91(HARN) StatePlaneSouth(ft

County Pierce Subsection SW1/4 of SW1/4 Section 22 Range 4 EWM Township 20N



CPT XL-4105 SR161 VIC PUYALLUP RIVER BRIDGE.GPJ SOILCPT.GDT 6/7/12

Washington State Department of Transportation

LOG OF CONE PENETROMETER TEST

Start Card S 42739/A 136751

Job No. XL-4105a SR 167 Elevation 52.6 ft

HOLE No. CPT-3ALT-11

Sheet 1 of 1

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Hilts, Brian Lic# 2249

Site Address Vic. SR-167 and Meridian St.

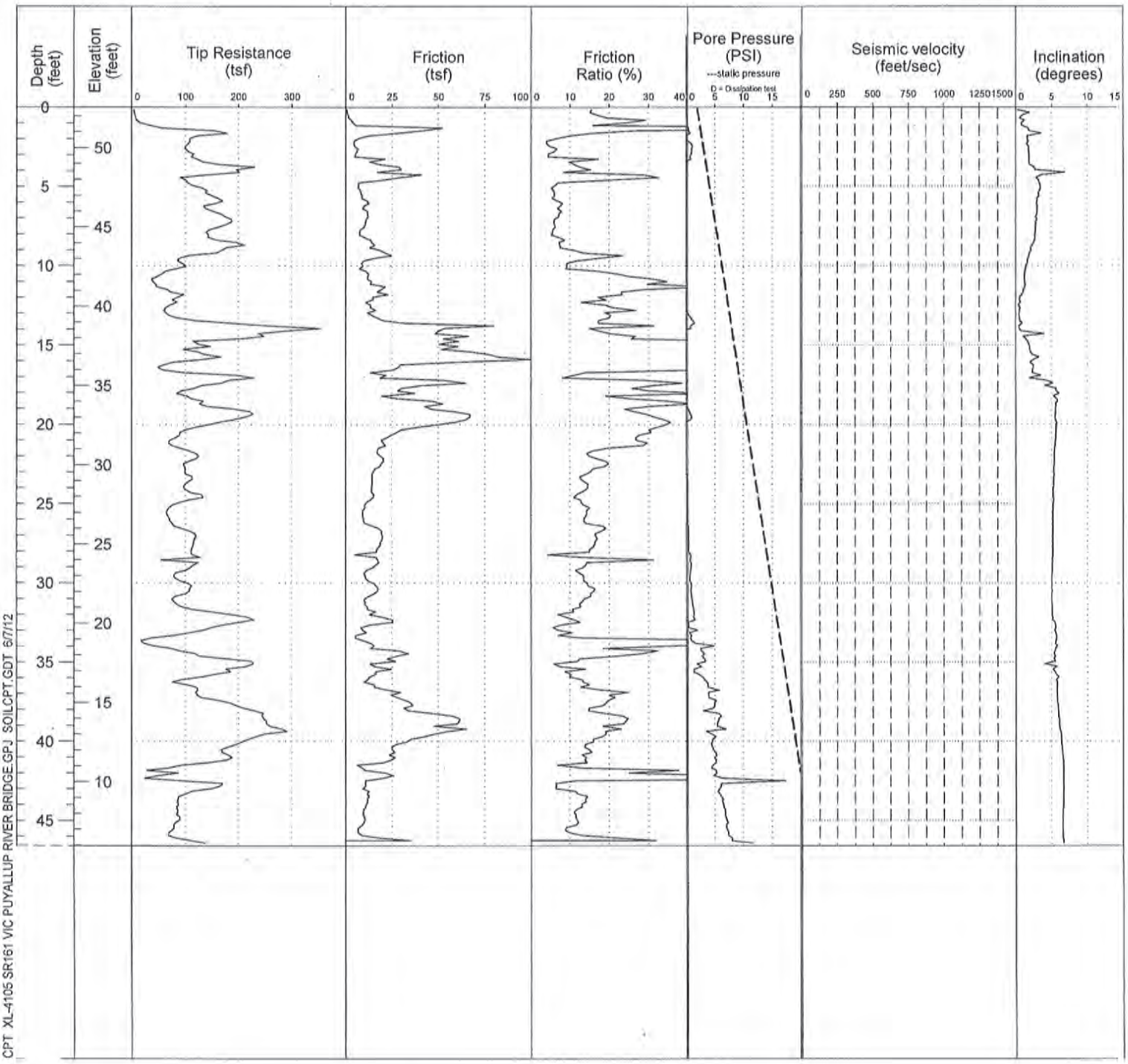
Inspector Hilts, Brian #2249

Start October 14, 2011 Completion October 14, 2011 Well ID# Equipment CPT (9C30-1) -

Station 36+50.02 Offset 39.18ft Lt. Hole Dia (inches) 2 Method

Northing 687114.95 Easting 1194435.12 Collected by Region Survey Crew Datum NAD 83_91(HARN) StatePlaneSouth(ft

County Pierce Subsection SW1/4 of SW1/4 Section 22 Range 4 EWM Township 20N



CPT XL-4105 SR161 VIC PUYALLUP RIVER BRIDGE.GPJ SOILCPT.GDT 6/7/12

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 77327

HOLE No. H-6p-11

Sheet 1 of 5

Job No. XL-4105a SR 167 Elevation 49.2 ft

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Nelson, Brad Lic# 2969

Site Address Vic of SR167 & Meridian Rd

Inspector Judd, Joe #2454

Start October 12, 2011 Completion October 13, 2011 Well ID# BCA 184

Equipment CME 55 (9C7-1) - AH

Station 37+69.32 Offset 3.04ft Rt. Hole Dia (inches) 4

Method Wet Rotary

Northing 687232.57 Easting 1194487.50 Collected by Region Survey Crew

Datum NAD 83_91(HARN) StatePlaneSouth(ft

County Pierce Subsection SW1/4 of SW1/4 Section 22 Range 4 EWM Township 20N

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	45.0			16 14 14 (28)		D-1		Well graded GRAVEL with silt and sand, sub-rounded, medium dense, gray, moist, homogeneous, HCl not tested. Length Recovered: 0.5 ft. Length Retained: 4 ft.		
5				5 21 26 (47)		D-2	GS MC	GW-GM, MC=10% Well graded GRAVEL with silt and sand, sub-rounded, dense, gray, moist, homogeneous, HCl not tested. Length Recovered: 0.5 ft. Length Retained: 0.5 ft.		
	40.0			7 3 7 (10)		D-3		Silty SAND, loose, dark gray, moist, homogeneous, HCl not tested. Length Recovered: 0.4 ft. Length Retained: 0.4 ft. 10/12/2011	▽	
10				1 3 3 (6)		D-4	GS MC	SM, MC=17% Silty SAND, loose, brown, moist, homogeneous, HCl not tested. Length Recovered: 0.4 ft. Length Retained: 0.4 ft.		
	35.0			1 2 1 (3)		D-5		Silty SAND, very loose, darkbrown, wet, homogeneous, HCl not tested. Length Recovered: 0.3 ft. Length Retained: 0.3 ft. 10/13/2011	▼	
15				3 3 3 (6)		D-6		SILT with sand, loose, brown, wet, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
	30.0			1 2 2 (4)		D-7	GS MC AL	ML, MC=30%, LL=NA, PL=NP SILT with sand, very loose, dark brown, wet, homogeneous, HCl not tested. Length Recovered: 0.9 ft. Length Retained: 0.9 ft.		
20										

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 77327

HOLE No. H-6p-11

Job No. XL-4105a SR 167 Elevation 49.2 ft

Sheet 2 of 5

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Nelson, Brad Lic# 2969

Field SPT (N) / Moisture Content / RQD — 20 40 60 80

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		3 4 5 (9)		D-8		SILT with sand, loose, dark brown, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
	25	5 7 6 (13)		D-9	GS MC AL	SM, MC=29%, LL=NA, PL=NP Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
25		6 14 15 (29)		D-10		Poorly graded SAND with silt, medium dense, black, moist, homogeneous, HCl not tested. Length Recovered: 0.8 ft. Length Retained: 0.8 ft.		
	20	5 12 12 (24)		D-11	GS MC	SP-SM, MC=23% Poorly graded SAND with silt, medium dense, black, moist, homogeneous, HCl not tested. Length Recovered: 7 ft. Length Retained: 0.7 ft.		
30		9 10 13 (23)		D-12		Poorly graded SAND with gravel, medium dense, black, wet, homogeneous, HCl not tested. Length Recovered: 0.5 ft. Length Retained: 0.5 ft.		
	15	8 11 11 (22)		D-13	GS MC	SP, MC=13% Poorly graded SAND with gravel, medium dense, black, wet, homogeneous, HCl not tested. Length Recovered: 0.6 ft. Length Retained: 0.6 ft.		
35		8 10 7 (17)		D-14		Poorly graded SAND with gravel, medium dense, black, wet, homogeneous, HCl not tested. Length Recovered: 0.1 ft. Length Retained: 1 ft.		
	10	5 2 2 (4)		D-15	GS MC	SW, MC=18% Well graded SAND with gravel, very loose, black, wet, homogeneous, HCl not tested. Length Recovered: 0.3 ft. Length Retained: 0.3 ft.		
40		2 4 4 (8)		D-16	GS MC AL	SM, MC=34%, LL=NA, PL=NP Silty SAND, loose, black, wet, stratified, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
	5	2 3 2 (5)		D-17		Silty SAND with gravel, loose, greenish gray, moist, homogeneous, HCl not tested. Length Recovered: 0.3 ft. Length Retained: 0.3 ft.		
45								

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 77327

HOLE No. H-6p-11

Job No. XL-4105a SR 167 Elevation 49.2 ft

Sheet 3 of 5

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Nelson, Brad Lic# 2969

◆ Field SPT (N) ✚ Moisture Content ▨ RQD (20 40 60 80)

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
		8 6 5 (11)		D-18		Silty SAND with gravel, medium dense, gray, wet, homogeneous, HCl not tested. Length Recovered: 0.9 ft. Length Retained: 0.9 ft.		
	0	2 3 3 (6)		D-19	GS MC AL	SM, MC=18%, LL=20 Silty SAND with gravel, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
50		2 2 3 (5)		D-20		Silty SAND, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
	-5	3 2 3 (5)		D-21		Silty SAND, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
55		1 2 2 (4)		D-22	GS MC AL	SM, MC=17%, LL=20 Silty SAND, very loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 0.4 ft. Length Retained: 0.4 ft.		
	-10	2 3 3 (6)		D-23		Silty SAND, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
60		2 2 3 (5)		D-24		Silty SAND, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
	-15	1 3 3 (6)		D-25	GS MC AL	SM, MC=14%, LL=20 Silty SAND, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1 ft. Length Retained: 1 ft.		
65		2 2 3 (5)		D-26		Silty SAND, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 0.7 ft. Length Retained: 0.7 ft.		
	-20	2 3 3 (6)		D-27		Silty SAND, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 0.8 ft. Length Retained: 0.8 ft.		
70								

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R 77327

HOLE No. H-6p-11

Job No. XL-4105a SR 167 Elevation 49.2 ft

Sheet 4 of 5

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Nelson, Brad Lic# 2969

Field SPT (N) / Moisture Content / RQD

Depth (ft)	Elevation (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material
		3 5 5 (10)		D-28	GS MC AL	SILT, loose, gray, wet, stratified, HCl not tested. Length Recovered: 1.2 ft. Length Retained: 1.2 ft. *NOTE: Encounterted Silt @72.2ft.*
	-25	3 3 5 (8)		D-29		SILT, loose, gray, wet, homogeneous, HCl not tested. Length Recovered: 1.1 ft. Length Retained: 1.1 ft.
75						
	-30	8 12 17 (29)		D-30		SILT, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.1 ft. Length Retained: 1.1 ft.
80						
	-35	14 20 21 (41)		D-31		Silty SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.
85						
	-40	25 34 40 (74)		D-32		Silty SAND, very dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.
90						
	-45	15 20 24 (44)		D-33	GS MC	SM, MC=24% Silty SAND, dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.
95						

SOILA_TEST XL-4105 SR161 VIC PUYALLUP RIVER BRIDGE.GPJ SOIL.GDT 6/21/12

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R 77327

HOLE No. H-6p-11

Job No. XL-4105a SR 167 Elevation 49.2 ft

Sheet 5 of 5

Project SR 167/Puyallup River Bridge - Bridge Replacement (No. 167/20E)

Driller Nelson, Brad Lic# 2969

◆ Field SPT (N)
✚ Moisture Content
▨ RQD

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			◆	14 14 16 (30)		D-34		Silty SAND, medium dense, dark gray, wet, homogeneous, HCl not tested. Length Recovered: 1.5 ft. Length Retained: 1.5 ft.		
	-50							End of test hole boring at 99.5 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal A flush mount monument was installed on this boring.		
100										
	-55									
105										
	-60									
110										
	-65									
115										
	-70									
120										

DATE	PIEZO #	WATER ELEV. (ft)
6/4/2012	BH-1P-12	29.5

DATE	PIEZO #	WATER ELEV. (ft)
4/23/2012	H-4P-11	36.0
5/16/2012	H-4P-11	36.1
6/4/2012	H-4P-11	36.2
6/11/2012	H-4P-11	36.30
6/12/2012	H-4P-11	36.20
6/13/2012	H-4P-11	36.30
6/14/2012	H-4P-11	36.20

DATE	PIEZO #	WATER ELEV. (ft)
4/23/2012	H-6P-11	37.0
5/16/2012	H-6P-11	36.9
6/4/2012	H-6P-11	36.7
6/11/2012	H-6P-11	36.7
6/12/2012	H-6P-11	36.6
6/13/2012	H-6P-11	36.8
6/14/2012	H-6P-11	36.6

NOTES:

Project Name	SR 167 Puyallup River Bridge Replacement
PREPARED BY	AJF
DATE	6/1/2012

Washington State Department of Transportation
Geotechnical Division

Piezometer Readings

Table A-1