







































In Situ Sample and Test Symbols	
	Standard Penetration Test
	Non-standard Penetration Test
	Shelby Tube
	Piston Sampler
	WSDOT Undisturbed Sampler
	Core Sample
	Grab Sample
	California Sampler
	Vane Shear Test
	Pressuremeter Test

Backfill and Instrument Symbols	
	Cement Surface Seal
	Bentonite Chips
	Bentonite Cement Grout (BCM)
	Sand Filter Pack
	Slough (Hole Collapse)
	Pipe (Piezometer or Instrument) in BCM
	Well Screen in Sand Filter Pack
	Vibrating Wire Piezometer in BCM

Water Level Symbols	
	Water Level During Drilling
	Water Range in Piezometer
	Transducer Depth
	Water is Below Transducer

Laboratory Testing Codes	
AL	Atterberg Limits Test
CD	Consolidated Drained Triaxial Test
CN	1-Dimensional Consolidation Test
CSS	Cyclic Simple Shear Test
CU	Consolidated Undrained Triaxial Test
DG	Degradation Test
DN	Density Test
DS	Direct Shear Test
DSS	Direct Simple Shear Test
GS	Grain Size Distribution Test
HC	Hydraulic Conductivity Test
HT	Hydrometer Test
JS	Jar Slake Test
LA	LA Abrasion Test
LOI	Loss on Ignition Test
MC	Moisture Content Test
PH	pH Test
PT	Point Load Compressive Test
RES	Resistivity Test
RS	Torsional Ring Shear Test
SG	Specific Gravity Test
SL	Slake Durability Test
UC	Unconfined Compression Test
UU	Unconsolidated Undrained Triaxial Test

Soil Stratigraphy Symbols			
COARSE GRAINED		FINE GRAINED & ORGANIC	
	GW: Well-graded Gravel		CL: Lean Clay
	GP: Poorly graded Gravel		ML: Silt
	GM: Silty Gravel		CH: Fat Clay
	GC: Clayey Gravel		MH: Elastic Silt
	SW: Well-graded Sand		OL: Organic Silt
	SP: Poorly graded Sand		OH: Organic Clay
	SM: Silty Sand		CL-ML: Silty Clay (dual symbol)
	SC: Clayey Sand		PT: Peat or Highly Organic Soil
Soil classification is per Chapter 4.2 of the WSDOT Geotechnical Design Manual (GDM). The soil groups above contain less than 15% of other constituents. When more than 15% other constituents are observed, the soil group names are modified (e.g. Silty Gravel with Sand; Sandy, Elastic Silt with Gravel) per ASTM 2488. For dual classifications, a split symbol is used (e.g. CL-ML above). Refer to the Material Description column on the log for a complete description of the observed soil conditions.			

Soil Density/Consistency				WSDOT GDM 4.2.5
COHESIONLESS SOILS		COHESIVE SOILS		
Blows/Ft	Density Term	Blows/Ft	Consistency Term	
< 5	Very Loose	< 2	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) is indicated on the log for any soil type when the penetration resistance exceeded 100 blows per foot (refusal conditions).		31 - 60	Hard	
		> 60	Very Hard	

Soil Angularity		WSDOT GDM 4.2.4
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces	
Subangular	Particles are similar to angular description but have rounded edges	
Subrounded	Particles have nearly plane sides but have well rounded corners and edges	
Rounded	Particles have smoothly curved sides and no edges	

Soil Moisture		WSDOT GDM 4.2.7
Dry	Absence of moisture, dusty, dry to touch	
Moist	Damp but no visible water	
Wet	Visible Free Water	

Soil Structure		WSDOT GDM 4.2.8
Stratified	Alternating layers of varying material or color with layers at least 0.25 inch thick	
Laminated	Alternating layers of varying material or color with layers less than 0.25 inch thick	
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 resists further breakdown	
Disrupted	Soil structure is broken and mixed. Infers that material has moved substantially - landslide debris	
Homogeneous	Same color and appearance throughout	
Cemented	Particles are held together by a binding agent	

Project: SR534/Unnamed Tributary to Carpenter Creek - Fish Passage

Job Number: XL6097 Route & MP Range: SR 534 MP 0.49 - 0.69

Northing: 492,679.6 feet Latitude: 48.341026 deg.

Driller/Inspector: Cahill, Kenneth (#3323T) / Cooper, Rich #2964

Easting: 1,278,050.4 feet Longitude: -122.323402 deg.

Start Card: RE-19062 Well Tag: BBC-532 Instrument: VWP

Elevation: 26.5 feet Collector: Region Survey

Drilling Method: Casing Advancer Hole Diam.: 6 in

Horizontal/Vertical Datum: NAD 83/91 HARN, SPN / NAVD88

Equipment: CME 45C (ID:9A4-7) Rod Type: AWJ

Started: March 17, 2020 Completed: March 20, 2020

Hammer Type: AutoHammer Historic Efficiency: 91.7%

Depth (feet)	Elevation (feet)	Profile	Moisture Content (%) Fines Content (%) Penetration Resistance (blows/ft) Field N	Blows/6" (N bpf) and other Field Data	Sample Type	Sample Number	Lab Tests	Material Description	Groundwater Data	As-Built
			0 20 40 60 80 100						See Note 4	
	25			11 19 10 7 (29) Rec=1.8'	D-1			-Asphalt (0.8 ft)		
				3 6 7 10 (13) Rec=1.8'	D-2		GS, AL	WELL-GRADED GRAVEL WITH SAND, sub-rounded, dense, dark gray, moist, stratified. -NOTE: For sample D-1, observe petroleum odor.		
5	20			3 6 6 7 (12) Rec=2.0'	D-3		GS, AL	LEAN CLAY WITH SAND, stiff, olive, moist, homogeneous.		
				2 3 4 5 (7) Rec=2.0'	D-4		GS, AL, HT, SG	ELASTIC SILT, stiff, gray, moist, homogeneous.		
10	15			Rec=1.8'	S-5		GS, AL, HT, SG, DN	FAT CLAY, medium stiff, gray, moist, homogeneous.		
				0 1 1 1 (2) Rec=2.0'	D-6		GS, AL, HT, SG	FAT CLAY, gray, wet.		
15	10			Rec=1.4'	S-7		GS, AL	LEAN CLAY, soft, gray, wet, homogeneous.		
				0 0 0 0 (0) Rec=2.0'	D-8		GS, AL	FAT CLAY, gray, wet.		
20	5			Rec=2.0'	S-9		GS, AL, HT, SG, DN, AL	LEAN CLAY, very soft, gray, wet, homogeneous.		
				0 2 2 3 (4) Rec=2.0'	D-10			LEAN CLAY, gray, wet.		
25	0							LEAN CLAY, soft, gray, wet, homogeneous.		

CONTINUED NEXT PAGE (see last page for notes)

 VERSION 1
FINAL

Project: SR534/Unnamed Tributary to Carpenter Creek - Fish Passage

Job Number: XL6097

Route & MP Range: SR 534 MP 0.49 - 0.69






Depth (feet)	Elevation (feet)	Profile	Moisture Content (%) Fines Content (%) Penetration Resistance (blows/ft) Field N	Blows/6" (N bpf) and other Field Data	Sample Type	Sample Number	Lab Tests	Material Description	Groundwater Data	As-Built
			(6) SPT N ₆₀ 0 20 40 60 80 100						See Note 4	
30	-5		◆	0 2 4 9 (6) Rec=2.0'	D-11			LEAN CLAY, medium stiff, gray, wet, homogeneous. -NOTE: At 29.0 ft, observe artesian pressure.		
35	-10		◆ ○	6 10 11 15 (21) Rec=1.6'	D-12		GS, AL	SILTY SAND, medium dense, gray, wet, homogeneous.		
40	-15		◆ ○	7 9 29 41 (38) Rec=2.0'	D-13		GS, AL, HT, SG	SANDY SILT, dense, gray, wet, homogeneous.		
45	-20		◆ >>◆	18 30 46 50 (76) Rec=1.6'	D-14		GS, AL	SILTY SAND WITH GRAVEL, sub-rounded, very dense, dark gray, wet, homogeneous.		
50	-25		◆	14 21 23 25 (44) Rec=2.0'	D-15		GS, AL	POORLY GRADED SAND, dense, gray, wet, homogeneous.		
55	-30		◆	12 21 31 33 (52) Rec=1.7'	D-16			POORLY GRADED SAND, subangular, very dense, gray, wet, homogeneous. -NOTE: At 54.0 ft, observe sand heave.		
60	-35		◆	5 13 18 23 (31) Rec=2.0'	D-17			POORLY GRADED SAND, subrounded, dense, gray, wet, homogeneous. -NOTE: At 59.0 ft, observe sand heave.		

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 VERSION 1
FINAL

Project: SR534/Unnamed Tributary to Carpenter Creek - Fish Passage

Job Number: XL6097 Route & MP Range: SR 534 MP 0.49 - 0.69

Depth (feet)	Elevation (feet)	Profile	Moisture Content (%) ✕ Fines Content (%) ○ Penetration Resistance (blows/ft) Field N SPT N ₆₀	Blows/6" (N bpf) and other Field Data	Sample Type	Sample Number	Lab Tests	Material Description	Groundwater Data <small>See Note 4</small>	As-Built
65			 	7 17 26 38 (43) Rec=2.0'		D-18		POORLY GRADED SAND, subangular, dense, gray, wet, homogeneous.		

HOLE ENDED AT 66.0 FEET ON 3-20-2020

NOTES:

1. This is a summary log of the boring. Soil/rock descriptions are derived from visual field identifications and laboratory test data (where tested). See exploration log legend for explanation of graphics and abbreviations.
2. The implied accuracy of the location information displayed on this log is typically sub-meter(X,Y) when collected using GPS methods by the Geotechnical Office and sub-centimeter (X,Y,Z) when collected by the Region survey crew.
3. Where oversized samplers were used, a correction was made to the N-value per the AASHTO Manual on Subsurface Investigations, 1988. Blow counts per 6-inch increment have not been corrected.
4. The groundwater level range shown on this log represents data collected between 5/7/2020 and 7/18/2022. The blue line extends between the minimum and maximum readings collected during the monitoring period. Artesian groundwater measurements were noted. See piezometer report for values.
5. Bail test not conducted due to artesian pressure.
6. Vibrating wire piezometers installed at 18.0 feet (SN: 1904890) and 33.0 feet (SN: 1904904).

Project: SR534/Unnamed Tributary to Carpenter Creek - Fish Passage

Job Number: XL6097 Route & MP Range: SR 534 MP 0.49 - 0.69

Northing: 492,659.9 feet Latitude: 48.340974 deg.

Driller/Inspector: Harrell, Nick (#3322T) / Cooper, Rich #2964

Easting: 1,278,088.2 feet Longitude: -122.323245 deg.

Start Card: RE-19099 Well Tag: BBC-702 Instrument: VWP

Elevation: 27.4 feet Collector: Region Survey

Drilling Method: Casing Advancer Hole Diam.: 6 in

Horizontal/Vertical Datum: NAD 83/91 HARN, SPN / NAVD88

Equipment: CME 45C (ID:9A4-7) Rod Type: AWJ

Started: March 9, 2020 Completed: March 11, 2020

Hammer Type: AutoHammer Historic Efficiency: 91.7%

Depth (feet)	Elevation (feet)	Profile	Moisture Content (%) Fines Content (%) Penetration Resistance (blows/ft) Field N	Blows/6" (N bpf) and other Field Data	Sample Type	Sample Number	Lab Tests	Material Description	Groundwater Data	As-Built
			0 20 40 60 80 100						See Note 4	
								-Asphalt (0.8 ft)		
25				50 31 15 12 (46) Rec=0.9'	D-1			WELL-GRADED GRAVEL WITH SAND, sub-angular, dense, light brown, moist, homogeneous. -NOTE: For sample D-1, observe petroleum odor.		
5				5 5 6 7 (11) Rec=1.5'	D-2		GS, AL	GRAVELLY LEAN CLAY WITH SAND, sub-angular, stiff, gray, moist, homogeneous.		
20				2 2 3 3 (5) Rec=2.0'	D-3		GS, AL, HT, SG	LEAN CLAY, medium stiff, gray, moist, homogeneous.		
10					S-4		GS, AL, HT, SG, DN	FAT CLAY, gray, moist.		
15				0 1 1 1 (2) Rec=1.8'	D-5		GS, AL, HT, SG	FAT CLAY, soft, gray, moist, homogeneous.		
15					S-6		GS, AL, HT, SG, DN AL GS, AL, HT, SG	FAT CLAY, gray, wet.		
10				0 2 1 1 (3) Rec=2.0'	D-7			FAT CLAY, soft, gray, wet, homogeneous.		
20				0 0 1 1 (1) Rec=2.0'	D-8			FAT CLAY, very soft, gray, wet, homogeneous.		
5					S-9		GS, AL, HT, SG, DN AL	SILT, gray, wet.		
25				0 1 1 1 (2) Rec=2.0'	D-10			FAT CLAY, soft, gray, wet, homogeneous.		

CONTINUED NEXT PAGE (see last page for notes)

 VERSION 1
FINAL

Project: SR534/Unnamed Tributary to Carpenter Creek - Fish Passage

Job Number: XL6097 Route & MP Range: SR 534 MP 0.49 - 0.69

Depth (feet)	Elevation (feet)	Profile	Moisture Content (%) Fines Content (%) Penetration Resistance (blows/ft) Field N	Blows/6" (N bpf) and other Field Data	Sample Type Sample Number	Lab Tests	Material Description	Groundwater Data	As-Built
			0 20 40 60 80 100					See Note 4	
30			◆ × ○	5 7 8 14 (15) Rec=2.0'	D-11	GS, AL	SANDY SILT, medium dense, gray, wet, homogeneous. -NOTE: At 29.0 ft, observe artesian pressure.		
35			◆ × ○	4 3 14 27 (17) Rec=1.8'	D-12	GS, AL	SILTY SAND, sub-rounded, medium dense, gray, moist, stratified.		
40			◆ >> ◇	17 43 43 26 (86) Rec=0.8'	D-13		WELL-GRADED GRAVEL, sub-rounded, very dense, gray, wet, homogeneous.		
45			× ◆ ◇	8 13 8 10 (21) Rec=0.9'	D-14	GS, AL	SILTY SAND WITH GRAVEL, sub-rounded, medium dense, gray, wet, stratified.		
50			× ○ ◆ ◇	16 36 28 32 (64) Rec=1.9'	D-15	GS, AL	SILTY SAND, very dense, gray, wet, homogeneous.		
55			× ◆ ◇	7 14 30 38 (44) Rec=1.8'	D-16	GS, AL, HT, SG	SILTY SAND, dense, dark gray, wet, homogeneous.		
60			◆ ◇	5 16 26 34 (42) Rec=1.9'	D-17		SILTY SAND, subangular, dense, dark gray, wet, homogeneous.		

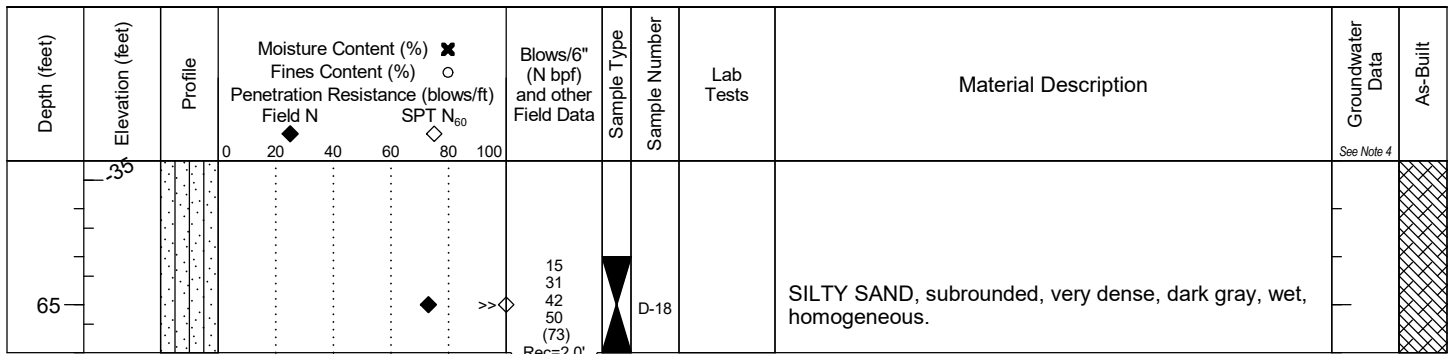
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VERSION 1
FINAL

Project: SR534/Unnamed Tributary to Carpenter Creek - Fish Passage

Job Number: XL6097

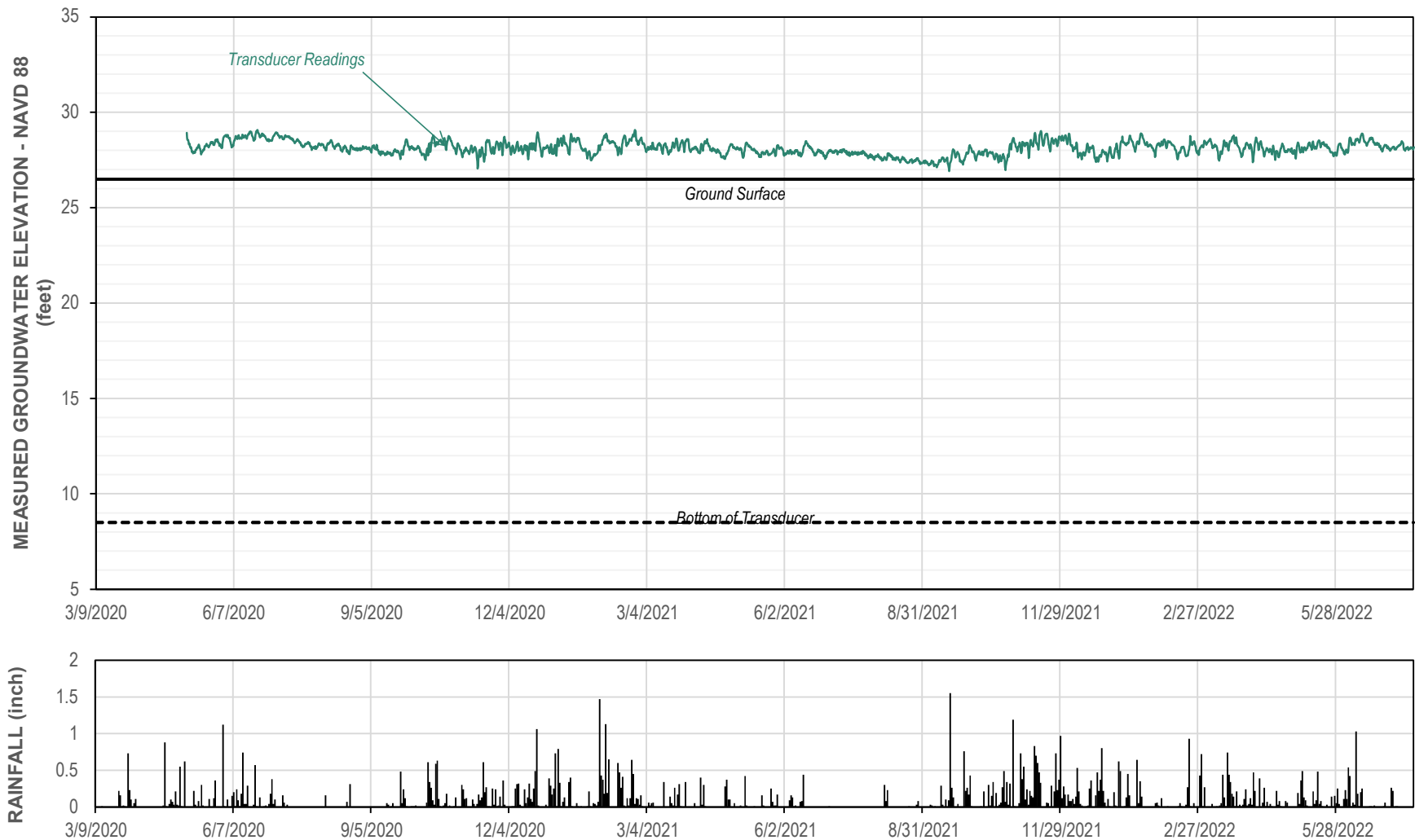
Route & MP Range: SR 534 MP 0.49 - 0.69



HOLE ENDED AT 66.0 FEET ON 3-11-2020

NOTES:


1. This is a summary log of the boring. Soil/rock descriptions are derived from visual field identifications and laboratory test data (where tested). See exploration log legend for explanation of graphics and abbreviations.
2. The implied accuracy of the location information displayed on this log is typically sub-meter(X,Y) when collected using GPS methods by the Geotechnical Office and sub-centimeter (X,Y,Z) when collected by the Region survey crew.
3. Where oversized samplers were used, a correction was made to the N-value per the AASHTO Manual on Subsurface Investigations, 1988. Blow counts per 6-inch increment have not been corrected.
4. The groundwater level range shown on this log represents data collected between 3/12/2020 and 7/18/2022. The blue line extends between the minimum and maximum readings collected during the monitoring period. Artesian groundwater measurements were noted. See piezometer report for values.
5. Bail test not conducted due to artesian pressure.
6. Vibrating wire piezometers installed at 15.5 feet (SN: 1904882) and 35.5 feet (SN: 1904891).



Exploration Information	
Northing (feet)	492,679.6
Easting (feet)	1,278,050.4
Ground Elevation (feet)	26.5
Total Boring Depth (feet)	66.0
Date Completed	3/20/2020

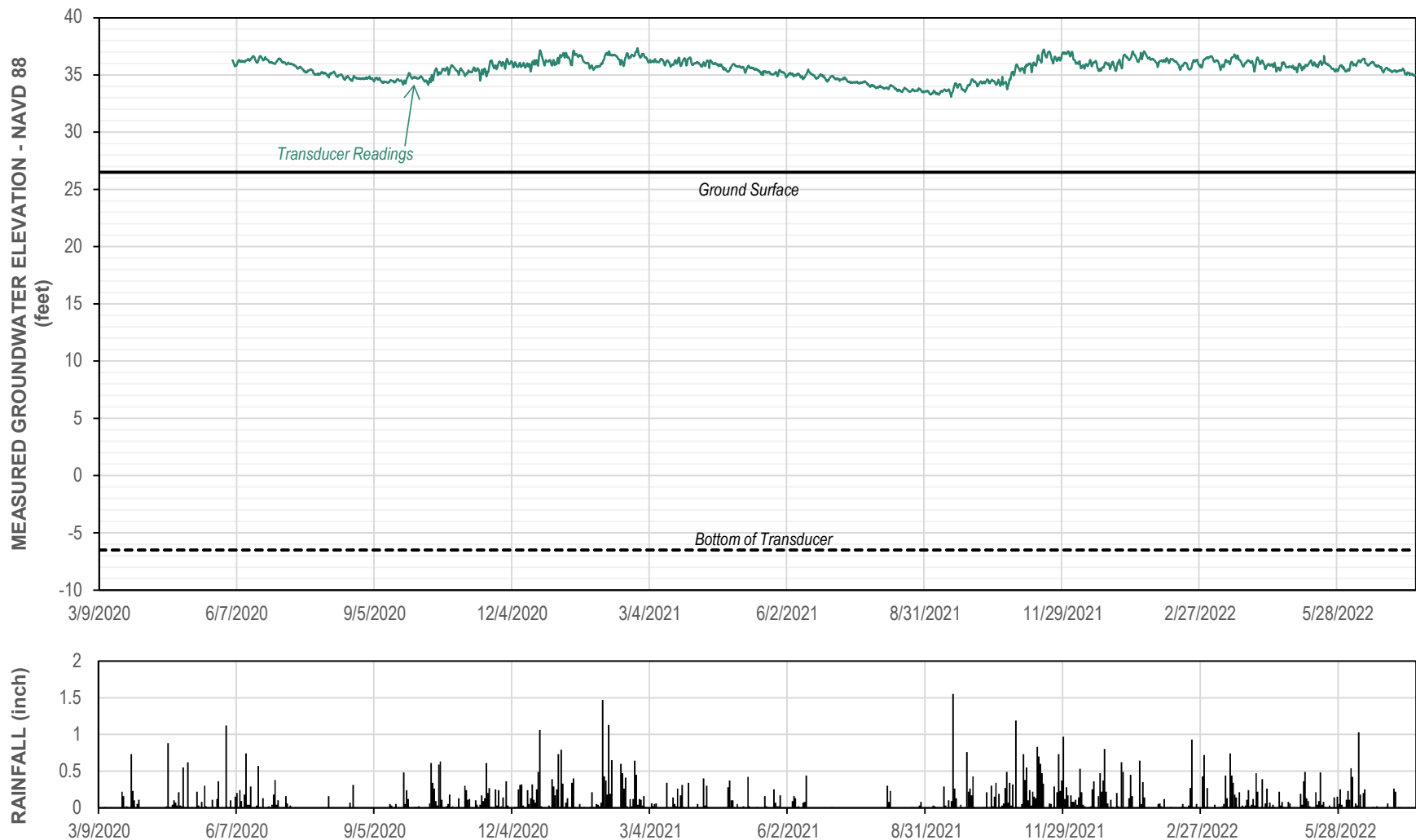
Piezo Information	Depth*	Elevation*
Vibrating Wire Piezometer (VWP) - SN: 1904890		
Bottom of VWP	18.0	8.5
In-Situ Soil/Rock	See boring log	
Highest Reading	-2.6	29.1
Average Reading	-1.6	28.1
Lowest Reading	-0.4	26.9

* all units in feet

JOB# XL6097	STATE ROUTE 534	MILEPOST(S) 0.49 - 0.69
GROUNDWATER MEASUREMENT PLOT BORING H-1VWP-20 (18.0 FT BGS) SR534/UNNAMED TRIBUTARY TO CARPENTER CREEK - FISH PASSAGE		
 GEOTECHNICAL OFFICE		
PREPARED BY D. Anderson		DATE Mar 2022

NOTE:

Rainfall data was downloaded from <https://www.ncdc.noaa.gov> for the Mount Vernon 0.8 SW, WA US station (ID GHCND:US1WASG0024), located about 4 miles north of the project site (Lat: 48.41298°, Lon: -122.324868°).




Exploration Information	
Northing (feet)	492,679.6
Easting (feet)	1,278,050.4
Ground Elevation (feet)	26.5
Total Boring Depth (feet)	66.0
Date Completed	3/20/2020

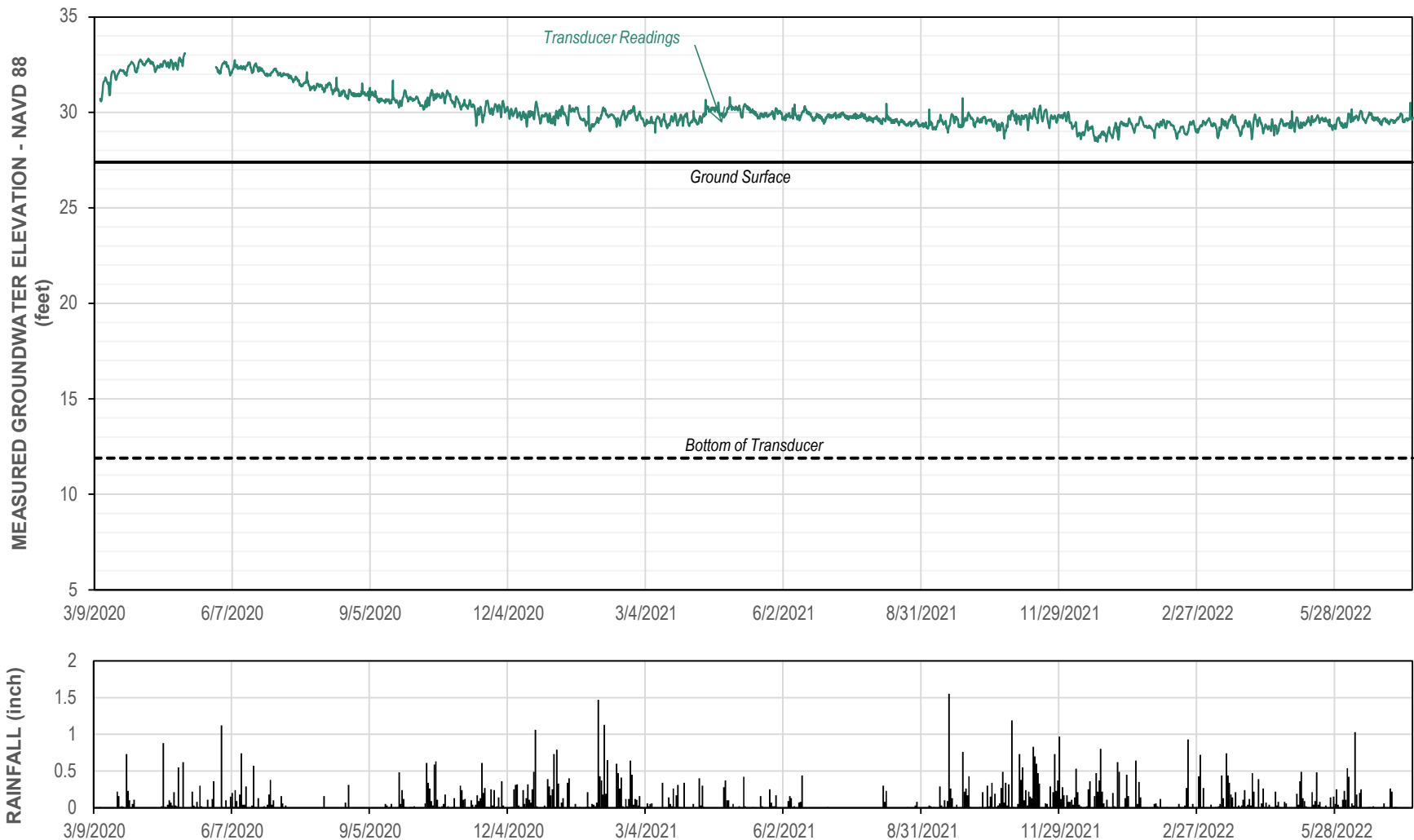
Piezo Information	Depth*	Elevation*
Vibrating Wire Piezometer (VWP) - SN: 1904904		
Bottom of VWP	33.0	-6.5
In-Situ Soil/Rock	See boring log	
Highest Reading	-10.8	37.3
Average Reading	-9.0	35.5
Lowest Reading	-6.6	33.1

* all units in feet

NOTE:

Rainfall data was downloaded from <https://www.ncdc.noaa.gov> for the Mount Vernon 0.8 SW, WA US station (ID GHCND:US1WASG0024), located about 4 miles north of the project site (Lat: 48.41298°, Lon: -122.324868°).

JOB# XL6097	STATE ROUTE 534	MILEPOST(S) 0.49 - 0.69
GROUNDWATER MEASUREMENT PLOT BORING H-1VWP-20 (33.0 FT BGS) SR534/UNNAMED TRIBUTARY TO CARPENTER CREEK - FISH PASSAGE		
 GEOTECHNICAL OFFICE		
PREPARED BY D. Anderson		DATE Mar 2022




Exploration Information	
Northing (feet)	492,659.9
Easting (feet)	1,278,088.2
Ground Elevation (feet)	27.4
Total Boring Depth (feet)	66.0
Date Completed	3/11/2020

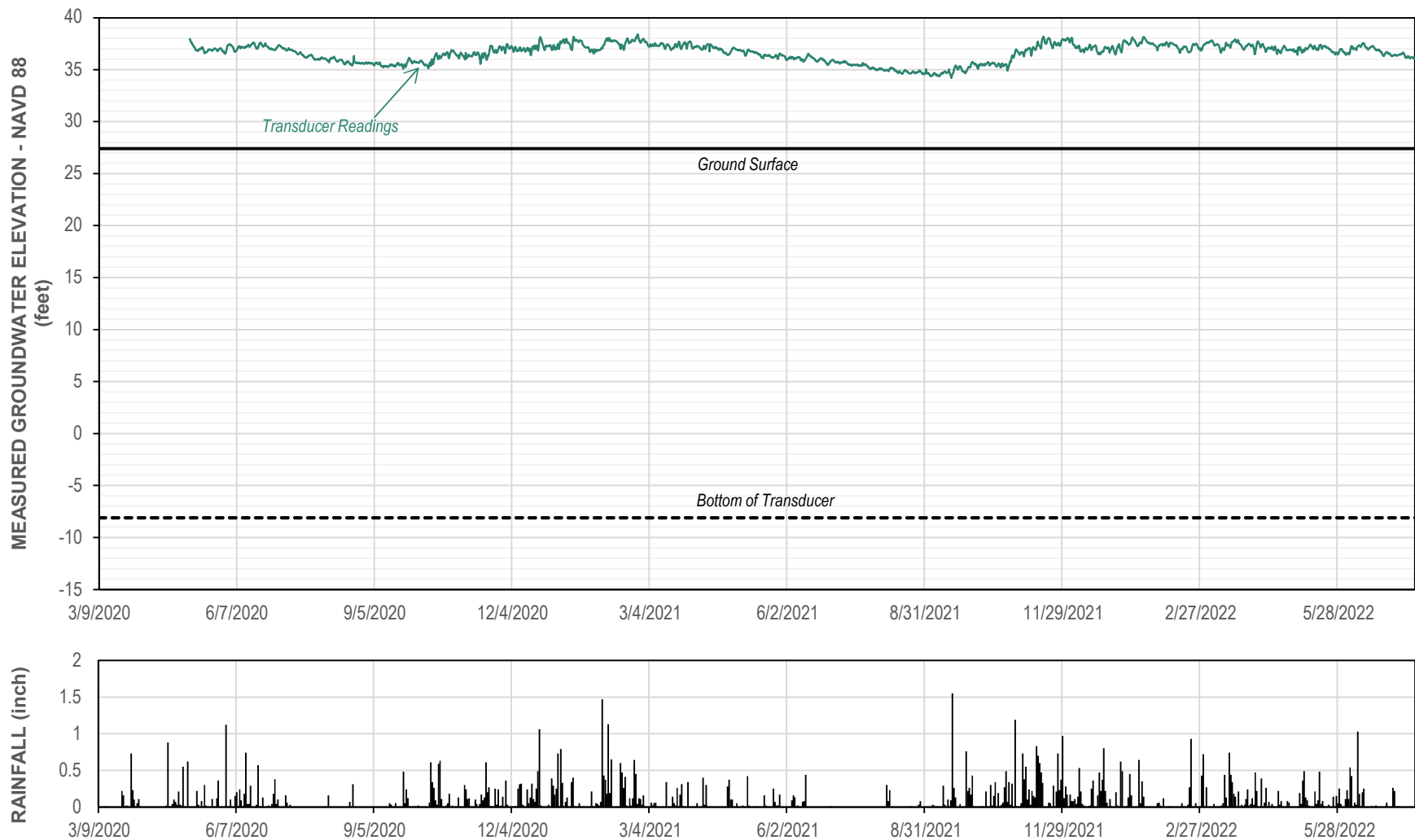
Piezo Information	Depth*	Elevation*
Vibrating Wire Piezometer (VWP) - SN: 1904882		
Bottom of VWP	15.5	11.9
In-Situ Soil/Rock	See boring log	
Highest Reading	-5.7	33.1
Average Reading	-2.7	30.1
Lowest Reading	-1.1	28.5

* all units in feet

NOTE:

Rainfall data was downloaded from <https://www.ncdc.noaa.gov> for the Mount Vernon 0.8 SW, WA US station (ID GHCND:US1WASG0024), located about 4 miles north of the project site (Lat: 48.41298°, Lon: -122.324868°).

JOB# XL6097	STATE ROUTE 534	MILEPOST(S) 0.49 - 0.69
GROUNDWATER MEASUREMENT PLOT BORING H-2VWP-20 (15.5 FT BGS) SR534/UNNAMED TRIBUTARY TO CARPENTER CREEK - FISH PASSAGE		
 GEOTECHNICAL OFFICE		
PREPARED BY D. Anderson		DATE Mar 2022




Exploration Information	
Northing (feet)	492,659.9
Easting (feet)	1,278,088.2
Ground Elevation (feet)	27.4
Total Boring Depth (feet)	66.0
Date Completed	3/11/2020

Piezo Information	Depth*	Elevation*
Vibrating Wire Piezometer (VWP) - SN: 1904891		
Bottom of VWP	35.5	-8.1
In-Situ Soil/Rock	See boring log	
Highest Reading	-11.0	38.4
Average Reading	-9.2	36.6
Lowest Reading	-6.8	34.2

* all units in feet

NOTE:

Rainfall data was downloaded from <https://www.ncdc.noaa.gov> for the Mount Vernon 0.8 SW, WA US station (ID GHCND:US1WASG0024), located about 4 miles north of the project site (Lat: 48.41298°, Lon: -122.324868°).

JOB# XL6097	STATE ROUTE 534	MILEPOST(S) 0.49 - 0.69
GROUNDWATER MEASUREMENT PLOT BORING H-2VWP-20 (35.5 FT BGS) SR534/UNNAMED TRIBUTARY TO CARPENTER CREEK - FISH PASSAGE		
 GEOTECHNICAL OFFICE		
PREPARED BY D. Anderson		DATE Mar 2022