Kiewit Infrastructure West Co. Klamath River Renewal Project Geotechnical Data Report

## **APPENDIX I1**

# Copco Road Geotechnical Survey Technical Memorandum (by GeoServ, Inc.)

(Pages I1-1 to I1-55)

April 6, 2020



GSI Project #: 190725

Knight Piésold Ltd. (KP)

Subject: KRRP Copco Road Surface and Subsurface Geotechnical Survey Technical Memorandum

Dear Knight Piésold:

In accordance with your request and authorization of GeoServ, Inc. (GSI) has prepared the enclosed Geotechnical Survey based on the requirements and proposed project specifics identified during our review. Specifically, this technical memorandum (memo) provides a summary of the methods used to survey Copco Road from the Klamathon Bride to the Copco Dam Road intersection. The memo also includes Appendix A that shows and lists relevant data and diagrams to include:

- Survey Field Road Core Test Results
- Road Core Logs
- Survey Diagrams
- Summary Photographs

Data and results presented in this technical memorandum are preliminary and subject to change. Additional analyses and interpretations need to be made from the survey data. Design recommendations are not included at this time pending input from KP and laboratory test results. If you have any questions regarding the data and results, please do not hesitate to contact this office. The opportunity to be of service is appreciated.

Respectfully submitted,

James Fitzgerald, Senior Geologist GeoServ, Inc. 624 South Mount Shasta Blvd. Mount Shasta, CA 96067 (530) 227-8963 jf@geoscienceserv.com



# KRRP Copco Road Surface and Subsurface Geotechnical Survey Technical Memorandum

Prepared for: Knight Piésold Ltd. (KP)

Prepared by: GeoServ, Inc. (GSI)

Initial Report Date: April 6, 2020





### Summary

GSI completed a surface and subsurface road survey of 17.5 miles of Copco/Iron Gate Lake Road (Copco Road). The survey included drilling 18 road cores and surveying both traffic lanes with ground penetrating radar (GPR) survey equipment. These data were used to characterize surface/subsurface road conditions. This report includes a summary of the methods used for data collection and analysis, data results, preliminary conclusions, and limitation and assumptions (see Appendix A for survey data). Copco Road is a rural Siskiyou County Road with an asphalt and gravel surface that accesses both the Iron Gate and Copco dams, as well as recreational areas and private properties. This survey focused on Copco Road starting at the Klamathon Bridge on the west end and Copco Dam on the east end (Appendix A: Figure C1).

Assessment of the Copco Road surface and shallow subsurface was accomplished through advancement of 18 road cores spread evenly along the road survey segment (Appendix A: Figure C1). The road cores were used to help determine asphalt, aggregate base, and native fill thickness, depth to bedrock, fill conditions, groundwater conditions, and road bearing capacity. To provide indirect data on the shallow subsurface and to allow for interpolation and extrapolation between drill sites, a GPR survey was completed along each lane of the surveyed road segments. The direct and indirect data were compiled and analyzed to give an estimate of average asphalt thickness and condition, aggregate base conditions, and cut and fill conditions.

Asphalt: Most of the Copco Road surface is paved with asphalt that is in fair to poor condition based on the direct and indirect measurements taken as part of this survey. There are short sections of gravel surface road. The average measured asphalt thickness is 2" and is in fair to poor condition.

Asphalt Subgrade: Directly under the pavement there is either aggregate base rock with moderate to high density or native fill material with moderate to high density.

Road Subgrade: The road prism is a combination of cut and fill with most of the prism having both cut and fill. Overall, most of the fill is native material locally sourced from the cut areas. The native fill tends to be firm to very stiff cohesive gravelly clay with moderate to high plasticity.

### Methods

Direct Measurements: Road core sampling was completed at 18 locations along Copco Road, and the core locations were spread out with about 1 core per mile of road surveyed (Appendix A: Figure C1 and Table 1). The asphalt was cored using a 6" diamond core bit. The road subgrade was sampled using a 6" hollow stem auger and a Standard Penetration Test (SPT) sampler. The road cores were located along the outside lane and were generally within the outside primary vehicle wheel tread.

Indirect Measurements: GPR survey was completed on 17.5 miles of Copco Road from the Klamathon Bridge crossing the Klamath River to the Copco Dam Access Road. The survey was completed to help evaluate existing asphalt thickness and condition and to estimate road subgrade soil/rock types and condition. Two GPR survey passes were made along the road, one in each lane, for a total of 35 miles of survey. Each traffic lane was scanned by one pass that corresponded with the primary vehicle wheel tread. Heading east, the survey line was on the outside lane within the outer tire tread. Heading west, the survey line was on the inside lane within the inner tire tread.

Within areas of obvious asphalt and/or subgrade failure, additional GPR passes were completed to better define the horizontal and vertical extents of the failures.

### Results

In general, drilling of the road surface and prism was accomplished with minimal drilling effort. Total road core depth to auger refusal ranged from 0.8' to 7.8' below ground surface (bgs) (Appendix A: Figures C2-C13 and Road Core Logs). Even with the presence of clay rich soils, the road core and GPR data correlate relatively well, and general conclusions of road condition can be estimated with relatively good certainty. A summary of the measured and estimated asphalt, aggregate base, road subgrade conditions is shown in Appendix A: Figures C2-C13 and Table 1.

The survey data indicate that in areas where an asphalt surface is present asphalt thickness is typically 1.5"-2". In road segments where repairs have taken place, the asphalt thickness generally increases, with the thickest measured asphalt at 6.25" in a repaired segment. Asphalt was typically dry with partial cracking visible on the road surface, areas of apparent subgrade failure show larger arcuate shaped cracking along the perimeter of the failing area as well as alligator cracking along some sections. It appears that repairs on the roadway typically consist of additional layer(s) of asphalt being placed on top of a failing section of road to make grade/alignment adjustment to bring the roadway surface back up to grade. Road segments with newer asphalt have a higher asphalt density, less cracking, and higher oil content.

Inferred from the road core and GPR data correlation, it appears that most of the surveyed road segment is underlain by between 4" to 6" of aggregate base rock. Recently repaired areas have up to 1' of base. The directly observed aggregate base rock is typically a cohesionless medium dense to dense <sup>3</sup>/<sub>4</sub>" minus gravel. The average measured in-place bearing capacity is 17,500 pounds per square foot (psf) (Appendix A: Table 1).

The measured native fill thickness along the surveyed road ranges from 0' to 7.5' with the thickest areas being associated with placement of culverts and fill across drainages and swales. The native fill thickness also varies from lane to lane as most of the roadway required the use of cut and fill construction methods in order to provide a level road surface and proper road alignment for vehicle traffic. Fill material most commonly consists of locally or adjacently sourced native soil and rock placed during original road building efforts. Fill material typically consists of cohesive sandy/gravelly/cobble clay with firm to very stiff consistency with an average measured undrained shear strength (N60) 7,500 psf (Appendix A: Table 1). For the directly observed native fill, the sand is very fine to coarse, the clay has medium to high plasticity, gravels are less than 1" in diameter, and cobbles are about 2.5" in diameter.

For fill areas of the road prism, below the aggregate base rock or native fill material, there is in-place native soil and rock. Most of the in-place material is hard volcanic rock varying from fresh to very weathered into clay with gravel and cobbles. The volcanic rock has an average measured bearing capacity of 37,500 psf (Appendix A: Table 1).

No groundwater was observed within the road cores or GPR data (Appendix A: Road Core Logs). Groundwater levels can fluctuate from season to season and year to year. Given that this survey was

completed during a dry time of year, shallow groundwater may be present during wet times of the year.

### **Preliminary Conclusions**

Overall, the surveyed road segments with full bench cuts are founded on hard bedrock and are stable. Road segments constructed using native fill are relatively unstable. Segments that are founded on rock have an estimated average ultimate bearing capacity of 37,000 psf (Appendix A). Road segments constructed using native fill have an estimated ultimate bearing capacity of (N60) 7,500 psf. The segments that are full bench cuts have good to fair road surface and subgrade conditions whereas segments that are cut/fill or all fill have fair to poor surface and subsurface conditions.

Based on the data interpretations and visual road assessment, there are likely two main causes of poor road surface condition. First, road prisms that are founded on relatively uncompacted expansive clay fill, very little or no aggregate base under the asphalt, a relatively thin layer of asphalt, and the age of the asphalt. Road segments assessed to be in poor condition tend to have an irregular surface, less aggregate base rock, and old and dray asphalt (e.g., alligator cracking). Second, road segments with a combination of cut and fill (i.e., sliver fills) tend to have outboard edge failures with arcuate shaped drops in the road prism. These fill failures are likely result from a lack of keyways into in-place native rock and soil on the outboard edge of the road, poor compaction of expansive clay soils, and heavy live loads.

### Limitations and Assumptions

The analysis and conclusions presented in this report have been conducted according to current geologic and engineering practice and the standard of care exercised by reputable professional consultants performing similar tasks in this area. The conclusions made are preliminary and subject to change. This is a preliminary summary and interpretation of these data. No other warranty, expressed or implied, is made regarding the conclusions and opinions expressed in this report. Variations may exist and conditions not observed or described in this report may be encountered during future assessments. GSI's conclusions are based on an analysis of the observed conditions and data available at the time of this report.

Data for this survey is inherently limited given the density of direct measurements (i.e., one road core per mile of survey). The point data at road core locations have the most objective and greatest certainty in the accuracy of conclusions made from these data. GPR data have the most uncertainty given the indirect nature of non-visual testing. The GPR data do have the most coverage relative to the road core data. The correlation between road core data and GPR data is limited to extrapolation between road cores. The conclusions made herein assume that asphalt composition and thickness between known points is relatively constant and that the aggregate base material is from the same source with similar thickness, and that native fill material is the same from station to station. Also assumed is that the aggregate base differs greatly from native fill material in gradation, density, and plasticity. It follows that fill compaction and or composition varies from adjacent native fill and in place material(s) allowing for differentiation with the return signal detected by the GPR equipment. As of this report, the laboratory testing of soil and rock samples has not occurred and is forthcoming.

## APPENDIX A

SHEET	INDEX

DRAWING #	TITLE	REVISION DATE
C1	COPCO ROAD GPR PROJECT AREA	2/19/20
C2	COPCO ROAD STA 157+00.0-236+20.0	2/19/20
C3	COPCO ROAD STA 236+20.0-328+60.0	2/19/20
C4	COPCO ROAD STA 328+60.0-407+80.0	2/19/20
C5	COPCO ROAD STA 394+60.0-473+80.0	2/19/20
C6	COPCO ROAD STA 473+80.0-539+80.0	2/19/20
C7	COPCO ROAD STA 539+80.0-619+00.0	2/19/20
C8	COPCO ROAD STA 632+20.0-711+40.0	2/19/20
C9	COPCO ROAD STA 711+40.0-790+60.0	2/19/20
C10	COPCO ROAD STA 790+60.0-869+80.0	2/19/20
C11	COPCO ROAD STA 869+80.0-949+00.0	2/19/20
C12	COPCO ROAD STA 949+00.0-1028+20.0	2/19/20
C13	COPCO ROAD STA 2028+20.0-1092+00	2/19/20



PERIMETER OF EXISTING TOPOGRAPHY -10 METER ACCURACY

PRIVILEGED AND CONFIDENTIAL



GEOSERV, INC.

P.O. BOX 831 MOUNT SHASTA, CA 96067 PH: (530) 227–8963 FAX: (530) 926–8921



170+00 175+00 180+00 157+00 160+00 165+00 +2.0CL) AC: 0.17' AC: 0.08' +1 0.0 0 -1.0-2.0 B I0N -3.0  $-4.0^{2}$ ×× -5.0XX -6.0AB: 0.5' AB: 0.3'





© GEOSERV, INC. RESERVES ITS COMMON LAW COPYRIGHT AND OTHER PROPERTY RIGHTS IN THESE PLANS.



.0	AC: 0.15'	AC: 0.1	8'	AC: 0.21'         Image: Constraint of the second seco
.0' .0' .0' .0'				
.0' .0' .0' AB: 0.60'	AB: 0.50'	AB: 0.30'	AB: 0.25'	AB: 0.125'

- NOTES: 1. DIMENSIONS SHOWN ARE OF MATERIAL THICKNESS
- 2. AREAS OUTSIDE OF MAPPED FILL COULD HAVE A FILL DEPTH RANGING IN 0'-2'. 3. MAPPED FILL AREAS SHOWN AT A 3.0' THICKNESS COULD RANGE FROM 2'-4'. 4. MAPPED FILL AREAS SHOWN AT A 5.0' THICKNESS COULD RANGE FROM 4'-6'.



# EL<u>EVATI</u>ON HORZ. SCALE 1"= 350'



Station

		GEOSERV INC
+++++++++++++++++++++++++++++++++++++++	++++++++++++++++++++++++++++++++++++++	P.O. BOX 831 MOUNT SHASTA, CA 96067
	2260	PH: (530) 227-8963 FAX: (530) 926-8921
- BH-RC CR 004	2240	
STA: 315+66.0	2230	
	2210	
	2190	
	2180	
	2160	
315+00 320+00	2150 325+00 328+60	
	]	
AC: 0 125'		
		ROAD CONDITION SURVEY,
		COPCO ROAD, HORNBROOK, SISKIYOU COUNTY
	LEGEND	
	EXISTING ASPHALT	
	EXISTING AGGREGATE BASE Rx	
		SHEET NAME:
	EXISTING FILL	COPCO ROAD STA
	I I COPCO GPR MAPPING TICKS-25'	PLAN SECTION &
34 Martin State		
		PROJECT NO:
		190725
		issue date: 2/19/20
		SCALE: AS NOTED
		DRAWN BY:
		CHECKED: JF
		SHEET:
		<b>C3</b>









	Y.

GEOSERV, INC.

P.O. BOX 831 MOUNT SHASTA, CA 96067 PH: (530) 227–8963 FAX: (530) 926–8921

ROAD CONDITION SURVEY, COPCO ROAD, HORNBROOK, SISKIYOU COUNTY

SHEET NAME:

COPCO ROAD STA 328+60-407+80 PLAN SECTION & PROFILE

190725

2/19/20

AS NOTED

KF

JF

**C4** 

**REVISIONS:** 

PROJECT NO:

ISSUE DATE:

DRAWN BY:

SCALE:

ENGINEERED:

CHECKED:

SHEET:

<u>LEGEND</u>

<u>+</u>2230

+2220

<u>+</u>2210

-2200

2190

++++ 2160

405+00 407+80

400+00

2250.0

-2180 2170

L /	<u> </u>	

	EXISTING ASPHALT
- - - -	EXISTING AGGREGATE BASE Rx
<	EXISTING FILL
	COPCO GPR MAPPING TICKS-25

FOR GROUND PENETRATION LOGS SEE APPENDIX **#** FOOTAGE LOGS: (5340, 550) EASTBOUND LANE; (4730, 5875) WEST BOUND LANE.

2480 1 + + + + + + + + + + + + + + + + + +			+++++++++++++++++++++++++++++++++++++++
2470			
2460			
2450			
2440			
2430			
2420			
2410			
2400			
2390			
2380			
2370			
2360			
2350			
2340			
2330			
2320			
2310			
2300			
2290			
2280			
2270			
2260			
2250			
2240			
2230			
2220			
2210			
2200			
2190			
2180			
2170	405+00 410-	+00 415	++++++++++++++++++++++++++++++++++++++



# <u>LEGEND</u>

EXISTING ASPHALT
EXISTING AGGREGATE BASE Rx
EXISTING FILL
COPCO GPR MAPPING TICKS-25'







# ELEVATION 1"= 350' 1 H = 10 V

		·  _		AC- 0.15	5	_		AC: 0.12
		~~~~~						****
	,0,							
<u> </u>	L K		*****		<u> </u>			
		-		AB: 0.4'			-	AB: 0.33
		1						

© GEOSERV, INC. RESERVES ITS COMMON LAW COPYRIGHT AND OTHER PROPERTY RIGHTS IN THESE PLANS.

	480	
	470 460	
	450	and the second of the second se
	440 430	GEOSERV, INC.
	420	
	410 400	P.O. BOX 831
	390	PH: (530) 227–8963 FAX: (530) 926–8921
	380 370	
H-RC CR 007 = 2	360	
	350 340	
2	330	
	320	
2	300	
2	290	
2	280 e 270 ti	
2	260	
2	250 240	
	230	
2	220 210	
2	200	
2	190 180	
++++++++++++++++++++++++++++++++++++++	170	
		ROAD CONDITION SURVEY,
		SISKIYOU COUNTY
D.125'		
стория и страниции и с		
0.33'		
		SHEET NAME:
IOWN ARE OF MATERIAL THICKNESS		394+60-473+80
E OF MAPPED FILL COULD HAVE A FILL DEPT AREAS SHOWN AT A 3.0' THICKNESS COULD	TH RANGING IN $0'-2'$ . RANGE FROM $2'-4'$ .	PLAN SECTION & PROFILE
REAS SHOWN AT A 5.0" THICKNESS COULD	RANGE FROM $4^{\circ}-6^{\circ}$ .	REVISIONS:
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,		
λ <sup>25</sup> <b>RC CR 007</b> ∧ 470+ <b>Ω</b> 0		
2400		
× 247		
2		PROJECT NO:
		190725
		ISSUE DATE: 2/19/20
		SCALE:
		ENGINEERED:
		CHECKED:
		JF
NOTE:		SHEET:
FUR GRUUND PENETRATION LOG FOOTAGE LOGS: (5546, 5520) E (5550, 5521) WEST DOLIND LAN	S SEE APPENDIX # EASTBOUND LANE; NF	<b>C5</b>





NOTES:

1. DIMENSIONS SHOWN ARE OF MATERIAL THICKNESS 2. AREAS OUTSIDE OF MAPPED FILL COULD HAVE A FILL DEPTH RANGING IN 0'-2'. 3. MAPPED FILL AREAS SHOWN AT A 3.0' THICKNESS COULD RANGE FROM 2'-4'. 4. MAPPED FILL AREAS SHOWN AT A 5.0' THICKNESS COULD RANGE FROM 4'-6'.

CL) Q

0



NOTE: FOR GROUND PENETRATION LOGS SEE APPENDIX # FOOTAGE LOGS: (5384, 4632, 5546) EASTBOUND LANE; (5420, 900, 4430, 5550) WEST BOUND LANE. ELEVATION HORZ. SCALE 1"= 350'

© GEOSERV, INC. RESERVES ITS COMMON LAW COPYRIGHT AND OTHER PROPERTY RIGHTS IN THESE PLANS.

V

GEOSERV, INC.

P.O. BOX 831 MOUNT SHASTA, CA 96067 PH: (530) 227-8963 FAX: (530) 926-8921

# ROAD CONDITION SURVEY, COPCO ROAD, HORNBROOK, SISKIYOU COUNTY

SHEET NAME:

COPCO ROAD STA 473+80-539+80 PLAN SECTION & PROFILE

**REVISIONS:** 

PROJECT NO: 190725
issue date: 2/19/20
SCALE: AS NOTED
DRAWN BY:
ENGINEERED:

CHECKED: JF

SHEET:

**C6** 

# <u>LEGEND</u>

EXISTING ASPHALT
EXISTING AGGREGATE BASE Rx
EXISTING FILL
COPCO GPR MAPPING TICKS-25









# Copco-Centerline PROFILE

SCALE: 1" = 350'

			Y
		 CHI DEPRIN	New Stall

GEOSERV, INC.

P.O. BOX 831 MOUNT SHASTA, CA 96067 PH: (530) 227-8963 FAX: (530) 926-8921

ROAD CONDITION SURVEY, COPCO ROAD, HORNBROOK, SISKIYOU COUNTY

COPCO ROAD STA

539+80-619+00 PLAN SECTION & PROFILE

190725

2/19/20

AS NOTED

KF

JF

**C7** 

SHEET NAME:

**REVISIONS:** 

PROJECT NO:

ISSUE DATE:

DRAWN BY:

CHECKED:

SHEET:

SCALE:

ENGINEERED:

# 2360 2350 -2340 +2330 619+00

EXISTING ASPHALT
EXISTING AGGREGATE BASE Rx
EXISTING FILL
COPCO GPR MAPPING TICKS-25'

AC:





NOTES:

1. DIMENSIONS SHOWN ARE OF MATERIAL THICKNESS

2. AREAS OUTSIDE OF MAPPED FILL COULD HAVE A FILL DEPTH RANGING IN 0'-2'. 3. MAPPED FILL AREAS SHOWN AT A 3.0' THICKNESS COULD RANGE FROM 2'-4'. 4. MAPPED FILL AREAS SHOWN AT A 5.0' THICKNESS COULD RANGE FROM 4'-6'.



25'		AC:	NO AC'	AC: 0.25'		AC:
	AB: 0.50'			AB: 0.62	5'	AB

# ELEVATION HORZ. SCALE 1"= 350'





NOTE: FOR GROUND PENETRATION LOGS SEE APPENDIX # FOOTAGE LOGS: (5360, 5310, 5395) EASTBOUND LANE; (5370, 5340) WEST BOUND LANE.

1 1













NOTE:

FOR GROUND PENETRATION LOGS SEE APPENDIX **#** FOOTAGE LOGS: (5310, 5395, 5385) EASTBOUND LANE; (5365) WEST BOUND LANE.

![](_page_15_Picture_9.jpeg)

GEOSERV, INC.

P.O. BOX 831 MOUNT SHASTA, CA 96067 PH: (530) 227–8963 FAX: (530) 926–8921

						-T2500
						± 2000
				$\overline{}$		<u>+</u> 2490
				•		±_2480
						$\frac{1}{2470}$
						2460
						<u>+</u> 2450
						<u><u> </u></u>
						±2440
						<u>+</u> 2430
						+2420
						±2410
						<u>+</u>
						<u>+</u> 2400
						<u>+</u> 2390
+++		+++++	++++++	++++++	++++++	<del> </del> 
780	+00	785-	+00		79704	ൺറൈ

SHEET	NAME:		
CC 71 Pl	)PCO  1+4 _AN \$ Pf	ROAD STA 0-790+60 SECTION & ROFILE	4 ) :
REVISIO	NS:		
PROJEC	T NO: 19	0725	
PROJEC	T NO: 19 DATE: 2/	0725 19/20	
PROJEC	ort no: 19 Date: 2/ AS	0725 /19/20 NOTED	
PROJEC ISSUE E SCALE: DRAWN	T NO: 19 DATE: 2/ AS BY:	0725 /19/20 NOTED KF	
PROJEC ISSUE E SCALE: DRAWN ENGINEE	T NO: 19 DATE: 2/ AS BY:	0725 /19/20 NOTED KF	
PROJEC ISSUE E SCALE: DRAWN ENGINEE	T NO: 19 DATE: 2/ AS BY: ERED:	0725 /19/20 NOTED KF	
PROJEC ISSUE E SCALE: DRAWN ENGINEE CHECKE	T NO: 19 DATE: 2/ AS BY: ERED: D:	0725 /19/20 NOTED KF	
PROJEC ISSUE E SCALE: DRAWN ENGINEE CHECKE SHEET:	T NO: 19 DATE: 2/ AS BY: ERED:	0725 /19/20 NOTED KF	

ROAD CONDITION SURVEY, COPCO ROAD, HORNBROOK, SISKIYOU COUNTY

![](_page_16_Figure_0.jpeg)

JENNY CREEK BRIDGE –

+2.0		AC: 0.125'		AC: 0.25'	AC: 0.5'	AC: 0.125'	AC:	0.08' AC: 0.125'
-1.0 -2.0								
-4.0 -5.0 -6.0	0' 0' 0' AB: 0.845'	AB:	0.50'		AB: 0.33'	AB:	0.50'	

NOTES:

1. DIMENSIONS SHOWN ARE OF MATERIAL THICKNESS

2. AREAS OUTSIDE OF MAPPED FILL COULD HAVE A FILL DEPTH RANGING IN 0'-2'.

MAPPED FILL AREAS SHOWN AT A 3.0' THICKNESS COULD RANGE FROM 2'-4'.
 MAPPED FILL AREAS SHOWN AT A 5.0' THICKNESS COULD RANGE FROM 4'-6'.

![](_page_16_Picture_8.jpeg)

![](_page_16_Picture_9.jpeg)

NOTE:

FOR GROUND PENETRATION LOGS SEE APPENDIX # FOOTAGE LOGS: (5385, 5345) EASTBOUND LANE; (5530, 3565) WEST BOUND LANE.

FI	FVATION

HORZ. SCALE 1"= 350'

![](_page_16_Figure_14.jpeg)

THE REPORT OF THE PARTY OF THE				V
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--	--	--	---

GEOSERV, INC.

P.O. BOX 831 MOUNT SHASTA, CA 96067 PH: (530) 227-8963 FAX: (530) 926-8921

RUAD CUNDITION SURVET,
COPCO ROAD, HORNBROOK,
SISKIYOU COUNTY

SHEET NAME:

COPCO ROAD STA 790+60-869+80 PLAN SECTION & PROFILE

REVISIONS:

PROJECT NO:
190725
ISSUE DATE:
2/19/20
SCALE:
AS NUIED

AS	NÜ	

DRAWN BY: KF

ENGINEERED:

CHECKED:

JF

SHEET:

**C10** 

****	++ <mark>++++ +++ +++ ++ </mark> +++ <u>+</u> −247C
	2460
	2450
	2410
	2400
	<u>_</u>
RC CR 011	2380
-861+30.0 -	
860+00 86	65+00 869+80

## <u>LEGEND</u>

EXISTING ASPHALT
EXISTING AGGREGATE BASE Rx
EXISTING FILL
COPCO GPR MAPPING TICKS-25'

 ${\mathcal N}$ 

![](_page_17_Figure_0.jpeg)

![](_page_17_Figure_1.jpeg)

NOTES:

1. DIMENSIONS SHOWN ARE OF MATERIAL THICKNESS

2. AREAS OUTSIDE OF MAPPED FILL COULD HAVE A FILL DEPTH RANGING IN 0'-2'. 3. MAPPED FILL AREAS SHOWN AT A 3.0' THICKNESS COULD RANGE FROM 2'-4'.

4. MAPPED FILL AREAS SHOWN AT A 5.0' THICKNESS COULD RANGE FROM 4'-6'.

![](_page_17_Picture_6.jpeg)

NOTE: FOR GROUND PENETRATION LOGS SEE APPENDIX **#** FOOTAGE LOGS: (5345, 5320) EASTBOUND LANE; (5280, 1921, 3530) WEST BOUND LANE.

EL	_E∨	//	$\uparrow$	- (	٦C	V
1"=	350'	1	Н	=	10	۷

	AC: 0.17'					
	13 <u>22221</u> 32 <u>2223</u> 22 <u>2222</u> 22 <u>222223</u> 22 <u>222223</u> 22 <u>22222</u> 22 <u>22222</u> 22 <u>22222</u> 22	<u></u> <u></u>			<u></u> <u></u>	
AB: 0.825'			AB: 0.5	0'		

![](_page_17_Picture_10.jpeg)

			Y
	and the way	山區畫	125 SA

GEOSERV, INC.

P.O. BOX 831 MOUNT SHASTA, CA 96067 PH: (530) 227–8963 FAX: (530) 926–8921

ROAD CON	DITION	SURVEY,
COPCO ROA	AD, HO	RNBROOK
SISKIY	SU COL	JNTY

2380 -2370 -2360 -2350 <u>+</u>2340 ++-2330 940+00 945+00 949+00

-2390

<u>LEGEND</u>	
	EXISTING ASPHALT
	EXISTING AGGREGA
	EXISTING FILL
	COPCO GPR MAPP

 $\mathcal{N}$ 

XISTING AGGREGATE BASE Rx EXISTING FILL

COPCO GPR MAPPING TICKS-25'

SHEET NAME:
COPCO ROAD STA 869+80-949+00 PLAN SECTION & PROFILE
REVISIONS:
190725
ISSUE DATE:
2/19/20
AS NOTED
drawn by: KF
ENGINEERED:
CHECKED:
JF
SHEET:
C11

![](_page_18_Figure_0.jpeg)

![](_page_18_Figure_1.jpeg)

NOTES: 1. DIMENSIONS SHOWN ARE OF MATERIAL THICKNESS

2. AREAS OUTSIDE OF MAPPED FILL COULD HAVE A FILL DEPTH RANGING IN 0'-2'.

3. MAPPED FILL AREAS SHOWN AT A 3.0' THICKNESS COULD RANGE FROM 2'-4'. 4. MAPPED FILL AREAS SHOWN AT A 5.0' THICKNESS COULD RANGE FROM 4'-6'.

![](_page_18_Picture_7.jpeg)

## NOTE:

FOR GROUND PENETRATION LOGS SEE APPENDIX # FOOTAGE LOGS: (5320, 5140) EASTBOUND LANE; " (4435, 5280) WEST BOUND LANE.

								/ STA: 10	05+84.0	
							/			
7'										
	<u>                                      </u>		<u></u> <u></u>	<u> _</u>	<u></u>	<u></u>		<u></u> ch <u>okoko</u> ko <u>koka</u>	<u>.</u> 0+0 <u>+0+0+</u> 0+ <u>0+0+0</u> +0 <u>+</u>	
	AB: 0.50	0'								
			ELEVATI	ON						

HORZ. SCALE 1"= 350'

975	5+00 98C	)+00 985	5+00 990	)+00 995	+00 1000	0+00 1005	x+00 1010	)+00 1015	+00
			Station						
			ELEVATI	ON					
			1"= 350' 1 H =	- 10 V			FIND O STA: 1	F AC 005+84.0	
1									
		<u>                                      </u>	<u>                                      </u>					<u>, нанананананананананан</u> ан <u>ан</u> ан <u>ан</u> ан	
									1

PRIVILEGED AND CONFIDENTIAL

GEOSERV, INC.

P.O. BOX 831 MOUNT SHASTA, CA 96067 PH: (530) 227-8963 FAX: (530) 926-8921

ROAD CONDITION SURVEY, COPCO ROAD, HORNBROOK, SISKIYOU COUNTY

SHEET NAME:

COPCO ROAD STA 949+00-1028+20 PLAN SECTION & PROFILE

**REVISIONS:** 

PROJECT NO: 190725 ISSUE DATE: 2/19/20 SCALE: AS NOTED DRAWN BY: KF ENGINEERED:

**C12** 

CHECKED:

SHEET:

2710 <u>+</u>2700 -2690 2680 -2670 <u>+</u>2660 <u>+</u>2650 <u>+</u>2640 <u>+</u>2630 <u>+</u>2620 <u>+</u>2610 2600 <u>+</u>2590 -2580 <u>+</u>2570 -2560 -2550 -2540 -2530 <u>+</u>2520 -2510 <u>+</u>2500 2490 -2480 -2470 <u>+</u>2460 <u>+</u>2450 <u>+</u>2440 <u>+</u>2430 -2420 <u>+</u>2410 2400 2390

AB: 0.33'

1020+00

<u>LEGEND</u> EXISTING ASPHALT EXISTING AGGREGATE BASE Rx EXISTING FILL COPCO GPR MAPPING TICKS-25' 1 1

S

-2380

-2370

1025+00 1028+20

![](_page_19_Figure_0.jpeg)

![](_page_19_Figure_1.jpeg)

### NOTES:

- 1. DIMENSIONS SHOWN ARE OF MATERIAL THICKNESS 2. AREAS OUTSIDE OF MAPPED FILL COULD HAVE A FILL DEPTH RANGING IN 0'-2'.

Ш

3. MAPPED FILL AREAS SHOWN AT A 3.0' THICKNESS COULD RANGE FROM 2'-4'. 4. MAPPED FILL AREAS SHOWN AT A 5.0' THICKNESS COULD RANGE FROM 4'-6'.

![](_page_19_Figure_6.jpeg)

NOTE: FOR GROUND PENETRATION LOGS SEE APPENDIX # FOOTAGE LOGS: (4660, 2030) EASTBOUND LANE; NO MAPPING DONE ON THE WEST BOUND LANE.

AB: 0.33'

ELEVATION HORZ. SCALE 1"= 350'

Station

ELEVATION

1"= 350' 1 H = 10 V

	in the section of the	V/200.

GEOSERV, INC.

P.O. BOX 831 MOUNT SHASTA, CA 96067 PH: (530) 227-8963 FAX: (530) 926-8921

# ROAD CONDITION SURVEY, COPCO ROAD, HORNBROOK, SISKIYOU COUNTY

SHEET NAME:

COPCO ROAD STA 949+00-1028+20 PLAN SECTION & PROFILE

**REVISIONS:** 

PROJECT NO: 190725 ISSUE DATE: 2/19/20

SCALE: AS NOTED

DRAWN BY: KF

ENGINEERED:

CHECKED:

SHEET:

**C13** 

2820 \_\_\_\_\_2810 <u>+</u>2800 <u>+</u>2790 <u>+</u>2780 <u>+</u>2770 <u>+</u>2760 2750 2730 \_\_\_\_2720 <u>+</u>2710 <u>+</u>2700 <u>+</u>2690 ±-2680 <u>+</u>2660 ++-2650 1090+010092+00

![](_page_19_Figure_30.jpeg)

![](_page_19_Picture_31.jpeg)

 ${\mathcal N}$ 

### Table 1. Road Core Data Summary and Field Tested Parameters.

			-												Undrained		Undraine				Presumpti		
											Relativ	Relativ	Frictio		Shear	Undrained	d Shear	Undrained			ve	Calculated	Calculated
			Dept	Depth GW	GW						e	e	n	Frictio	Strength	Shear	Strength	Shear		Cohesive	Bearing	Bearing	Bearing
		Borehole	h	(meters Depth	Depth	_		Cohesion			Densit	Densit	Angle	n	(N60)	Strength	(N60)	Strength	Non-cohesive	Soil	Capacity	Capacity	Capacity
STA	Distance (feet)	Number	(feet)	) (feet)	(meters)	Туре	Material Type	Туре	N N6	0 N1,60	y (N60)	) y	(N60)	Angle	(kPa)	(kPa)	(psf)	(psf)	Soil Density	Consistency	(psf)	(kPa)	(psf)
180+60	18060	RC-CR-001	1.0	0.3 No Water	No Water	r Native Rock	k Weathered Volcanic	Cohesionless	50 40.	.0 68.0	114.0	) 121.28	46.9	49.5					Very Dense			2,191	45,760
236+20	23620	RC-CR-002	1.0	0.3		Fil	ll Sandy Clay with Grave	l Cohesive	8 6.	4 10.9	47.0	) 52.00			94	118	1,963	2,464	-	Firm		ļJ	l
236+20	23620	RC-CR-002	2.0	0.6		Fil	Il Sandy Clay with Grave	l Cohesive	12 9.	6 16.3	53.0	) 59			245	306	5,117	6,391		Stiff		<b>ل</b> ــــــــــا	
236+20	23620	RC-CR-002	4.0	1.2		Fil	Il Sandy Clay with Grave	Cohesive	9 7.	2 12.2	43.0	) 47			184	230	3,843	4,804	-	Stiff		µ]	
236+20	23620	RC-CR-002	5.0	1.5		Fi	Il Sandy Clay with Grave	l Cohesive	10 8.	0 13.6	44.0	) 48		10 -	204	255	4,261	5,326		Stiff		<u> </u>	1
236+20	23620	RC-CR-002	7.0	2.1		Native Rock	k Weathered Volcanic	Cohesionless	50 40.	0 62.8	88.0	0 100	47.0	49.5		10.0			Very Dense			2,191	45,760
220+57	22057	RC-CR-003	1.0	0.3		Fil	Il Sandy Clay with Grave	Cohesive	16 12.	.8 21.8	65.0	) 72			326	408	6,809	8,521		Very Stiff		ļ/	
220+57	22057	RC-CR-003	2.0	0.6		Fil	Il Sandy Clay with Grave	l Cohesive	27 21.	.6 36.7	77.0	) 85			551	688	11,508	14,369		Very Stiff		µ]	
220+57	22057	RC-CR-003	4.0	1.2		Fil	ll Sandy Clay with Grave	l Cohesive	25 20.	0 8.0	41.0	) 46		10 -	510	637	10,652	13,304		Very Stiff			1
315+66	31566	RC-CR-004	1.0	0.3		Native Rock	k Weathered Volcanic	Cohesionless	50 40.	.0 68.0	114.0	) 121.28	46.9	49.5					Very Dense			2,191	45,760
386+17	38617	RC-CR-005	0.5	0.2		Al	B Aggregate Base Rock	Cohesionless	45 36.	.0 61.2	120.0	) 133	38.0	41.0					Dense			1,567	32,727
386+17	38617.	RC-CR-005	1.7	0.5		Native Rock	k Weathered Volcanic	Cohesionless	50 40.	.0 68.0	114.0	) 121.28	46.9	49.5					Very Dense			2,191	45,760
430+68	43068	RC-CR-006	0.5	0.2		AF	B Aggregate Base Rock	Cohesionless	50 40.	.0 68.0	114.0	) 121.28	46.9	49.5					Very Dense			2,191	45,760
470+56	47056	RC-CR-007	0.5	0.2		Native Rock	k Weathered Volcanic	Cohesionless	50 40.	.0 68.0	114.0	) 121.28	46.9	49.5					Very Dense			2,191	45,760
507+44	50744	RC-CR-008	1.0	0.3		Fil	ll Sandy Clay with Grave	l Cohesive	13 10.	4 17.7	59.0	65.0			265	332	5,535	6,934	-	Stiff			
507+44	50744	RC-CR-008	3.0	0.9		Fil	ll Sandy Clay with Grave	l Cohesive	5 4.	.0 6.8	34.0	) 37			102	128	2,130	2,673		Firm			
507+44	50744	RC-CR-008	4.5	1.4		Fil	ll Sandy Clay with Grave	l Cohesive	16 12.	.8 21.8	65.0	) 72			326	408	6,809	8,521		Very Stiff			
507+44	50744	RC-CR-008	6.0	1.8		Native Rock	k Weathered Volcanic	Cohesionless	50 40.	.0 68.0	114.0	) 121.28	46.9	49.5					Very Dense			2,191	45,760
552+05	55205	RC-CR-009	1.0	0.3		Fil	ll Sandy Clay with Grave	l Cohesive	33 26.	4 44.9	90.0	) 100			673	841	14,056	17,565	)	Hard			
552+05	55205	RC-CR-009	2.5	0.8		Fil	ll Sandy Clay with Grave	l Cohesive	13 10.	4 17.7	59.0	65.0			265	332	5,535	6,934	-	Stiff			
698+00	69800	RC-CR-009A	1.0	0.3		Fil	ll Sandy Clay with Grave	l Cohesive	17 13.	.6 23.1	67.0	) 74			345	434	7,205	9,064	-	Very Stiff			
698+00	69800	RC-CR-009A	2.5	0.8		Fil	ll Sandy Clay with Grave	l Cohesive	20 16.	.0 27.2	65.0	) 72			408	510	8,521	10,652	2	Very Stiff			
698+00	69800	RC-CR-009A	4.5	1.4		Native Rock	k Weathered Volcanic	Cohesionless	28 22.	4 38.1	71.0	) 78	41.0	43.0					Medium Dense			490	10,234
739+58	73958	RC-CR-010	1.0	0.3		Fil	ll Sandy Clay with Grave	l Cohesive	19 15.	2 25.8	70.0	) 78			388	485	8,104	10,129	)	Very Stiff			
739+58	73958	RC-CR-010	2.0	0.6		Fil	ll Sandy Clay with Grave	l Cohesive	40 32.	.0 54.4	92.0	) 102			816	1,020	17,043	21,303		Hard			
831+92	83192	RC-CR-010A	1.0	0.3		Fil	ll Sandy Clay with Grave	l Cohesive	19 15.	.2 25.8	70.0	) 78			388	485	8,104	10,129	)	Very Stiff			
831+92	83192	RC-CR-010A	2.0	0.6		Fil	ll Sandy Clay with Grave	l Cohesive	16 12.	.8 21.8	65.0	) 72			326	408	6,809	8,521		Very Stiff			
831+92	83192	RC-CR-010A	4.0	1.2		Fil	ll Sandy Clay with Grave	l Cohesive	10 8.	.0 13.6	44.0	) 48			204	255	4,261	5,326	5	Stiff			
753+85	75385	RC-CR-010B	0.5	0.2		AI	B Aggregate Base Rock	Cohesionless	18 14.	.4 24.5	73.0	) 81	28.0	30.0					Medium Dense			229	4,783
753+85	75385	RC-CR-010B	2	0.6		Fil	ll Sandy Clay with Grave	l Cohesive	7 5.	.6 9.5	41.0	) 46			143	179	2,987	3,738	8	Firm			
753+85	75385	RC-CR-010B	3.5	1.1		Fil	ll Sandy Clay with Grave	l Cohesive	6 4.	.8 8.2	36.0	) 40			122	153	2,548	3,195	, ,	Firm			
753+85	75385	RC-CR-010B	5	1.5		Fil	ll Sandy Clay with Grave	l Cohesive	3 2.	4 4.1	25.0	) 28			61	77	1,274	1,608	8	Firm			
861+30	86130	RC-CR-011	0.5	0.2		AI	B Aggregate Base Rock	Cohesionless	24 19.	.2 32.6	83.0	92	30.0	32.0					Medium Dense			365	7,623
861+30	86130	RC-CR-011	2	0.6		Fil	ll Sandy Clay with Grave	l Cohesive	10 8.	.0 13.6	44.0	) 48			204	255	4,261	5,326		Stiff			
861+30	86130	RC-CR-011	3.5	1.1		Fil	ll Sandy Clay with Grave	l Cohesive	22 17.	.6 30.0	65.0	) 72			449	561	9,378	11,717	7	Very Stiff		<sup>_</sup>	
861+30	86130	RC-CR-011	5	1.5		Fil	ll Sandy Clay with Grave	l Cohesive	20 16.	.0 27.2	60.0	) 66			408	510	8,521	10,652	2	Very Stiff			
918+36	91836	RC-CR-011A	0.5	0.2		AF	B Aggregate Base Rock	Cohesionless	35 28.	.0 47.6	99.0	) 110	33.0	36.0					Dense			798	16,667
918+36	91836	RC-CR-011A	2	0.6		Native Rock	k Weathered Volcanic	Cohesionless	50 40.	.0 68.0	114.0	) 121.28	46.9	49.5					Very Dense			2,191	45,760
960+49	96049	RC-CR-012	0.5	0.2		AF	B Aggregate Base Rock	Cohesionless	28 22.	.4 38.1	89.0	) 99	31.0	33.0					Medium Dense			490	10,234
960+49	96049	RC-CR-012	2.5	0.8		Native Rock	k Weathered Volcanic	Cohesionless	37 29.	.6 50.3	86.0	) 95	44.0	46.0					Dense			916	19,131
1019+33	101933	RC-CR-013	0.5	0.2		AI	B Aggregate Base Rock	Cohesionless	38 30.	4 51.7	102.0	) 114	34.0	36.0					Dense			980	20,468
1019+33	101933	RC-CR-013	2	0.6		Fil	ll Sandy Clay with Grave	l Cohesive	50 40.	0 68.0	113.0	102.00			1020	1,275	21,303	26,629	)	Hard			
1059+30	105930	RC-CR-014	0.5	0.2		AI	3 Aggregate Base Rock	Cohesionless	16 12.	.8 21.8	69.0	76	31.0	33.0					Medium Dense			193	4,031
1059+30	105930	RC-CR-014	2	0.6		Fil	ll Sandy Clay with Grave	Cohesive	18 14.	4 24.5	64.0	71			367	459	7,665	9,586		Very Stiff			
1059+30	105930	RC-CR-014	3.5	1.1		Fil	ll Sandy Clay with Grave	l Cohesive	24 19.	.2 32.6	68.0	) 75			490	612	10,234	12,782		Very Stiff			
1059+30	105930	RC-CR-014	5	1.5		Fil	ll Sandy Clay with Grave	l Cohesive	11 8.	.8 15.0	46.0	50			224	281	4,678	5,869		Stiff			
1059+30	105930	RC-CR-014	6.5	2.0		Fil	ll Sandy Clay with Grave	l Cohesive	32 25.	.6 41.2	72.0	80			653	816	13,638	17,043		Hard			
1059+30	105930	RC-CR-014	7.9	2.4		Native Rock	k Weathered Volcanic	Cohesionless	50 40.	0 59.0	86.0	96	47.0	50.0					Very Dense			1,393	29,093

JF & JS	D BY S		BEGIN DATE Nov 25th, 2019	COMPLETION DATE Nov 25th, 2019	BOREHOLE L 41.89861	862	-12	(Lat/Long	5786	rth/Eas	st and	Datum	1)			9	HOLE ID
GeoS	Serv,	NTRACTOR		11.1	BOREHOLE L	+60	ION	(Offset, S	Station.	Line)	2					1	SURFACE ELEVATION 2157.76
Power	Augeri	THOD ing		4	DRILLING RIG	3										1	BOREHOLE DIAMETER
SAMPL CA Spl	ER TY	PE(S) AND S an 2"	IZES (ID)		STP HAMMER Saftey Hamn	R TYP	E	<u>.</u>		5							HAMMER EFFICIENCY. ERI Edit-Text
BOREH Holeph	IOLE B	ACKFILL AN v 25th, 2019	D COMPLETION		GROUNDWAT READINGS	TER	2	DURIN ND	NG DRI	LLING	3	AF	TER DR	ILLING (I	DATE	):	TOTAL DEPTH OF BORING
ELEVATION (II)	DEPTH (ft)	Material Graphics	10.	DESCRIPTION		Sample Location	Sample Number	Blows per 8 in.	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Bearing Capacity (psf)	lerdrained Shear Strength ost)	Drilling Method	Casing Depth	Remarks

![](_page_21_Figure_2.jpeg)

REPORT	TITLE Condition S	urvey, Copco	Road	R	C-CR-001
DIST.	Siskiyou	ROUTE	POSTMILE	Đ	A
PROJEC KRRP	T OR BRIDGE NA	AME			
BRIDGE	NUMBER	PREPARED BY		DATE 2/18/20	SHEET 1
	REPORT Road DIST. PROJEC KRRP BRIDGE NA	REPORT TITLE Road Condition S DIST. COUNTY Siskiyou PROJECT OR BRIDGE N/ KRRP BRIDGE NUMBER NA	REPORT TITLE       Road Condition Survey, Copco       DIST.     COUNTY       Siskiyou     ROUTE       PROJECT OR BRIDGE NAME     KRRP       BRIDGE NUMBER     PREPARED BY       NA     KF	REPORT TITLE       Road Condition Survey, Copco Road       DIST.     COUNTY     ROUTE     POSTMILE       Siskiyou     PROJECT OR BRIDGE NAME     PROJECT OR BRIDGE NAME       KRRP       BRIDGE NUMBER     PREPARED BY       NA     KF	REPORT TITLE     H       Road Condition Survey, Copco Road     R       DIST.     COUNTY     ROUTE     POSTMILE       Siskiyou     PROJECT OR BRIDGE NAME     E       KRRP     BRIDGE NUMBER     PREPARED BY     DATE       NA     KF     2/18/20

CONTRACTO	Nov 25th, 2019	Nov 25th, 2019	41 00007									Phil C. M. Smith and a second
CONTRACTO	P		41.89997	7054, -1	122.500	)8489	4					RC-CR-002
	13		BOREHOLE	LOCATIO	N (Offset,	Station.	Line)	2				SURFACE ELEVATION
erv, Inc.			STA-236	+20								2156.44'
METHOD			DRILLING RI	G				_				BOREHOLE DIAMETER
ugering			Little Beave	ur .								6"
R TYPE(S) AND	SIZES (ID)		STP HAMME	R TYPE		-		-		-		HAMMER EFFICIENCY. ERI
Spoon 2"			Saftey Ham	mer								All a second
LE BACKFILL /	AND COMPLETION		GROUNDWA	TER	DUR	ING DR	ILLING	5	AFTER	RILLING (D	ATE)	TOTAL DEPTH OF BORING
, Nov 25th, 201	19		READINGS		ND				NA			7.0'
EPTH (ft) aterial raphics	10.	DESCRIPTION		mple Location mple Number	ws per 8 in.	ws per foot	covery (%)	NB0/ N1,60	ction Angle Ic. Bearing	drained Shear ingth	illing Method sing Depth	Remarks
JE S L L	METHOD gering TYPE(S) ANC poon 2" E BACKFILL / Nov 25th, 20 Nov 25th, 20	VETHOD gering TYPE(S) AND SIZES (ID) poon 2" E BACKFILL AND COMPLETION Nov 25th, 2019	INTERNOO gering TYPE(S) AND SIZES (ID) poon 2" E BACKFILL AND COMPLETION Nov 25th, 2019 DESCRIPTION	METHOD DRILLING RI gering Little Beave TYPE(S) AND SIZES (ID) STP HAMME poon 2" Saftey Ham E BACKFILL AND COMPLETION GROUNDWA Nev 25th, 2019 DESCRIPTION	VETHOD DRILLING RIG gering Little Beaver TYPE(S) AND SIZES (ID) STP HAMMER TYPE poon 2" Saftey Hammer E BACKFILL AND COMPLETION GROUNDWATER READINGS DESCRIPTION GROUNDWATER READINGS	VETHOD DRILLING RIG gering Little Beaver TYPE(S) AND SIZES (ID) STP HAMMER TYPE poon 2" Saftey Hammer E BACKFILL AND COMPLETION GROUNDWATER Nov 25th, 2019 DESCRIPTION UP	VETHOD DRILLING RIG gering Little Beaver TYPE(S) AND SIZES (ID) STP HAMMER TYPE poon 2" Saftey Hammer E BACKFILL AND COMPLETION GROUNDWATER Nov 25th, 2019 DESCRIPTION READINGS ND VETHOD VIEW VIEW VIEW VIEW VIEW VIEW VIEW VIEW	VETHOD DRILLING RIG gering Little Beaver TYPE(S) AND SIZES (ID) STP HAMMER TYPE poon 2" Saftey Hammer E BACKFILL AND COMPLETION GROUNDWATER Nov 25th, 2019 DESCRIPTION UP 10 10 10 10 10 10 10 10 10 10 10 10 10	METHOD DRILLING RIG gering Little Beaver TYPE(S) AND SIZES (ID) STP HAMMER TYPE poon 2" Saftey Hammer E BACKFILL AND COMPLETION GROUNDWATER READINGS ND Nov 25th, 2019 DESCRIPTION UP and so on a soft of the soft of th	VETHOD DRILLING RIG gering Little Beaver TYPE(S) AND SIZES (ID) STP HAMMER TYPE poon 2" Saftey Hammer E BACKFILL AND COMPLETION GROUNDWATER Nov 25th, 2019 DESCRIPTION DESCRIPTION USED A VOID A Structure Software S	METHOD DHILLING RIG gering Little Beavor TYPE(S) AND SIZES (ID) poon 2" E BACKFILL AND COMPLETION Nov 25th, 2019 DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DES	METHOD DRILLING RIG gering Little Beavor TYPE(S) AND SIZES (ID) STP HAMMER TYPE poon 2" Saftoy Hammer E BACKFILL AND COMPLETION GROUNDWATER READINGS ND NA Nov 25th, 2019 DESCRIPTION UP and smooth of the start

n n	0	Asphalt	a di secondo	50	8/ 6.4/	2.464	T	
		GW: WELL GRADED AGGREGATE BASE ROCK(GW); very dense; reddish brown; dry; <3/4" diameter.	9/4/4		19.9			
	1-	SC: SAND CLAY with GRAVEL (Fill-SC); firm to stiff; moist to dry; reddish brown to brown; low to medium plasticity; <1" subangular to angular GRAVEL: very fine to coarse SAND	0/4/4					
2155	-	GRAVEL, VELY INTE ID COALSE GAND		50	12/ 9.6) 16.3	5,391		
	-		3/6/6					
	3		-	75	9/ 7.2/ 12.2	4.004		- F
	-		4/5/4					
	4							1
	-			50	10/ 8/ 13.6	5,326		
	-		3/4/6					
2150		Weathered Volcanic Rx: NATIVE ROCK; very dense; cohesionless; highly weathered; gravel						
	7	decreases with depth.	50:0,083 3'	0	50/ 49.5. 40/ 62.8	5		
	-							

![](_page_22_Picture_3.jpeg)

JF & J	ED BY		BEGIN DATE Nov 25th, 2019	COMPLETION DATE Nov 25th, 2019	41.900575	592,	-12	2.490	0745	th/Eas	and and	Datum	)			ł	HOLE ID
Geo	NG COI Serv,	NTRACTOR		11.14	BOREHOLE LO	57	ON (C	Offset, S	Station.	Line)	1				Č	1	SURFACE ELEVATION 2152.45'
Power	NG MET	THOD			DRILLING RIG	-										Ţ	BOREHOLE DIAMETER
SAMPL CA Spl	ER TY	PE(S) AND S on 2"	SIZES (ID)		STP HAMMER Saftey Hamm	TYPE		<u>a.</u>									HAMMER EFFICIENCY. ERI
BOREH	HOLE B	ACKFILL AN v 25th, 2019			GROUNDWAT READINGS	ER	5.)	ND	NG DRI	LLING	5	AFT NA	TER DR	ILLING (D	ATE)		TOTAL DEPTH OF BORING
ELEVATION (II)	DEPTH (ft)	Material Graphics	1	DESCRIPTION		Sample Location	sampre rumoer	Blows per 8 in.	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Bearing Capacity (psf)	lerdrained Shear itrength psf)	Drilling Method	Casing Depth	Remarks

0		Asphalt	11.	100			
		GW: WELL GRADED AGGREGATE BASE ROCK (FILL-GW); very dense; reddish brown; dry; <3/4" diameter.	12/5/11	75 12.8/ 12.8/ 21.8	-6.609		
1		SC: SAND CLAY with GRAVEL (Fill-SC); very stiff; moist; brown; low to medium plasticity; <1" subangular to angular GRAVEL; very fine to		100 27/ 21.8/ 36.7	11.50e	9	~
2	-	coarse SAND.	5/11/16				
3	-	SC: SAND CLAY with GRAVEL and COBBLES (Fill-SC); very stiff; moist; reddish brown; low to medium plasticity; <1" subangular to angular GRAVEL; <2.5" subangular COBBLE; very fine to coarse SAND		70 25/ 30/ 8	10,652		
4	-		8/10/15				
5	-			Ħ			

![](_page_23_Picture_3.jpeg)

LOGGE	ED BY	1	BEGIN DATE	COMPLETION DATE	BOREHOLE L	OCAT	NON	(Lat/Long	or Nor	rth/Eas	st and	Datum	)			HOLE ID
JF & J	IS		Nov 25th, 2019	Nov 25th, 2019	41.90960	758,	-12	2.463	4071	5				_		RC-CR-004
DRILLI	NG CO	NTRACTOR			BOREHOLE	OCAT	ION	(Offset, S	Station.	Line)						SURFACE ELEVATION
Geo	Serv,	Inc.			STA-315	+66										2207.32'
ORILLI	NG ME	THOD			DRILLING RIC	3									-	BOREHOLE DIAMETER
Power	Augeri	ing			Little Beave	•										6"
SAMPL	LER TY	PE(S) AND S	SIZES (ID)		STP HAMME	R TYP	E					-				HAMMER EFFICIENCY. ERI
CA Sp	lit Spor	on 2"			Saftey Ham	ner										11 1 1 1 1 1
BOREH	HOLE B	ACKFILL AN	D COMPLETION		GROUNDWA	TER	_	DURI	NG DRI	LLING	š	AFT	TER DR	ILLING (D	ATE)	TOTAL DEPTH OF BORING
Holepi	lug, No	v 25th, 2019			READINGS		2.,	ND				NA	÷.,	123		0.8
VATION (II)	отн (ft)	lerial aphics		DESCRIPTION		ple Location	ple Number	is per 6 in.	is per foot	(%) Alance	60/ N1,60	son Angle	Bearing acity (psf)	ained Shear gth	ing Method	Remarks
ELE	DEI	Gra				Sam	Sam	Blow	Blow	Rea	N/N	Frict	Calc	Stren (psf)	Dull	

Asphalt		100		
Weathered Volcanic Rx: NATIVE ROCK; very dense; cohesionless; highly weathered to fresh; gravel to cobble subangular grains; weathering decreases with depth.		0 68 46	9. 45.750	
	5			
	20/ 50:0.333'			

![](_page_24_Picture_3.jpeg)

JF&J	D BY		BEGIN DATE Nov 25th, 2019	COMPLETION DATE Nov 25th, 2019	BOREHOLE LO 41.92278	41, ·	-122	(Lat/Long 2.4496	5139	rth/Eas	st and	Datum	0				HOLE ID
Geo	vg con Serv,	NTRACTO	R	11.1.1	BOREHOLE LO	OCAT	TION	(Offset, S	Station,	Line)	7					ī	SURFACE ELEVATION
Power	Auger	THOD			DRILLING RIG	8	5									1	BOREHOLE DIAMETER 6"
SAMPL CA Sp	ER TY	PE(S) AND on 2"	I SIZES (ID)		STP HAMMER Saftey Hamm	R TYP	Æ									Ť	HAMMER EFFICIENCY. ERI
BOREH	IOLE B	ACKFILL /	IND COMPLETION		GROUNDWAT READINGS	rer		DURIN ND	NG DRI	ILLING	5	AFT NA	TER DR	ILLING (I	DATE		TOTAL DEPTH OF BORING
(IEVATION (II)	DEPTH (ft)	Material Graphics		DESCRIPTION		sample Location	ample Number	llows per 6 in.	liows per foot	tecovery (%)	V/ N60/ N1,60	riction Angle	tals Bearing Capacity (psf)	erdrained Shear trength sth	Drilling Method	asing Depth	Remarks

11	<sup>0</sup> Asphalt		100				pi I	Ĩ
	GW: WELL GRADED AGGREGATE BASE ROCK (FILL-GW); dense; reddish brown; dry; <3/4" diameter.		90	.45/ 36/ 61,2	41.0	12.727		
		10/11/34						1
2220	Weathered Volcanic Rx: NATIVE ROCK; very dense; cohesionless; highly weathered to fresh; gravel to cobble subangular grains; weathering decreases with depth.	50: 0,458'	85	50/ 40/ 68	49.5	45,760		
đ	2							
	-							

	REPOR	Condition S	urvey, Copco	Road	R	C-CR-005
	DIST	COUNTY Siskiyou	ROUTE	POSTMILE	E	A
	KRRF	T OR BRIDGE NA	ME			
the second	BRIDGE NA	NUMBER	PREPARED BY		DATE 2/18/20	SHEET 5

LOGGED	D BY		BEGIN DATE	COMPLETION DATE	BOREHOLE LC	DCA1	NON	Lat/Long	or Nor	th/Eas	and and	Datum	5			HOLEID
JF & JS	<u>k</u>		Nov 25th, 2019	Nov 25th, 2019	41.932381	193	, -12	.2.441	57609	9						RC-CR-006
DRILLING	GCON	TRACTOR	a second second		BOREHOLE LC	DCAT	TION /	Offset, S	station.	Line)	2			-		SURFACE ELEVATION
GeoS	jerv,	Inc.			STA-430+	+68										2195.36'
DRILLING	GMET	HOD			DRILLING RIG	-		_		-	_				-	BOREHOLE DIAMETER
Hollow 7	Stem A	Auger			Little Beaver	23										6"
SAMPLE	RTYP	E(S) AND S	SIZES (ID)		STP HAMMER	TYP	Æ	_	-		-	_		_	-	HAMMER EFFICIENCY. ERI
CA Split	I Spoo	in 2"			Saftey Hamm	ier										110 and 12 19 14
BOREHC	OLE B/	ACKFILL AN	D COMPLETION		GROUNDWAT	ER		DURI	IG DRI	LLINC	<u>,                                     </u>	AFT	FER DR	ILLING (D/	ATE)	TOTAL DEPTH OF BORING
Bentoni	ite Chir	p, Nov 25th	, 2019		READINGS	5	2	ND			<u></u>	NA	5			1.5'
(II) (II)	PTH (ft)	terial aphics		DESCRIPTION		tple Location	tple Number	vs per 6 in.	vs per foot	(%) /Jano	160/ N1,60	tion Angle	<ul> <li>Bearing</li> <li>aoity (psf)</li> </ul>	rained Shear	ling Method	Remarks
ELE	DE	Gn				San	Sam	Blov	Blov	Rec	NN	Frict	Calc	Strer Strer (psf)	Del	

		Asphalt		100	1 1	1.5		
2195		GW: WELL GRADED AGGREGATE BASE ROCK (FILL-GW); very dense; reddish brown; dry; <3/4" diameter.		50	50/ 40/ 68	45,760		
	-	SC: SAND CLAY with GRAVEL (Fill-SC); stiff; moist; brown; low to medium plasticity; <1" subangular to angular GRAVEL; very fine to coarse SAND.	18/27/30					
	NAMENT -	Weathered Volcanic Rx: NATIVE ROCK; very dense; cohesionless; highly weathered; gravel to cobble subangular grains; weathering decreases with depth.						-
1								
	2							

	REPOR	Condition S	urvey, Copco	Road	R	C-CR-006
TED BY	DIST.	Siskiyou	ROUTE	POSTMILE	E/	, ,
	KRR	OT OR BRIDGE NA	ME			
The second	BRIDGE NA	NUMBER	PREPARED BY		DATE 2/18/20	SHEET 6

LOGGE	ED BY		BEGIN DATE	COMPLETION DATE	BOREHOLE L	OCAT	ION (	Lat/Long	or Nor	rth/Eas	al and	Datum	n)		1		HOLEID
JF & J	IS		Nov 25th, 2019	Nov 25th, 2019	41.94152	973,	, -12	2.444	5926	8						14	RC-CR-007
DRILLIN	NG COI	NTRACTOR			BOREHOLE L	OCAT	ION (	Offset, S	itation.	Line)	3				-	-	SURFACE ELEVATION
Geo	Serv,	Inc.			STA-470+	-56											2451.54'
DRILLIM	NG MET	THOD			DRILLING RIG	1		-	-						_		BOREHOLE DIAMETER
Hollow	w Stem	Auger			Little Beaver	ģ_											6"
SAMPL	LER TY	PE(S) AND !	SIZES (ID)		STP HAMMER	TYP	E					_		_	-	-	HAMMER EFFICIENCY. ERI
CA Spl	lit Spor	on 2"			Saftey Hamm	ier											11 A 14 18 14
BOREF	HOLE B	SACKFILL AN	ID COMPLETION	7	GROUNDWAT	ER		DURIN	IG DRI	ILLING	5	AF	TER DR	ILLING (I	DATE	).	TOTAL DEPTH OF BORING
Bentor	nite Ch	ip, Nov 25th	i, 2019		READINGS	1	2.,	ND			5	NA	-				0.8'
ELEVATION (II)	DEPTH (ft)	Material Graphics		DESCRIPTION		Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Béaring Capacity (psf)	lerdrained Shear Strength osf)	Drilling Method	Casing Depth	Remarks

![](_page_27_Figure_2.jpeg)

Г

T		Asphalt		100			
		GW: WELL GRADED AGGREGATE BASE ROCK (FILL-GW); very dense; reddish brown; dry; <3/4" diameter.		100 50/ 40/ 58	49.5 45760		
	<b>HEARING</b>	Weathered Volcanic Rx: NATIVE ROCK; very dense; cohesionless; highly weathered to fresh; gravel to cobble subangular grains; weathering decreases with depth.	38/50:0				
Į.	(Charles)						
	<u>,</u>						
	1						
2450	1						
	_						

	REPORT	TITLE Condition St	urvey, Copco	Road	R	C-CR-007
ED5/ERV	DIST	COUNTY Siskiyou	ROUTE	POSTMILE	Đ	A
	PROJEC KRRP	T OR BRIDGE NA	ME			
	BRIDGE	NUMBER	PREPARED BY		DATE 2/18/20	SHEET 7

LOGGE	DBY		BEGIN DATE	COMPLETION DATE	BOREHOLE	OCATIC	N (Lat/L	ong or No	orth/Ea	st and	Datum)	£.,		220	HOLE ID
JF & JS	s		Nov 25th, 2019	Nov 25th, 2019	41.94752	309, -	122.4	65272	20						RC-CR-008
DRILLIN	NG CON	NTRACTOR	1	and the second se	BOREHOLE L	OCATIC	N (Offse	t. Station	Line)	1				1	SURFACE ELEVATION
GeoS	Serv,	Inc.			STA-507-	+44									2409.19'
DRILLIN	IG MET	THOD			DRILLING RIG	3							_	-	BOREHOLE DIAMETER
Hollow	Stem	Auger			Little Beaver	6. ml									6"
SAMPL	ER TYP	PE(S) AND S	SIZES (ID)		STP HAMMER	RTYPE		_	-	-	_	-	_	-	HAMMER EFFICIENCY. ERI
CA Spl	lit Spoo	on 2"			Saftey Hamn	ner									10
BOREH	IOLE B	ACKFILL AN	D COMPLETION		GROUNDWAT	TER	DL	RING DF	RILLING	3	AFTE	R DR	LLING (D	ATE)	TOTAL DEPTH OF BORING
Benton	nite Chi	ip, Nov 25th	, 2019		READINGS		NC				NA	Ε.	123		6.0'
VATION (II)	PTH (ft)	terial aphics	1 1 1	DESCRIPTION		tple Location	vs per 8 in.	vs per foot	(%) Anavo	160/ N1,60	tion Angle	acity (psf)	rained Shear ogth	ling Method	Remarks
ELE	DEI	Gr				Sam	Blow	Blow	Reci	NN	Frict	Cap	Strer (psf)	Del	

1 f	0	Asphalt		100	13/	11		6.934	
		GW: WELL GRADED AGGREGATE BASE ROCK (FILL-GW); very dense; reddish brown; dry; <3/4" diameter.		100	10.4/ 17.7				
		SC: SAND CLAY with GRAVEL (Fill-SC); firm to very stiff; moist to dry; reddish brown to brown; low to medium plasticity; <1" subangular to angular GRAVEL; very fine to coarse SAND	13/8/5						
K	2								
	-			95	5/ 4/ 5.6		e ř	2,673	
	-		3/3/2						
2405	4			100	16) 12.8/ 21.8			8,521	
	5		3/4/12						
		Weathered Volcanic Rx: NATIVE ROCK; very dense; cohesionless; highly weathered; gravel to cobble subangular grains; weathering		75	501	49.5	45,760		
	_ <del>\</del>		50:0.333	10	40/ 68	11			
	-								
	7								-
	-								

![](_page_28_Picture_3.jpeg)

BY		BEGIN DATE	COMPLETION DATE	BOREHOLE L	OCAT	TION	(Lat/Long	or No	rth/Eas	st and	Datum	1)				HOLEID
0.001	TRACTOR	Nov 25th, 2019	Nov 25th, 2019	41.95554	070,	, -12	2.439	1070	4	-			_	_		RC-CR-009
erv, l	Inc.			STA-552	+05	HON	Unset, a	station,	Line)							2355.96'
Stem A	HOD Auger			DRILLING RIG	5										ŀ	BOREHOLE DIAMETER
R TYP	E(S) AND S	ZES (ID)		STP HAMMER Saftey Hamn	R TYP	PE		Č.	-							HAMMER EFFICIENCY. ERI
DLE BA	ACKFILL ANI p. Nov 25th,	2019		GROUNDWAT READINGS	TER		DURIN ND	NG DRI	ILLING	3	NA	TER DR	ILLING (I	DATE	).	TOTAL DEPTH OF BORING
EPTH (ft)	aterial raphics		DESCRIPTION		tiple Location	tiple Number	ws per 6 in.	ws per foot	(%) (January (%)	N60/ N1,60	tion Angle	c. Beaning paoity (psf)	drained Shear ngth	lling Method	sing Depth	Remarks
	BY CON Prv, SMET Stem / Spoo DLE B/ (1) HLd	BY S CONTRACTOR erv, Inc. S METHOD Stem Auger R TYPE(S) AND SI Spoon 2" DLE BACKFILL ANI te Chip, Nov 25th, B Chip, Nov 25th, B Chip, Nov 25th, Chip, Chip, Ch	BY BEGIN DATE Nov 25th, 2019 S CONTRACTOR erv, Inc. SMETHOD Stem Auger R TYPE(S) AND SIZES (ID) Spoon 2" DLE BACKFILL AND COMPLETION the Chip, Nov 25th, 2019	BY BEGIN DATE COMPLETION DATE Nov 25th, 2019 Nov 25th, 2019 S CONTRACTOR erv, Inc. SMETHOD Stem Auger R TYPE(S) AND SIZES (ID) Spoon 2" DLE BACKFILL AND COMPLETION Is Chip, Nov 25th, 2019 E	BY     BEGIN DATE     COMPLETION DATE     BOREHOLE L       Nov 25th, 2019     Nov 25th, 2019     41.95554       S CONTRACTOR     BOREHOLE L       erv, Inc.     STA-552-       S METHOD     DRILLING RIC       Stem Auger     Little Beaver       R TYPE(S) AND SIZES (ID)     STP HAMMER       Spoon 2"     Saftey Hammer       ILE BACKFILL AND COMPLETION     GROUNDWA'       READINGS     DESCRIPTION	BY     BEGIN DATE     COMPLETION DATE     BOREHOLE LOCA       Nov 25th, 2019     Nov 25th, 2019     41.95554070       S CONTRACTOR     BOREHOLE LOCA       erv, Inc.     STA-552+05       SMETHOD     DRILLING RIG       Stem Auger     Little Beaver       R TYPE(S) AND SIZES (ID)     STP HAMMER TYS       Spoon 2"     Saftey Hammer       ILE BACKFILL AND COMPLETION     GROUNDWATER       READINGS     DESCRIPTION	BY     BEGIN DATE     COMPLETION DATE     BOREHOLE LOCATION 41.95554070, -12       Nov 25th, 2019     Nov 25th, 2019     41.95554070, -12       S CONTRACTOR     BOREHOLE LOCATION       erv, Inc.     STA-552+05       S METHOD     DRILLING RIG       Stem Auger     Little Beaver       R TYPE(S) AND SIZES (ID)     STP HAMMER TYPE       Spoon 2"     Saftey Hammer       ILE BACKFILL AND COMPLETION     GROUNDWATER READINGS       Image:     DESCRIPTION	BY     BEGIN DATE Nov 25th, 2019     COMPLETION DATE Nov 25th, 2019     BOREHOLE LOCATION (Lat/Long 41.95554070, -122.439       S CONTRACTOR     BOREHOLE LOCATION (Offset. S STA-552+05       STV, Inc.     STA-552+05       SMETHOD     DRILLING RIG       Stem Auger     Little Beaver       R TYPE(S) AND SIZES (ID)     STP HAMMER TYPE       Spoon 2"     Sattey Hammer       ILE BACKFILL AND COMPLETION     GROUNDWATER ND       Image:     DESCRIPTION	BY     BEGIN DATE     COMPLETION DATE     BOREHOLE LOCATION (Lat/Leng or Nor 41.95554070, -122.4391070)       Nov 25th, 2019     Nov 25th, 2019     BOREHOLE LOCATION (Lat/Leng or Nor 41.95554070, -122.4391070)       S CONTRACTOR     BOREHOLE LOCATION (Offset. Station, STA-552+05       STMETHOD     DRILLING RIG       Stem Auger     Little Beaver       R TYPE(S) AND SIZES (ID)     STP HAMMER TYPE       Spaon 2"     Sattey Hammer       ILE BACKFILL AND COMPLETION     GROUNDWATER READINGS     DURING DRI READINGS       Image BackFill AND COMPLETION     DESCRIPTION     Image BackFill	BY     BEGIN DATE Nov 25th, 2019     COMPLETION DATE Nov 25th, 2019     BOREHOLE LOCATION (LastLong or North/Ea 41.95554070, -122.43910704       S CONTRACTOR     BOREHOLE LOCATION (Offset. Station, Line)       strv, Inc.     STA-552+005       SMETHOD     DRILLING RIG       Stem Auger     Little Beaver       R TYPE(S) AND SIZES (ID)     STP HAMMER TYPE       Spoon 2"     Saftey Hammer       ILE BACKFILL AND COMPLETION     GROUNDWATER READINGS     DURING DRILLING BORINGS       Image BackFill AND COMPLETION     DESCRIPTION     Image Backfill Back	BY     BEGIN DATE     COMPLETION DATE     BOREHOLE LOCATION (Lat/Long or North/East and 41.95554070, -122.43910704       S CONTRACTOR     BOREHOLE LOCATION (Offset. Station, Line)       strv, Inc.     STA-552+05       S METHOD     DRILLING RIG       Stem Auger     Little Beaver       R TYPE(S) AND SIZES (ID)     STP HAMMER TYPE       Spoon 2"     Saftey Hammer       ILE BACKFILL AND COMPLETION     GROUNDWATER READINGS     DURING DRILLING ND       (1)     Image being be	BY     BEGIN DATE     COMPLETION DATE     BOREHOLE LOCATION (Lat/Leng or North/East and Datum 41.95554070, -122.43910704       S CONTRACTOR     BOREHOLE LOCATION (Clifset. Station, Line)       STA-552+05     STA-552+05       S METHOD     DRILLING RIG       Stem Auger     Little Beaver       R TYPE(S) AND SIZES (ID)     STP HAMMER TYPE       S Date Y Ammer     Satey Hammer       JE BACKFILL AND COMPLETION     GROUNDWATER     DURING DRILLING       Image BackFill AND COMPLETION     BORENOLS (ID)     STP HAMMER TYPE       Statey Hammer     Satey Hammer     Jackground (I)       JE BACKFILL AND COMPLETION     BESCRIPTION     Image Backfill (I)       Image Backfill AND COMPLETION     DESCRIPTION     Image Backfill (I)	BY     BEGIN DATE     COMPLETION DATE     BOREHOLE LOCATION (Lat/Long or North/Least and Datum)       Nov 25th, 2019     Nov 25th, 2019     41.95554070, -122.43910704       S CONTRACTOR     BOREHOLE LOCATION (Offset. Station, Line)       erv, Inc.     STA-552+05       S METHOD     DRILLING RIG       Stem Auger     Little Beaver       R TYPE(S) AND SIZES (ID)     STEP HAMMER TYPE       Spoon 2"     Saftey Hammer       ILE BACKFILL AND COMPLETION     GROUNDWATER     DURING DRILLING       Is chip, Nov 25th, 2019     DESCRIPTION     In the second of the second	BY     BEGIN DATE     COMPLETION DATE     BOREHOLE LOCATION (Lat/Long or North//East and Datum)       Nov 25th, 2019     Nov 25th, 2019     41.95554070, -122.43910704       S CONTRACTOR     BOREHOLE LOCATION (Offset. Station, Line)       erv, Inc.     STA-552+05       S METHOD     DRILLING RIG       Stem Auger     Little Beaver       R TYPE(S) AND SIZES (ID)     STP HAMMER TYPE       Spoon 2"     Sattey Hammer       JLE BACKFILL AND COMPLETION     GROUNDWATER     DURING DRILLING       Nov 25th, 2019     DESCRIPTION     In the second of the se	BY     BEGIN DATE Nov 25th, 2019     COMPLETION DATE Nov 25th, 2019     BOREHOLE LOCATION (Lat/Long or North/East and Datum) 41.95554070, -122.43910704       S CONTRACTOR     BOREHOLE LOCATION (Offset. Station, Line)       STA-552+005       STMETHOD       Stem Auger       R TYPE(S) AND SIZES (ID)       S Date Y Ammer       S Date Y Ammer       S DESCRIPTION       BECKIPIC NOV 25th, 2019       BECKIPIC NOV 25th, 2019       BECKIPIC NOV 25th, 2019	BY     BEGIN DATE     COMPLETION DATE     BOREHOLE LOCATION (Lat/Long or North/East and Datum)       Nov 25th, 2019     Nov 25th, 2019     BOREHOLE LOCATION (Lat/Long or North/East and Datum)       S CONTRACTOR     BOREHOLE LOCATION (Offset. Station, Line)       STA-552+005     STA-552+005       S METHOD     DRILLING RIG       Stem Auger     Little Beaver       R TYPE(S) AND SIZES (ID)     STP HAMMER TYPE       Spoon 2"     Saftey Hammer       JLE BACKFILL AND COMPLETION     GROUNDWATER     DURING DRILLING AFTER DRILLING (DATE)       No v25th, 2019     DESCRIPTION     In on one of the second of th

11	0 Asphalt		85		
	SC: SAND CLAY with GRAVEL and COBBLE (Fill-SC); hard to stiff; moist to dry; reddish brown; low to medium plasticity; <1" subangular to angular GRAVEL; <2.5" subangular COBBLE; very fine to coarse SAND		100 337 264/ 449	17.565	
2355		7/13/20			
	-		100 130 15.40 17.7		
				6,994	
	2				
	-	6/8/5			
2				-	

	REPORT	TITLE Condition St	urvey, Copco	Road	R	C-CR-009
	DIST.	COUNTY Siskiyou	ROUTE	POSTMILE	E	A
	PROJEC KRRP	T OR BRIDGE NA	ME			
the second s	BRIDGE NA	NUMBER	PREPARED BY		DATE 2/18/20	SHEET 9

LOGGE	ED BY		BEGIN DATE	COMPLETION DATE	BOREHOLE L	OCAT	ION (	Lat/Long	or Nor	rth/Eas	st and	Datum	0		28		HOLEID
JF & J	IS		Nov 25th, 2019	Nov 25th, 2019	41.96907	399,	, -12	2.434	9012	4							RC-CR-009A
DRILLI	NG COI	NTRACTOR		and the second s	BOREHOLE L	OCAT	ION (	Offset, S	station.	Line)	-				-	-	SURFACE ELEVATION
Geo	Serv,	Inc.			STA-6984	+00										1	2352.0'
DRILLI	NG ME	THOD			DRILLING RIG	5		-	-	-						-	BOREHOLE DIAMETER
Hollow	w Stem	Auger			Little Beaver	r -											6"
SAMPL	LER TY	PE(S) AND S	IZES (ID)		STP HAMMER	RTYP	E					_			-	1	HAMMER EFFICIENCY. ERI
CA Sp	dit Spor	on 2"			Saftey Hamm	ner											11 . A & A. A.
BORE	HOLEB	SACKFILL AN	D COMPLETION		GROUNDWAT	TER		DURIN	NG DRI	ILLING	5	AFT	TER DR	ILLING (E	DATE)	5	TOTAL DEPTH OF BORING
Bentor	nite Ch	ip, Nov 25th,	2019		READINGS	_	2.	ND			5	NA					5.0'
ELEVATION (II)	DEPTH (ft)	Material Graphics		DESCRIPTION		Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	V/ N60/ N1,60	Inction Angle	Calc Bearing Capacity (psf)	erdrained Shear itrength osf)	Drilling Method	casing Depth	Remarks

![](_page_30_Figure_2.jpeg)

![](_page_30_Picture_3.jpeg)

JF & JS	BY	BEGIN DATE Nov 25th, 2019	COMPLETION DATE Nov 25th, 2019	41.96769	OCATIC 722, -	N (Lat/Lon 122.423	g or No	rth/Eas	and C	)atum)			HOLE ID
GeoSe	S CONTRACT	TOR		BOREHOLE LO	OCATIO	N (Offset.	Station.	Line)	1			4	SURFACE ELEVATION
DRILLING Hollow S	3 METHOD Stem Auger			DRILLING RIG									BOREHOLE DIAMETER
SAMPLER CA Split	R TYPE(S) A Spoon 2"	NO SIZES (ID)		STP HAMMER Saftey Hamm	R TYPE		Na						HAMMER EFFICIENCY. ERI
BOREHO Bentonit	LE BACKFIL	L AND COMPLETION 25th, 2019		GROUNDWAT READINGS	ER	DUR ND	ING DR	ILLING	5	AFTER D	RILLING (D	ATE)	TOTAL DEPTH OF BORING
ELEVATION (II)	DEPTH (ft) Material Graphics		DESCRIPTION		Sample Location Sample Number	Blows per 8 in.	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle Calc. Béaring Caracity (osf)	lerdrained Shear Strength pst)	Drilling Method Casing Depth	Remarks

0	Asphalt		100			
:415	GW: WELL GRADED AGGREGATE BASE ROCK (FILL-GW); dense; reddish brown; dry; <3/4" díameter.	12/11/8	80	19/ 15 2/ 25,6	10,129	
1	SC: SAND CLAY with GRAVEL and COBBLES (Fill-SC); very stiff to hard; moist; brown; low to medium plasticity; <1" subangular to angular GRAVEL; <2" subangular COBBLE at 2.0' bgs; very fine to coarse SAND.		25	40/	21,303	 -
2-		6/22/18		24.4		
3-						
4						

REPORT	TITLE Condition Si	urvey, Copco	Road	R	C-CR-010
DIST.	COUNTY Siskiyou	ROUTE	POSTMILE	E	A
PROJEC KRRP	T OR BRIDGE NA	ME			
BRIDGE	NUMBER	PREPARED BY		DATE 2/18/20	SHEET 11

LOGGE	D BY	B	EGIN DATE	COMPLETION DATE	BOREHOLE LO	CATION	(Lat/Long	g or Nor	rth/Eas	at and [	Datum)	ā		5.2		HOLE ID
JF & JS	5	D	ec 4th, 2019	Dec 4th, 2019	41.973573	73, -1	22.398	7385	7							RC-CR-010A
DRILLIN	IG CONT	TRACTOR			BOREHOLE LO	CATION	(Offset, §	Station.	Line)	3				-		SURFACE ELEVATION
GeoS	Serv, I	inc.			STA-831+	92										2352.0'
DRILLIN	IG METH	HOD		2.1	DRILLING RIG	-	-		-	_						BOREHOLE DIAMETER
Hollow	Stem A	uger			Little Beaver											6"
SAMPLE	ER TYPE	E(S) AND SIZES	(ID)		STP HAMMER	TYPE					_	-				HAMMER EFFICIENCY. ERI
CA Spli	it Spoor	n 2"			Saftey Hamme	H.									1	little and set of the
BOREH	OLE BA	CKFILL AND CC	MPLETION		GROUNDWATE	R	DURI	NG DR	ILLING	5	AFTE	R DRI	LLING (D	ATE)		TOTAL DEPTH OF BORING
Bentoni	lite Chip	), Nov 25th, 2015	k =		READINGS		ND				NA	<u></u>				4.5'
ELEVATION (II)	DEPTH (ft)	Material Graphics		DESCRIPTION		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Capacity (psf)	derdrained Shear Strength (psf)	Drilling Method	Casing Depth	Remarks

![](_page_32_Figure_2.jpeg)

![](_page_32_Picture_3.jpeg)

LOGGE	DBY		BEGIN DATE	COMPLETION DATE	BOREHOLE L	OCATI	ION (	Lat/Long	or Nor	rth/East	stand	Datum	0			1	HOLEID
JF & JS	s		Dec 4th, 2019	Dec 4th, 2019	41.96998	006,	-12	2.419	6457	5						1	RC-CR-010B
DRILLIN	NG CON	NTRACTOR			BOREHOLE L	OCATI	ION (	Offset, S	Station.	Line)	1				1		SURFACE ELEVATION
GeoS	Serv,	Inc.			STA-753-	+85										1	2441.27'
DRILLIN	IG MET	THOD			DRILLING RIC	3											BOREHOLE DIAMETER
Hollow	Stem	Auger			Little Beaver	r										9	6"
SAMPLE	ER TYP	PE(S) AND S	ZES (ID)		STP HAMMER	R TYPE	5				-	_			-		HAMMER EFFICIENCY. ERI
CA Spli	lit Spoo	on 2"			Saftey Hamn	ner											1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
BOREH	IOLE B	ACKFILL ANI	COMPLETION		GROUNDWA	TER		DURIN	NG DRI	LLING	š	AF	TER DR	ILLING (D	ATE)		TOTAL DEPTH OF BORING
Benton	nite Chi	ip, Nov 25th,	2019		READINGS		2.,	ND				NA					6.0'
VATION (II)	РТН (ft)	terial aphics	1	DESCRIPTION		ple Location	Iple Number	/s per 6 in.	vs per foot	(%) Alano	60/ N1,60	son Angle	: Béaring acity (psf)	rained Shear Igth	ling Method	ng Depth	Remarks
ELE	DEI	Gra				Sam	Sam	Blow	Blow	Reci	N/N	Frict	Calc	Stren (psf)	Del	Casi	

	°	Asphalt		100	18/	30. 4.7	53	Ē
		GW: WELL GRADED AGGREGATE BASE ROCK (FILL-GW); medium dense; reddish brown; dry; <3/4" diameter.	20/13/5	00	14,4/ 24,5			
2440	-	SC: SAND CLAY with GRAVEL and COBBLES (Fill-SC); firm; moist; brown; low to medium plasticity; <1" subangular to angular GRAVEL; <4" subangular to angular COBBLE at 2.0' bgs;		50	7) 5,80		5,738	
	2	very fine to coarse SAND.	5/3/4		9.5			
	- 3			60	5/ 4.8/ 8.7/		3.195	
	4		4/3/3					
			-	50	3/ 24/ 4.1		1,683	
	-		2/1/2					
2435	6		-		2			
	7	(						

![](_page_33_Picture_3.jpeg)

LOGG	ED BY		BEGIN DATE	COMPLETION DATE	BOREHOLE	LOCATIO	V (Lat/Lor	g or No	orth/East	st and	Datum	n)		510	H	IOLE ID
JF & J	IS		Dec 4th, 2019	Dec 4th, 2019	41.9699	0519, -	22.394	9164	9							RC-CR-011
DRILLI	NG CO	NTRACTOR			BOREHOLE	LOCATIO	V (Offset.	Station.	Line)	2				7	S	SURFACE ELEVATION
Geo	Serv,	Inc.			STA-861	+30										2353.69'
DRILLI	NG ME	THOD			DRILLING RI	G									B	OREHOLE DIAMETER
Hollow	w Stem	Auger			Little Beave	or										6"
SAMP	LER TY	PE(S) AND S	SIZES (ID)		STP HAMME	R TYPE					_			-	H	AMMER EFFICIENCY. ERI
CA Sp	olit Spor	on 2"			Saftey Ham	mer										
BORE	HOLE B	BACKFILL AN	D COMPLETION		GROUNDWA	ATER	DUR	ING DR	ILLING	3	AF	TER DR	ILLING (D	ATE)	T	TOTAL DEPTH OF BORING
Bento	nite Ch	nip, Dec 4th,	2019		READINGS	1.1	ND			5	NA		2.2			6.0'
ELEVATION (II)	DEPTH (ft)	Material Graphics		DESCRIPTION		sample Location sample Number	dows per 8 in.	liows per foot	tecovery (%)	V/ N60/ N1,60	nction Angle	talo: Béaring tapacity (psf)	erdrained Shear trength sf)	Drilling Method	asing Depth	Remarks

	0	Asphalt		1980	24/	32	7,623		
		GW: WELL GRADED AGGREGATE BASE ROCK (FILL-GW); medium dense; reddish brown; dry; <3/4" diameter.	10/10/10		32.6				
	1	SC: SANDY CLAY with GRAVEL (Fill-SC); stiff to very stiff; moist to dry; reddish brown to dark brown; low to high plasticity; <1/2" subangular to angular GRAVEL; very fine to coarse SAND	16/12/12						1
	-			80	10/ 8/ 13.6			5,326	
	-		13/5/5						 
	3			80	22/ 17,6/ 30			11.717	i i
2350	-		4/8/14						
	4				200			10.000	
	5	Weathered Volcanic Rx: NATIVE ROCK: very		80	16/ 27.2			10:652	
		dense; weathering to clay; highly weathered; gravel to cobble subangular grains; weathering decreases with depth.	7/9/11						
\$	6 <b>-</b>				2				-
	-								
	_								

![](_page_34_Picture_3.jpeg)

LOGGE	D BY	-	BEGIN DATE	COMPLETION DATE	BOREHOLE L	OCA	TION	(Lat/Long	or Nor	th/Eas	st and	Datum	0		1	1	HOLE ID
JF & J	s		Dec 3rd, 2019	Dec 3rd, 2019	41.97099	703	, -12	2.375	5689	3							RC-CR-011B
DRILLIP	NG COI	NTRACTOR			BOREHOLE L	OCA	TION	(Offset, S	station.	Line)						-	SURFACE ELEVATION
Geos	Serv,	Inc.			STA-918-	+36											2389.63'
DRILLIN	NG MET	THOD		11	DRILLING RIG	à		_		_						1	BOREHOLE DIAMETER
Hollow	/ Stem	Auger			Little Beaver	6											6"
SAMPL	ER TY	PE(S) AND S	SIZES (ID)		STP HAMMER	R TYP	ЪЕ		-	-						-	HAMMER EFFICIENCY. ERI
CA Spl	lit Spor	an 2"			Saftey Hamm	ner											10. a & 2. 4
BOREH	HOLE B	ACKFILL AN	D COMPLETION		GROUNDWAT	TER		DURIN	NG DRI	LLING	5	AFT	TER DR	ILLING (E	DATE	).	TOTAL DEPTH OF BORING
Benton	nite Chi	ip, Dec 3rd,	2019		READINGS	_	2	ND				NA	1.11				2.3'
LEVATION (II)	DEPTH (ft)	Material Graphics		DESCRIPTION		ample Location	ample Number	llows per 6 in.	lows per foot	(%) (%)	V N60/ N1,60	riction Angle	alc Béaring apacity (psf)	erdrained Shear trength sf)	Drilling Method	asing Depth	Remarks

	Asphalt		100						
	GW: WELL GRADED AGGREGATE BASE ROCK (FILL-GW); dense; reddish brown; dry; <3/4" diameter.		80	36/ 28/ 47.6	36	16.957			
NSWERS -	Weathered Volcanic Rx: NATIVE ROCK; very dense; cohesionless; highly weathered to fresh; gravel to cobble subangular grains; weathering decreases with depth.	14/16/19					 		
an the start		-	80	50/ 40/ 68	49.5	45,760			
NANANANANANANANANANANANANANANANANANANA		24/ 50:0.333							
-									

![](_page_35_Picture_3.jpeg)
LOGGE	DBY		BEGIN DATE	COMPLETION DATE	BOREHOLEL	BOREHOLE LOCATION (Lat/Long or North/East and Datum)								HOLE ID		
JF & JS	s		Dec 3rd, 2019	Dec 3rd, 2019	41.97727	691,	-12	2.364	3068	8						RC-CR-012
DRILLIN	DRILLING CONTRACTOR					BOREHOLE LOCATION (Offset, Station, Line)										SURFACE ELEVATION
GeoServ, Inc.					STA-960+49										2395.86'	
DRILLIN	DRILLING METHOD					DRILLING RIG										
Hollow Stem Auger					Little Beaver											6"
SAMPLER TYPE(S) AND SIZES (ID)					STP HAMMER TYPE											HAMMER EFFICIENCY. ERI
CA Spl	lit Spoo	on 2"			Saftey Hammer										All a second	
BOREH	OLE B	ACKFILL AND	COMPLETION		GROUNDWA	TER		DURING DRILLING		ING AFTER DRILLING (DATE)			ILLING (D	ATE)	TOTAL DEPTH OF BORING	
Benton	nite Chi	ip, Dec 3rd, 2	019		READINGS		2.,	ND			5.	NA		125		3.0'
ELEVATION (II)	DEPTH (ft)	Material Graphcs	7	DESCRIPTION		Sample Location	sample Number	slows per 8 in.	Blows per foot	Recovery (%)	V/ N60/ N1,60	riction Angle	Calc. Bearing Capacity (psf)	erdrained Shear trength osf)	Drilling Method Sering Denth	Remarks

0	Asphalt		100	11	11	i Li	Π	
	GW: WELL GRADED AGGREGATE BASE ROCK (FILL-GW); medium dense; reddish brown; dry; <3/4" diameter.		80	28/ 22.4/ 38.1	33	10,254		
395 1—	SC: SANDY CLAY with GRAVEL (Fill-SC); loose to moderately stiff; moist; reddish brown to dark brown; low to high plasticity; <1/2" subangular to angular GRAVEL; very fine to coarse SAND	17/15/13						
			80	37/	46	19 151		
-			50	29.6/				
	Weathered Volcanic Rx: NATIVE ROCK; dense; cohesionless; highly weathered; gravel to cobble subangular grains; weathering decreases with depth.	7/11/26						
3								
-								
-								



LOGGE	D BY	1	BEGIN DATE	COMPLETION DATE	BOREHOLE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)								HOLEID			
JF & JS	5		Dec 3rd, 2019	Dec 3rd, 2019	41.98730	504,	-122	2.353	3275	3							RC-CR-013
DRILLIN	RILLING CONTRACTOR					OCATI	ION (C	Offset, S	Station.	Line)	3				1		SURFACE ELEVATION
GeoServ, Inc. DRILLING METHOD					STA-1019+33 DRILLING RIG										1	2663.56'	
															1	BOREHOLE DIAMETER	
Hollow Stem Auger					Little Beaver												6"
SAMPLE	SAMPLER TYPE(S) AND SIZES (ID)					STP HAMMER TYPE											HAMMER EFFICIENCY. ERI
CA Spli	it Spoo	on 2"			Saftey Hammer											10. a 14. P.	
BOREH	OLE B	ACKFILL AN	D COMPLETION		GROUNDWAT	FER		DURI	NG DRI	LLING	5	AFT	TER DR	ILLING (D	ATE)		TOTAL DEPTH OF BORING
Benton	Bentonite Chip, Nov 25th, 2019				READINGS	<u></u>	2,)	ND				NA	÷.,	129			3.0'
ATION (II)	TH (ft)	erial phrcs		DESCRIPTION		ole Location	Ne Number	s per 8 in.	s per foot	(%) (Jen	50/ N1,60	on Angle	Bearing city (psf)	ained Shear gth	ng Method	ig Depth	Remarks
ELEV	DEP	Gra				Samp	Sam	Blow	Blow	Reco	N/N	Fricti	Calc	Streng (psf)	Della	Casir	

		GW: WELL GRADED AGGREGATE BASE ROCK (FILL-GW); dense; reddish brown; dry; <3/4" diameter.	17/17/21	80	38/ 30.4/ 51.7	36	20,466			
	-	SC: SAND CLAY with GRAVEL and COBBLES (Fill-SC); hard; moist to dry; reddish brown to dark brown; low to medium plasticity; <1" subangular to angular GRAVEL; <4" subangular COBBLE; very fine to coarse SAND.		80	50/ 40/ 68			28629		
	-		20/18/33							
	2									
1	3									10
2660	-									



LOGGE	DBY		BEGIN DATE	COMPLETION DATE	BOREHOLEL	BOREHOLE LOCATION (Lat/Long or North/East and Datum)								HOLE ID			
JF & JS	s		Dec 3rd, 2019	Dec 3rd, 2019	41.97727691, -122.36430688										RC-CR-014		
DRILLIN	DRILLING CONTRACTOR					BOREHOLE LOCATION (Offset, Station, Line)											
GeoServ, Inc. DRILLING METHOD					STA-1059+30 DRILLING RIG										2395.86'		
															BOREHOLE DIAMETER		
Hollow Stem Auger					Little Beaver	9. S.									6"		
SAMPLER TYPE(S) AND SIZES (ID)					STP HAMMER	HAMMER EFFICIENCY. ERI											
CA Spli	it Spot	on 2"			Saftey Hammer										10. a. s. 19.		
BOREH	OLE B	ACKFILL A	ND COMPLETION		GROUNDWATER DURING DRILLING AFTER DRILLING						DRILLING (	DATE)	5	TOTAL DEPTH OF BORING			
Bentonite Chip, Dec 3rd, 2019					READINGS		ND				NA		$\leq 1$		7.8'		
(ATION (II)	(t) H1	erial phics		DESCRIPTION		ple Location ple Number	s per 8 in.	s per foot	(%) (January (%)	80/ N1,60	on Angle Bearing	acity (psi) alned Shear gth	ing Method	ng Depth	Remarks		
ELEV	DEF	Gra				Sam	Blow	Blow	Rect	N/N	Frict	Strem (nsf)	Della	Casi			

	0	GW: WELL GRAI ROCK (FILL-GW brown; dry; <3/4"	DED AGGREGATE BASE y; medium dense; reddish diameter.		90	16/ 12.8/ 21.8	33	4,031		
2395	, † .	SC: SANDY CLA stiff to hard; mois low to high plastic angular GRAVEL	Y with GRAVEL (Fill-SC); very t; reddish brown to dark brown; ity; <1/2" subangular to ; very fine to coarse SAND	9/6/10						144
K	2			7/9/9	100	19/ 14.4/ 24.5			9,588	-
	3				100	24/ 19.2/ 32.6			12.782	
	4			9/11/13	100	11/			5,669	0
	5			8/4/7		15				E
2390	6				90	32) 26.6) 41.2			17.043	4
	7			10/13/19						1
	8	Weathered Volca dense; cohesionil to cobble subang decreases with de	nic Rx: NATIVE ROCK; very ess; highly weathered; gravel ular grains; weathering epth.	50:0.333	80	50) 40) 59	50	29,053		- 





Photographs 1. Road Core RC-CR-001 (STA 180+60.0) SPT sample taken from 0-1.5' bgs.



Photograph 2. Asphalt core sample at Road Core RC-CR-002 (STA 236+20.0).



**Photograph 3/4/5**. SPT samples taken at 0-1.5' bgs -**Left**, 1.5-3' bgs -**Middle**, & 3-4.5' bgs -**Right** (CR-RC-002).



Photograph 6 & 7. SPT sample taken at 4.5-6.0' bgs-Left, & 6.5-6.584' bgs-Right (CR-RC-002).



Photograph 7. Asphalt core sample at Road Core RC-CR-003 (STA 220+57.0).



**Photographs 8/9/10**. SPT samples taken at 0-1.5' bgs-**Left**, 1.5'-3.0' bgs-**Middle**, & 3.0-4.5' bgs-**Right** (CR-RC-003).



Photograph 11. Looking at asphalt coring at Road Core RC-CR-004 (STA 315+66.0).



Photograph 12. Asphalt core sample at Road Core RC-CR-004.



Photograph 13. SPT sample taken at 0-0.8' bgs (CR-RC-004).



Photograph 14. Asphalt core sample at Road Core RC-CR-005 (STA 386+17.0).



Photograph 15 & 16. SPT samples taken at 0-1.5' bgs -Left, & 1.5-1.958' bgs-Right (CR-RC-005)



Photograph 17. Looking at asphalt coring at Road Core RC-CR-006 (STA 430+68.0).



Photograph 18. SPT sample taken at 0-1.5' bgs (CR-RC-006)



Photograph 19. Asphalt core sample at Road Core RC-CR-007 (STA 470+56.0)



Photograph 20. SPT sample taken at 0-0.8' bgs (CR-RC-007)



Photograph 21. Asphalt core sample at Road Core RC-CR-008. (507+44.0)



Photographs 22 & 23. SPT samples taken at 0-1.5' bgs-Left, & 2.5-4.0' bgs-Right (CR-RC-008)



Photograph 24. SPT sample taken at 4.0-5.5' bgs (CR-RC-008)



Photograph 25. Asphalt core sample at Road Core RC-CR-009 (STA 552+05).



Photograph 26 & 27. SPT samples taken at 0-1.5' bgs -Left, & 1.5-3.0' bgs -Right (CR-RC-009)



Photograph 28. Asphalt core sample at Road Core RC-CR-09A, (STA-739+58.0).



**Photograph 29**. Looking at SPT sample taken from 0.5-2.5' bgs (RC-CR-09A).



Photograph 30. Looking at Road Core location RC-CR-010 (STA 739+58.0).



Photograph 31. Looking at Road Core location RC-CR-010A (STA 831+92.0).



Photograph 32. Looking at Road Core location RC-CR-010B (STA 753+85).



Photograph 33. Looking at Road Core location RC-CR-011 (STA 861+30.0).



Photograph 34. Looking at Road Core location RC-CR-011A (STA 918+36.0).



Photograph 35. Looking at Road Core location RC-CR-012 (STA 960+49.0).



Photograph 36. Looking at Road Core location RC-CR-013 (STA 1019+33).



Photograph 37. Looking at Road Core location RC-CR-013 (STA 1059+30).

Kiewit Infrastructure West Co. Klamath River Renewal Project Geotechnical Data Report

### **APPENDIX I2**

## Transportation Geotechnical Data Report (by GeoServ, Inc.)

(Pages I2-1 to I2-64)



July 14, 2020

Knight Piésold Ltd. (KP)

Subject: KRRP Transportation Geotechnical Data Report

Dear Knight Piésold:

In accordance with your request and authorization of GeoServ, Inc. (GSI) has prepared the enclosed Geotechnical Data Report based on the requirements and proposed project specifics identified during our review. Specifically, this report provides a summary of the methods used to collect geotechnical data and the data results for the following sites:

- Sheet 1 Copco Road at Dry Creek Bridge
- Sheet 2 Lakeview Road Bridge
- Sheet 3 Scotch Creek Culvert
- Sheet 4 Camp Creek Culvert
- Sheet 5 Fall Creek at Daggett Road
- Sheet 6 Fall Creek at Substation Road Bridge
- Sheet 7 Fall Creek at Copco Road Bridge

The memo includes Appendix A that shows and lists relevant data and diagrams to include:

- Borehole Locations and Logs
- Borehole Data
- Site Summary Photographs
- Available Laboratory Data

Data and results presented in this report are preliminary and subject to change. Additional analyses and interpretations need to be made from the data at the 90% design phase. Data analysis, interpretation, and design recommendations are not included at this time pending input from KP. If you have any questions regarding the data and results, please do not hesitate to contact this office. The opportunity to be of service is appreciated.

Respectfully submitted,

James Fitzgerald, Senior Geologist GeoServ, Inc. 624 South Mount Shasta Blvd. Mount Shasta, CA 96067 (530) 227-8963 jf@geoscienceserv.com



## KRRP Transportation Geotechnical Data Report

Prepared for: Knight Piésold Ltd. (KP)

Prepared by: GeoServ, Inc. (GSI)

Initial Draft Report Date: June 24, 2020

Second Draft Report Date: July 14, 2020





#### Summary

GSI completed a subsurface geotechnical investigation at seven sites associated with the transportation system needed for KRRP construction access and post dam drawdown road improvements. The investigation included compiling existing data and information and drilling geotechnical borings. These data were used to characterize and measure subsurface conditions. This report includes a summary of the methods used for data collection, presents the geotechnical data, and lists the data limitations.

Field investigation of the transportation sites was accomplished through advancement of 18 geotechnical borings at the following sites:

Site	Borehole ID
	BH-DR01
Coppo Road at Day Crook Bridge	BH-DR02
Copeo Road at Dry Creek Blidge	BH-DR03
	BH-DR04
Laboriow Pood Bridge	BH-A01
Lakeview Road Dildge	BH-A02
Santah Crook Culwort	BH-SC01
Scotch Creek Cuivert	BH-SC02
Camp Graak Culvant	BH-CC01
Camp Creek Curvert	BH-CC02
Fall Crock Culvert at Deccett Pood	BH-DG03
Fan Creek Curvert at Daggett Koad	BH-DG04
Fall Creak Culturet at Substation	BH-DG01
Fail Creek Curvert at Substation	BH-DG02
	BH-FL01
Conne Road at Fall Creek Bridge	BH-FL02
Copeo Road at Fall Creek Bridge	BH-FL03
	BH-FL04

The borehole locations are shown on the following sheets:

- Sheet 1 Copco Road at Dry Creek Bridge
- Sheet 2 Lakeview Bridge
- Sheet 3 Scotch Creek Culvert
- Sheet 4 Camp Creek Culvert
- Sheet 5 Fall Creek at Daggett Road
- Sheet 6 Fall Creek at Substation Road Bridge
- Sheet 7 Fall Creek at Copco Road Bridge

#### Methods

This investigation was completed to obtain information on the engineering properties of site fill, soil, rock, and groundwater at sites associated with the project road, bridge, and culvert improvements sites. The engineering properties of the site rocks and soils were assessed using industry standard methods (BOR 2001, U.S. Army Corps of Engineers 1960, and Williamson 1984). The rocks and soils were classified and assessed following the most recent ASTM methods.

Eighteen (18) boreholes were advanced at 7 project sites using either a Lonestar Auger Drill, Deere 35G Limited Access Drill, or a T1 Air Hammer Drill. The drilling tools included a 6" hollow stem auger and a 10" tri-cone bit. Standard Penetration Test (SPT) and bulk samples were taken in each borehole. Relatively undisturbed samples were taken with a 2" SPT sampler at 2.5' to 5' intervals or at changes in soil/rock type. At Lakeview Bridge, once the rock layer was reached, the holes were advanced with the T1 Air Hammer Drill with a 10" Tri-Cone bit.

Borehole logs and summary sheets were drafted following CalTrans standards. For each borehole, the rock/soil depth, color, particle size and volume, relative density/consistency, particle angularity and shape, moisture content, strength, cohesion, plasticity, and compaction were visually noted and field classified. SPT tests were completed following ASTM 1586. Split spoon core samples were collected, photographed, and field classified. The recovery of un-disturbed samples was limited given the material characteristics. The borehole logs are shown in Appendix A. A subset of the samples were sent to a soil laboratory and tested for gradation, plasticity, and strength (Appendix A). Field and laboratory measured soil and rock properties are summarized in Appendix A – Table 1. Summary photos of each site are included in Appendix A.

This report includes the data for each site and does not provide data analysis, interpretation, or design recommendations. At Scotch and Camp Creeks, that have had existing geotechnical data, their historic data was combined with the GSI data to help characterize the horizontal and vertical extent of subsurface conditions (Sheet 3 and Sheet 4).

#### Results

#### Copco Road at Dry Creek Bridge

Drilling at this site was accomplished with moderate to high drilling effort. The boreholes were located as close to the existing bridge abutments as possible (Sheet 1). For all four boreholes, there is a layer of rock rubble and native fill at the surface. That fill likely extends down to the base of the abutments. The total depth drilled to auger refusal ranged from 5.5' to 11.5' below ground surface (bgs) (Appendix A – Borehole Logs and Table 1). The measured fill thickness ranges from 5' to 7.5' bgs. The material consists of cohesive sandy gravel/cobble clay with soft to very stiff consistency (Appendix A – Borehole Logs and Table 1). For the directly observed fill bulk samples, the sand is very fine to coarse, the clay has medium to high plasticity, gravels are less than 1" in diameter, and cobbles are about 2.5" in diameter. Below the fill layer, there is in-place native rock. Most of the in-place material is hard volcanic rock varying from fresh to very weathered into clay with gravel and cobbles. No groundwater was observed within the boreholes.

#### Lakeview Bridge

Drilling at this site was accomplished with moderate to high drilling effort. Boreholes BH-AB01 and BH-AB02 were located on the right bank of the river on the shoulder of Copco Road and the boat ramp (Sheet 2). At BH-AB01 and BH-AB02 depth to refusal ranged from 35' and 30' bgs, respectively (Appendix A – Borehole Logs and Table 1). The right river bank has three prominent layers of material, an upper artificial fill (containing: gravels, cobbles, and boulders), a clay rich material, and a volcanic bedrock material to at least 35' bgs. The artificial fill layer was encountered to a depth of about 5' bgs. The upper layer was rock rubble likely placed as part of road construction. The fill was generally loose near the surface and dense before the clay soil was encountered. The clay soil is stiff and moist from  $\sim$ 5' to 18' bgs. At 18' bgs, the stiff clay soil transitioned to a soft organic sandy clay in BH-AB01 and a loose gravelly clay in BH-AB02. The thickness of these soft and loose layers ranges from 2.5' to 5.0'. Below the weaker layer of gravelly clay and sandy clay is a very dense weathered volcanic rock. The USGS mapped the dominant geological unit in the area as Tertiary volcanic rock; minor pyroclastic deposits that correlates to the observed rock. The degree of weathering decreased with depth at 35.0' bgs in BH-AB-01 and 30.0' bgs in BH-AB02. The depth to bedrock in BH-AB01 and BH-AB02 correlated well. Groundwater was encountered in BH-AB01 at 13.0' bgs and in BH-AB02 at 10.0' bgs. The observed groundwater depths were well above the river water level. It appears that there is perched shallow groundwater flowing along the soil-rock contact.

#### Scotch Creek Culvert

Drilling at this site was accomplished with moderate to high drilling effort. Boreholes BH-SC01 and BH-SC02 were located on the right and left banks, respectively, of Scotch Creek just downstream of Copco Road (Sheet 3). At BHSC-01 and BH-SC02 depth to refusal ranged from 7.5' and 7' bgs, respectively (Appendix A – Borehole Logs and Table 1). The right and left streambanks have two prominent layers of material, alluvial sandy to clayey gravel and weathered volcanic rock (at a relatively shallow depth). The upper layer of clay, sand, and gravel is stiff/dense and moist from 0' to 7' bgs. At about 7' bgs, the alluvium transitioned to a very dense weathered volcanic rock. The USGS mapped the dominant geological unit in the area as Tertiary volcanic rock; minor pyroclastic deposits that correlates to the observed rock. The degree of weathering decreased with depth at 7.5' bgs at BH-SC01. No groundwater was not encountered within the boreholes.

#### **Camp Creek Culvert**

Drilling at this site was accomplished with low to moderate drilling effort. Boreholes BH-CC01 and BH-CC02 were located on the left and right banks, respectively, of Camp Creek just downstream of Copco Road (Sheet 4). At BH-CC01 and BH-CC02 depth to refusal ranged from 20' and 22' bgs, respectively (Appendix A – Borehole Logs and Table 1). The right and left streambanks have two prominent layers of material, loose alluvial sandy clay to clayey sand and medium dense well graded sand. No bedrock was encountered in either borehole. From 0' to 18' bgs, the alluvium is likely sediment deposited in Camp Creek delta on top of the original stream channel (Sheet 4). The upper layer of alluvial material is loose and liquefiable given that during drilling sand flowed up into the auger. Groundwater was encountered in both boreholes between 3' and 4' bgs. The groundwater was perched above the stream with the surface water in the stream 2' to 3' lower than the water level measured in the boreholes.

#### Fall Creek at Daggett Road

Drilling at this site was accomplished with low to high drilling effort. The boreholes were located as close to the existing culvert as possible (Sheet 5); however, given the road width, underground utilities, and the need to keep the road open during drilling, the holes had to be located at a less than ideal proximity to the culvert (Sheet 5). For BH-DG03, the top of the borehole was located adjacent to the road at the toe of the road fillslope. The fill consists of medium dense clayey sand and gravel and extends to about 10.5' bgs (Appendix A – Borehole Logs and Table 1). Below the fill is a 2.5' thick layer of loose to stiff sandy clay. Below the clay is a very dense weathered volcanic rock. The USGS mapped the dominant geological unit in the area as Tertiary volcanic rock; minor pyroclastic deposits that correlates to the observed rock. For BH-DG04, the borehole was located in the road shoulder about 40' west of the existing culvert. The top 3' is fill consisting of loose to medium dense clayey sand and gravel (Appendix A – Borehole Logs and Table 1). Below the fill there is a stiff sandy silty clay with gravel to 6.5' bgs. Below the clay a very dense weathered volcanic rock similar to the rock encountered in BH-DG03. No groundwater was observed within the boreholes.

#### Fall Creek at Substation Road Bridge

Drilling at this site was accomplished with medium to high drilling effort. The boreholes were located as close to the existing bridge as possible (Sheet 6); however, given the road width and the need to keep the road open during drilling, the holes had to be located at a less than ideal distance from the bridge (Sheet 6). For BH-DG02, there is fill that consists of medium dense sandy gravel to about 1.5' bgs (Appendix A – Borehole Logs and Table 1). Below the fill is stiff sandy clay with gravel to 9.5' bgs. Below the clay is a very dense weathered volcanic rock was encountered to at least about 11' bgs. The USGS mapped the dominant geological unit in the area as Tertiary volcanic rock; minor pyroclastic deposits that correlates to the observed rock. For BH-DG01, there is fill that consists of very stiff gravelly clay to 7' bgs (Appendix A – Borehole Logs and Table 1). Below the fill is a stiff to very stiff gravely clay with sand to 9.0' bgs. Auger refusal was met in this hole before hitting rock. No groundwater was observed within the boreholes.

#### Fall Creek at Copco Road Bridge

Drilling at this site was accomplished with high drilling effort. The boreholes were located as close to the existing bridge abutments as possible (Sheet 7). At the surface there was a layer of rock rubble that extends to the base of the abutments in most locations. Only one borehole could be advanced through the rock rubble layer (i.e., BH-FC1). The total depth drilled to auger refusal ranged from 2' to 6.1' bgs (Appendix A – Borehole Logs and Table 1). The fill consists loose to medium dense clayey sand and gravel. No groundwater was observed within the boreholes.

#### Limitations

The geotechnical data presented in this report were collected following current geologic and engineering practice and the standard of care exercised by reputable professional consultants performing similar tasks in this area. The data are preliminary and subject to change. No other warranty, expressed or implied, is made regarding the data in this report. Variations may exist and conditions not observed or measured as part of this effort#nay exist at the site(s).

#### References

U.S. Army Corps of Engineers, 1960. The Unified Soil Classification System: U.S. Army Technical Memorandum 3-357.

U.S. Bureau of Reclamation (BOR), 2001. Engineering Geology Field Manual, Second Edition, Volume I.

Williamson, D.A., 1984, Unified Rock Classification System: Bulletin of the Association of Engineering Geologists, Vol. XXI, No. 3, p. 345-354.



R

 $\langle \mathcal{L} \rangle$ //

BH-DR02 -

# $\frac{\text{VICINITY}}{1" = 1 \text{ MILE}} \text{MAP}$













SUBSURFACE CONDITIONS UNKNOWN

SECTION-1"= 100'; 5H = 1V



VICINITY MAP 1" = 1 MILE



GEOSERV, INC.

P.O. BOX 831 MOUNT SHASTA, CA 96067 PH: (530) 227-8963 FAX: (530) 926-8921

SITE INVESTIGATION, COPCO ROAD, HORNBROOK, SISKIYOU COUNTY

SHEET NAME:

STRATA DESCRIPTIONSTRENGTH/ DENSITY DESC.CALC. BEARING CAPACITY (PSF)UNDRAINED SHEAR STRENGTH (PSF)A A A A A A A A A A A A A A A A A A A A BOULDERMODERATELY STRONGCALC. BEARING CALC. BEARING STRENGTH (PSF)BOULDER BOULDER A COBBLEBOULDER BOULDER A COBBLEImage: Comparison of the comparison			LEGEND		
A A A A A       BASALT       MODERATELY STRONG         BOULDER       BOULDER         BOULDER       BOULDER         CL       MEDIUM STIFF         FHLL       SEE INNER STRATUM         CH-SC       VERY LOOSE         GP       MEDIUM DENSE TO DENSE         OL       VERY SOFT         SP       LOOSE TO MEDIUM DENSE         SP       LOOSE TO MEDIUM DENSE         SP       LOOSE TO MEDIUM DENSE         SP       LOOSE TO MEDIUM DENSE         SV       VERY LOOSE TO DENSE         SP       LOOSE TO MEDIUM DENSE         A A A A       VOLCANIC BRECCIA       VERY WEAK         X       VOLCANIC SILTSTONE       WEAK TO MOD. STRONG		STRATA DESCRIPTION	STRENGTH/ DENSITY DESC.	CALC. BEARING CAPACITY (PSF)	UNDRAINED SHEAR STRENGTH (PSF)
P       BOULDER       BOULDER         BOULDER       & COBBLE       Image: Comparison of the streng strength of the streng strength of the strengt		BASALT	MODERATELY STRONG		
Image: Second constraints       BOULDER & COBBLE         CL       MEDIUM STIFF         FILL       SEE INNER STRATUM         CH-SC       VERY LOOSE       196-355         GC       VERY STIFF       196-355         GC       VERY STIFF       123         GP       MEDIUM DENSE TO DENSE       196-3,008         SP       LOOSE TO MEDIUM DENSE       196-3,008         SP       LOOSE TO DENSE       196-3,008         SW       VERY LOOSE TO DENSE       1,878-3,008         A A A A A       VOLCANIC BRECCIA       VERY WEAK       1.878-3,008         X       VOLCANIC SILTSTONE       WEAK TO MOD. STRONG       VERA TO MOD. STRONG		BOULDER			
CL       MEDIUM STIFF         FHL       SEE INNER STRATUM         FHL       SEE INNER STRATUM         CH-SC       VERY LOOSE       196-355         GC       VERY STIFF       196-355         GP       MEDIUM DENSE TO DENSE       123         OL       VERY SOFT       196-3,008         SP       LOOSE TO MEDIUM DENSE       196-3,008         SP       LOOSE TO MEDIUM DENSE       196-3,008         SW       VERY LOOSE TO DENSE       1,878-3,008         A A A A A       VOLCANIC BRECCIA       VERY WEAK       1.878-3,008         X       VOLCANIC SILTSTONE       WEAK TO MOD. STRONG       Image: Note Street		BOULDER & COBBLE			
FILLSEE INNER STRATUMCH-SCVERY LOOSE196-355GCVERY STIFF196-355GPMEDIUM DENSE TO DENSE123OLVERY SOFT123SPLOOSE TO MEDIUM DENSE196-3,008SPLOOSE TO MEDIUM DENSE196-3,008SPSWVERY LOOSE TO DENSE1,878-3,008AAAAAAVOLCANIC BRECCIAVERY WEAKVOLCANIC SILTSTONEWEAK TO MOD. STRONGVERY NOA		CL	MEDIUM STIFF		
CH-SCVERY LOOSE196-355GCVERY STIFFIGPMEDIUM DENSE TO DENSEIOLVERY SOFT123SPLOOSE TO MEDIUM DENSE196-3,008SPSWVERY LOOSE TO DENSE1,878-3,008SWVERY WEAKVERY WEAKVOLCANIC BRECCIAVERY WEAKVOLCANIC SILTSTONEWEAK TO MOD. STRONG		FILL	SEE INNER STRATUM		
GC       VERY STIFF       Image: Stiff formula		CH-SC	VERY LOOSE	196-355	
GP       MEDIUM DENSE TO DENSE       Image: Construction of the construction		GC	VERY STIFF		
OLVERY SOFT123SPLOOSE TO MEDIUM DENSE196-3,008SWVERY LOOSE TO DENSE1,878-3,008A A A A A A A A AVOLCANIC BRECCIAVERY WEAKVOLCANIC SILTSTONEWEAK TO MOD. STRONG	2000 2000 2000 2000 2000	GP	MEDIUM DENSE TO DENSE		
SP       LOOSE TO MEDIUM DENSE       196-3,008         SW       VERY LOOSE TO DENSE       1,878-3,008         A A A A A       VOLCANIC BRECCIA       VERY WEAK         VOLCANIC SILTSTONE       WEAK TO MOD. STRONG       VOLCANIC VERY WEAK		OL	VERY SOFT		123
SW     VERY LOOSE TO DENSE     1,878-3,008       A A A A A A A A A A     VOLCANIC BRECCIA     VERY WEAK       K     VOLCANIC BRECCIA     VERY WEAK       K     VOLCANIC SILTSTONE     WEAK TO MOD. STRONG		SP	LOOSE TO MEDIUM DENSE	196-3,008	
A A A A A     VOLCANIC       A A A A     BRECCIA       A A A A     VOLCANIC       BRECCIA     VERY WEAK       VOLCANIC     WEAK TO       SILTSTONE     WEAK TO       MOD. STRONG		SW	VERY LOOSE TO DENSE	1,878-3,008	
VOLCANIC     WEAK TO       SILTSTONE     MOD. STRONG	$\begin{smallmatrix} \Delta & \Delta & \Delta & \Delta & \Delta \\ \Delta & \Delta & \Delta & \Delta & \Delta \\ \Delta & \Delta &$	VOLCANIC BRECCIA	VERY WEAK		
	$\langle \times \rangle$	VOLCANIC SILTSTONE	WEAK TO MOD. STRONG		

CAMP CREEK CULVERT **REVISIONS:** PROJECT NO: 190725 ISSUE DATE: 7/14/20 SCALE: AS NOTED DRAWN BY: KF ENGINEERED: CHECKED: JF FIGURE:

300

200

1" = 100'





PROJECT NO: 190725
issue date: <b>7/14/20</b>
SCALE: AS NOTED
drawn by: KF
ENGINEERED:
CHECKED: JF
FIGURE: 5

**REVISIONS:** 

FALL CREEK CULVERT at DAGGETT ROAD

SHEET NAME:

SITE INVESTIGATION, COPCO ROAD, HORNBROOK, SISKIYOU COUNTY





GEOSERV, INC.







## VICI<u>NITY</u>MAP 1" = 1 MILE





## APPENDIX A

Borehole Logs and Data
## Table 1. KRRP Transportation Geotechnical Data Borehole Data Summary Table

								Relative		Field Measured Friction	Lab Measured Friction	Lab Measured	Undrained Shear	Lab		Cohesive	Presumptive Bearing	Calculated Bearing
Feature	Borehole	Depth Groundwate	n Material Type	Cohesion Type	N	N60	N1 60	Density (N60)	Relative	Angle	Angle (deg)	Cohesion	Strength	Measured	Non-cohesive Soil	Soil	Capacity	Capacity
Copco Road at Dry Creek Bridge	BH-DR01	3 No Wate	r Clavey Sand	Cohesive	13	10.4	17.7	.56	Density	(ucg)	(ucg)	(psi)	5.538	Tasticity	Density	Stiff		(psi)
Copco Road at Dry Creek Bridge	BH-DR02	5.5 No Wate	r Sandy Clay	Cohesive	10	8.0	13.6	44					4.260			Firm	1 1	
Copco Road at Dry Creek Bridge	BH-DR02	8 No Wate	r Sandy Clay	Cohesive	7	5.6	8.2	34					2,982			Firm	11	
Copco Road at Dry Creek Bridge	BH-DR02	10.5 No Wate	r Sandy Clay	Cohesive	22	17.6	22.4	63			31.2	222.0	9,372	25		Very Stiff	1 1	
Copco Road at Dry Creek Bridge	BH-DR03	6 No Wate	r Sandy Clay	Cohesive	2	1.6	2.7	18					852			Very Soft		
Copco Road at Dry Creek Bridge	BH-DR03	8.5 No Wate	r Sandy Clay	Cohesive	- 9	7.2	10.2	39					3,834			Stiff	1	
Copco Road at Dry Creek Bridge	BH-DR04	6 No Wate	r Sandy Clay	Cohesive	5	4.0	6.8	30					2,130			Firm		
Copco Road at Dry Creek Bridge	BH-DR04	10 No Wate	r Sandy Clay	Cohesive	11	8.8	11.5	42					4,686			Stiff	1	
Lakeview Road Bridge	BH-AB01	3 No Wate	r Fill	Non-cohesive	20	16.0	27.2	59	65	41			,		Medium Dense		5,117	4,950
Lakeview Road Bridge	BH-AB01	6.5 No Wate	r Clay with Gravel	Non-cohesive	21	16.8	28.6	60	66	41					Medium Dense		5,117	5,305
Lakeview Road Bridge	BH-AB01	10 No Wate	r Clay with Gravel	Non-cohesive	25	20.0	32.6	58	64	42					Medium Dense		5,117	6,767
Lakeview Road Bridge	BH-AB01	15 13	3 Clay with Gravel	Cohesive	15	12.0	13.2						3,697			Stiff		
Lakeview Road Bridge	BH-AB01	20 13	3 Sandy Clay	Cohesive	26	20.5	16.7						5,033			Very Stiff		
Lakeview Road Bridge	BH-AB01	25 13	3 Rock	Non-cohesive	33	26.0	24.7	63	57	45					Dense		9,190	9,774
Lakeview Road Bridge	BH-AB02	6.5 No Wate	r Clay with Gravel	Cohesive	18	14.4	23.2						4,428			Stiff		
Lakeview Road Bridge	BH-AB02	10 10	0 Clay with Gravel	Cohesive	15	12.0	15.7						3,697			Stiff		
Lakeview Road Bridge	BH-AB02	15 10	0 Clay with Sand	Cohesive	3	2.4	2.8						737			Firm		
Lakeview Road Bridge	BH-AB02	20 10	0 Rock	Non-cohesive	28	17.2	18.4	49	54	41					Medium Dense		5,117	5,472
Scotch Creek Culvert	BH-SC01	1 No Wate	r Sandy Gravely Cobbles	Non-cohesive	15	12.0	20.0	66	60	30					Medium Dense		5,117	3,300
Scotch Creek Culvert	BH-SC01	4 No Wate	r Sandy Clay	Cohesive	9	7.2	12.2	35	31				1,107			Stiff	2,089	
Scotch Creek Culvert	BH-SC01	6.5 No Wate	r Clayey Gravel and Sand	Non-cohesive	21	16.8	29.0	78	69	33					Medium Dense		5,117	5,305
Scotch Creek Culvert	BH-SC01	7 No Wate	r Rock	Non-cohesive	50	40.0	68.0	100	90	37					Very Dense		9,189	17,878
Scotch Creek Culvert	BH-SC02	1 No Wate	r Sandy Clay with Cobbles	Cohesive	18	14.4	24.5	73	65				2,214			Very Stiff	2,089	
Scotch Creek Culvert	BH-SC02	3.5 No Wate	r Sandy Gravely Cobbles	Non-cohesive	31	24.8	42.2	84	74	32					Dense		5,117	9,148
Scotch Creek Culvert	BH-SC02	6.5 No Wate	r Rock	Non-cohesive	50	40.0	68.0	100	90	37					Very Dense		9,189	17,878
Camp Creek Culvert	BH-CC01	1 No Wate	r Sandy Clay to Clayey Sand	Non-cohesive	3	2.4	4.1	24	22	20					Very Loose		500	355
Camp Creek Culvert	BH-CC01	5 3.0	0 Sandy Clay to Clayey Sand	Non-cohesive	2	1.6	2.7	20	19	19					Very Loose		400	196
Camp Creek Culvert	BH-CC01	7.5 3.0	0 Poorly Graded Sand	Non-cohesive	12	9.6	16.3	52	46	26					Medium Dense		2,000	2,423
Camp Creek Culvert	BH-CC01	19 3.0	0 Well Graded Sand with Gravel	Non-cohesive	34	19.6	24.9	55	49	30	37.5	607.0			Dense		5,117	6,579
Camp Creek Culvert	BH-CC02	1 4.0	0 Sandy Clay to Clayey Sand	Non-cohesive	3	2.4	4.1	24	22	20					Very Loose		500	347
Camp Creek Culvert	BH-CC02	5 4.0	0 Organic Debris with Sand	Cohesive	1	0.8	1.4	16	14				123			Very Soft	300	0
Camp Creek Culvert	BH-CC02	7.5 4.0	0 Poorly Graded Sand	Non-cohesive	14	11.2	19.0	42	38	27					Medium Dense		2,000	3,008
Camp Creek Culvert	BH-CC02	13 4.0	0 Poorly Graded Sand	Non-cohesive	10	8.0	11.4	35	32	25					Loose		1,500	1,876
Camp Creek Culvert	BH-CC02	19 4.0	0 Well Graded Sand with Trace Gravel	Non-cohesive	3	2.4	3.0	18	16	20					Very Loose		400	349
Camp Creek Culvert	BH-CC02	21 4.0	0 Well Graded Sand with Trace Gravel	Non-cohesive	3	2.4	2.9	18	16	20					Very Loose		400	349
Camp Creek Culvert	BH-CC02	21.5 4.0	0 Clayey Sand	Non-cohesive	33	26.0	31.0	67	75	41	43.4	39.0			Dense		400	349
Fall Creek Culvert at Daggett Road	BH-DG03	11 No Wate	r Sandy Clay	Cohesive	9	7.2	9.1						2,214	46		Stiff		<b> </b>
Fall Creek Culvert at Daggett Road	BH-DG03	15 No Wate	r Rock	Non-cohesive	50	40.0	46.8	99	113	49					Very Dense		15,500	17,857
Fall Creek Culvert at Daggett Road	BH-DG04	3.5 No Wate	r Sandy Silty Clay	Cohesive	12	9.6	16.3						2,945			Stiff		<b> </b>
Fall Creek Culvert at Daggett Road	BH-DG04	5 No Wate	r Clay	Cohesive	21	16.8	28.6						5,159			Very Stiff		<b> </b>
Fall Creek at Substation Road Bridge	BH-DG02	3.5 No Wate	r Clay with Sandy Gravel	Cohesive	14	11.2	19.0						3,446			Stiff	<u> </u>	<u> </u>
Fall Creek at Substation Road Bridge	BH-DG02	8.5 No Wate	r Kock	Non-cohesive	33	26.4	25.3	61	69	44					Dense		9,190	9,983
Fall Creek at Substation Road Bridge	BH-DG01	3.5 No Wate	r Gravelly Clay with Sand	Cohesive	34	27.2	46.2						8,354			Hard	┥───┤	
Fall Creek at Substation Road Bridge	BH-DG01	7.5 No Wate	r Gravelly Clay with Sand	Cohesive	26	20.8	31.2						6,391			Very Stiff	┥───┤	l
Fall Creek at Copco Road Bridge	BH-FC01	3 No Wate	r Silty Clay with Gravel	Cohesive	7	5.6	9.5						1,713			Firm	┥───┤	<b> </b>
Fall Creek at Copco Road Bridge	BH-FC01	4.5 No Wate	r Silty Clay with Gravel	Cohesive	14	11.2	19.0						3,425			Stift		L

LOGGE	DBY		BEGIN DATE COMPLETION DATE	BOREHOLE	OCATI	ON (Lat	Lang o	r Nort	WEas	t and	Datum	)		-	HOLE ID	20.00
JF&J	S	ONTRACT	January 26th, 2020 January 27th, 2020 OR	41.91759 BOREHOLE I	, -12	ON (Offs	6 et, Sta	tion. 1	ine)	-					BH-DF	LEVATION
Geo	Serv	, Inc.		None		2		and the second							2168.06	
DRILLI	NG ME	ETHOD		DRILLING RIC	G	_								-	BOREHOLE	DIAMETER
Hollow	Sterr	Auger		Lonestar Dr	TYPE	_								_	6"	FICIENCY ER
SPT 2		11 2(0) A		Saftey Hami	mer										TOWNING CO	rienzia (, zia
BOREN Neat C	IOLE	BACKFIL nt, 1/27/20	L AND COMPLETION	GROUNDWAT READINGS	TER	D	URING D	DRIL	LING		AFT	ER DR	ILLING (D	ATE)	TOTAL DEP	TH OF BORING
ELEVATION (ft)	DEPTH (1)	Material Graphics	DESCRIPTION		Sample Location	Sample Number	till o lad subjo	Blows per foot	Recovery (%)	09'1N /09N /N	Friction Angle	Calc. Bearing Capacity (psf)	nderdrained Shear Strength (psf)	Dritting Method Casing Depth	Rem	arks
	1		Fill: ARTIFICIAL FILL - GRAVEL (FILL moist, loose; SAND coarse to very coar GRAVEL < 3/4" dia. angular, road base Fill: ARTIFICIAL FILL - GRAVELLY CL SAND with BOULDERS and COBBLE reddish brown; moist, firm; CLAY med. plasticity; SAND coarse to very coarse; GRAVEL 0.5" dia. subangular to subrou COBBLES less than 4"dia. subangular subrounded; BOULDERS < 8" dia. sub	); brown; se; rX. AYEY S (FILL); to high unded; to angular to												
:165	2		angular.		X	9/4	3/5	13	50						Bulk sam from 2'-3'	ple taken bgs
	4		Fill: ARTIFICIAL FILL - GRAVELLY CL BOULDERS and COBBLES (Fill); redd moist, firm to stiff; CLAY med. to high p GRAVEL < 0.5" dia. subangular to subr COBBLES less than 4"dia. subangular subrounded; BOULDERS < 8" dia. sub angular.	AY with lish brown; lasticity; ounded; to angular to	Y										Bulk sam 4.0' bgs	ple taken @
	-	•			¥	50	:6"								Auger ref bgs	usal @ 5.5'
-		_			17	REPORT	TITLE	_	÷	-	-		-	_		HOLE ID
		Ins		1.1		Geotec	hnica	Inv	estig	atio	1, Co	pco R	oad			BH-DR01
			JEU DE EV	· · · ·			Sis	skiyo	bu	F	OUTE		POS	WILE		EA
				1		PROJEC	RORE		E NA	ME	/er T		eek		-	
				- AT		BRIDGE	NUMB	ER		PRE	PARE	DBY		-	DATE	SHEET
				10.4	7	NA	÷		1	KF	12				7/14/20	20 1

LOGGE	DBY		BEGIN DATE COMPLETION DATE	BOREHOLE	OCA	TION	(Lat/Long	or No	rth/Eas	st and	Datum	0		-	HOLE ID	
JF & J	S	ONTRACT	January 27th, 2020 January 27th, 2020	41.9175,	-122	2.46	062	tation	Line)	1					BH-DR02	_
Geo	Serv	, Inc.		None		non	(Onset, D	tation	Lancy						2168.19	
DRILLI	IG M	ETHOD		DRILLING RIC	3	_								-	BOREHOLE DIAMETER	-
Hollow	Sten	n Auger		Lonestar Dr	ill									-	6*	_
SAMPL	ERT	YPE(S) A	ND SIZES (ID)	STP HAMME	R TYF	PE									HAMMER EFFICIENCY, ER	
BOREH	IOLE	BACKFIL	L AND COMPLETION	GROUNDWAT	TER	-	DURIN	GDR	LLING	1	AF	TER DR	ILLING (D	ATE)	TOTAL DEPTH OF BORING	-
Neat C	emer	nt, 1/27/20	0	READINGS	_	_	ND	-			ND				11.5'	
ELEVATION (f)	DEPTH (ft)	Material Graphics	DESCRIPTION		Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Bearing Capacity (psf)	Inderdrained Shear Strength (psf)	Dritting Method Casing Depth	Remarks	
	0		Fill: ARTIFICIAL FILL - GRAVEL (FILL moist, loose; SAND coarse to very coars GRAVEL < 3/4" dia. angular, road base	); brown; se; e rock.		1		1								
2165	2 3		Fill: ARTIFICIAL FILL - GRAVELLY CL SAND with BOULDERS and COBBLE: reddish brown; moist, firm; CLAY med. plasticity; SAND coarse to very coarse; GRAVEL 0.5" dia. subangular to subrou COBBLES less than 4" dia. subangular subrounded; BOULDERS < 8" dia. sub angular.	LAYEY S (FILL); to high unded; to angular to											Bulk sample taken from 2.0'-3.0' bgs	
	4		Fill: ARTIFICIAL FILL - GRAVELLY CL BOULDERS and COBBLES (Fill); redd moist, firm to stiff; CLAY med. to high p CRAVEL < 0.5" dia subapqulat subb	AY with lish brown; lasticity;											Bulk sample taken	
	6		SCAPEL C 0.5 that subangular to sub COBBLES less than 4"dia. subangular subrounded; BOULDERS < 8" dia. sub angular. GC: GRAVELLY CLAY with BOULDER	to angular to RS and	Ĩ		4/5/5	10	75						11011 4.0-5.0 bgs	
	7		COBBLES (GC); reddish brown; moist, stiff; CLAY medium to high plasticity; G 0.5" dia. subangular to subrounded; CC less than 4"dia. subangular to subround BOULDERS < 8" dia. subangular to any	firm to RAVEL < BBLES ded; gular.	Ŷ											
160	8		SC: SANDY CLAY and GRAVEL and C (SC); reddish brown; moist, firm to stiff; med. to high plasticity; SAND coarse; G 0.5" dia, subangular to subrounded: CC	COBBLES CLAY BRAVEL < DBBLES	ň											
	9		less than 4"dia. subangular to subround	led.	Ŷ		4/3/5	8	75							
	10				Ň		5/8/14	22	80							
	12		SC: CLAYEY SAND with GRAVEL (SC brown; moist; firm; CLAY med. to high p SAND coarse to very coarse; GRAVEL rounded to subrounded.	C); pruplish plasticity; < 0.5" dia.	Ŷ										Auger refusal @ 11.25'	
	43	-				REP	PORT TITL otechnic	E al In	vesti	gatio	n, Co	pco R	oad		HOLE ID BH-DR02	
						DIS	T. C. S.	OUNT iskiy	Y OU IGE NA	AME	ROUTE		POS	TMILE	EA	
				N.		BRI NA	DGE NUM	BER	at Dr	PRE KF	PARE	Bridg D BY	e		DATE SHEET 7/14/2020 2	ĉ

oggei JF & JS	D BY		BEGIN DATE COMPLETION DATE January 26th, 2020 January 27th, 2020	BOREHOLE L 41.91743	OCATI	ON (Lat/L)	ing ar N	orth/Ea	st and	Datum	0			н	IOLE ID BH-DR03	
GeoS	G CO	Inc.	OR	BOREHOLE L	OCATI	ON (Offse	Station	n, Line)						s	URFACE ELEV	TION
RILLIN	G ME	Auger		DRILLING RIG	3								1	8	OREHOLE DIA	IETER
AMPLI	ER TY	PE(S) AN	ND SIZES (ID)	STP HAMMER Saftey Hamm	R TYPE									н	AMMER EFFICI	ENCY, ERI
OREH leat Co	OLE 8	BACKFILI t, 1/27/20	LAND COMPLETION	GROUNDWAT READINGS	ER	DU	RING DI	RILLING	3	ND	TER DR	LLING (D/	ATE)	5	OTAL DEPTH O 9.5'	FBORING
ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION		Sample Location	Blows per 6 in.	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Bearing Capacity (psf)	derdrained Shear Strength (p≤f)	Dritting Method	Casing Depth	Remarks	
	0		Fill: ARTIFICIAL FILL - GRAVEL (FILL) moist, loose; SAND coarse to very coars GRAVEL < 3/4" dia. angular, road base	); brown; se; rx.								un l				
55	2 3		Fill: ARTIFICIAL FILL - GRAVELLY CL SAND (FILL); reddish brown; moist, fim med. to high plasticity; SAND coarse to coarse; GRAVEL< 0.5" dia. subangular subrounded.	AYEY n; CLAY very to										Bi	ulk sample om 2.0'-4.0	taken ' bgs
	4 1 1 1		Fill: ARTIFICIAL FILL - SANDY CLAY a GRAVEL and COBBLES (Fill); reddish moist, firm to stiff; CLAY med. to high p SAND coarse; GRAVEL < 0.5" dia. sub subrounded; COBBLES less than 4"dia subangular to subrounded.	and brown; lasticity; angular to										Bi 4.	ulk sample 5' bgs	taken at
60	6 	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	GC: SANDY CLAY and GRAVEL and C (GC); reddish brown; moist, firm to stiff; med. to high plasticity; SAND coarse; G 0.5" dia. subangular to subrounded; CO less than 4"dia. subangular to subround COBBLE @ 7.5'.	COBBLES CLAY RAVEL < BBLES led, more	X	3/1)	1 2	20						Ві 6.	ulk sample 0' bgs	taken at
	9 1 1				Υ Υ	9/4/	5 9	60						Au	uger réfusa gs.	al @ 9.5'
	10L	- That			4 (	EPORT 1 Geotech	TLE nical li COUN	nvesti TY	gatio	n, Co ROUTE	pco Ri	pad Pos	TIVILE		B E	ILE ID H-DR03
					1	ROJECT	Siski or Bri Road	you DGE N at Dr	AME Ty Cr	eek l	Bridge	•				
			The second s	- Carlor	1		JMBER		KF	PARE	DBY				DATE 7/14/2020	SHEET

ogged by JF & JS	Y	BEGIN DATE COMPLETION DATE January 26th, 2020 January 27th, 2020	BOREHOLE L	OCATIC	N (Lat/Lon 6039	g or No	rth/Eas	and I	Datum	0			'	HOLE ID	1
	ONTRACT	OR	BOREHOLE L	OCATIO	N (Offset,	Station	Line)	-					1	SURFACE ELEVATI	ON
GeoSer	V, Inc.		DRILLING RIG	5			_					_	-	BOREHOLE DIAME	TER
Hollow Ster	m Auger		Lonestar Dri	n	_									6"	
SAMPLER T	TYPE(S) A	ND SIZES (ID)	STP HAMMER	R TYPE									"	HAMMER EFFICIEN	ICY, ERI
BOREHOLE	BACKFIL	LAND COMPLETION	GROUNDWAT	ER	DURI	NG DR	ILLING		AFT	TER DR	ILLING (D	ATE)	+	TOTAL DEPTH OF	BORING
leat Ceme	nt, 1/27/2	0	READINGS		ND				ND	-				11.5'	_
ELEVATION (ft) DEPTH (ft)	Material Graphics	DESCRIPTION		Sample Location Sample Number	Blows per 6 in	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Bearing Capacity (psf)	nderdrained Shear Strength (psf)	Dritting Method	Casing Depth	Remarks	
0		Fill: ARTIFICIAL FILL - GRAVEL (FILL moist, loose; SAND coarse to very coars GRAVEL < 3/4" dia. angular, road base	); brown; se; a rx.								2				
1- 2- 165 3-		Fill: ARTIFICIAL FILL - GRAVELLY CL SAND (FILL); reddish brown; moist, firr med. to high plasticity; SAND coarse to coarse; GRAVEL< 0.5" dia. subangular subrounded.	AYEY n; CLAY very to	-									В	Bulk sample to	aken
4- 5- 6-		Fill: ARTIFICIAL FILL - SANDY CLAY : GRAVEL and COBBLES (Fill); reddish moist, firm to stiff; CLAY med. to high p SAND coarse; GRAVEL < 0.5" dia. sub subrounded; COBBLES less than 4"dia subangular to subrounded.	and brown; plasticity; pangular to I.	Ţ	2/3/2	5	30	3					fr E O	rom 3.0'-4.0' Easy drilling fr 0-5.5' bgs	om
7- 60 8- 9- 10-		GC; SANDY CLAY and GRAVEL and G (GC); reddish brown; moist, firm to stiff med. to high plasticity; SAND coarse; G 0.5" dia. subangular to subrounded; CC less than 4"dia. subangular to subround COBBLE @ 7.5'.	COBBLES ; CLAY SRAVEL < DBBLES Jed, more	T	5/4/7		75						Α	Auger refusal	@ 11.5'
11-		SC: CLAYEY SAND (SC); pruplish bro firm; CLAY med. to high plasticity; SAN to very coarse.	wn; moist; D coarse	Ŷ									b	gs	
12	-														
				IR	EPORT TIT	LE		_	_					Тног	EID
			12.5	G	eotechni	cal In	vestig	gation	n, Co	pco R	oad			BH-	DR-04
	1		10	D	IST. C	Siski	you	R	ROUTE		POS	TMILE		EA	
			C. G	P	ROJECTO	R BRID	GE NA	ME						1	
		HI HI HA		C	RIDGE NU	oad a	at Dr	y Cre	PARE	Bridg	e	_	_	DATE 1	SHEFT
				N	A			KF		24				7/14/2020	4

LOGG	ED BY		BEGIN DATE	COMPLETION DATE	BOREHOLE I	LOCATIC	N (Lat/Long	or No	rth/Eas	st and	Datum	0			HOLE ID	1
DRILL	NG CO	ONTRACT	OR		BOREHOLE I	LOCATIC	N (Offset, St	ation,	Line)	-				-	SURFACE ELEVAT	ION
Geo	Serv	, Inc.			None			-							2194.21'	
Air Ro	otary D	Drill			T1	G									6" to 10"	TER
SAMP	LERT	YPE(S) AN	ND SIZES (ID)		STP HAMME	RTYPE			_					-	HAMMER EFFICIE	NCY, ERI
SPT 2					Saftey Ham	mer	DUDIN	0.00			453					BODING
Neat	HOLE	BACKFILI	LAND COMPLETION		READINGS	IER.	18.0'	GDR	LING		13.	0' (1/30/	(20)	ALE)	35'	BORING
		1	-		-		1.		1.1				~			_
ELEVATION (ft)	DEPTH (ft)	Material Graphics	6 616 U	DESCRIPTION		Sample Location Sample Number	Blows per 6 in	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Bearing Capacity (psf)	Inderdrained Shea Strength (psf)	Dritting Method	Remarks	
1	0	3	GW: WELL GRAI	DED AGGREGATE ); dry; <3/4" diameter	BASE			T						Τ		-
2190	2 3 4 5		GP: GRAVELS C (Fill-GP); loose to angular GRAVEL/ BOULDER.	OBBLES, and BOUL dense; dry; subangu COBBLE/BOULDEF	LDERS lar to R; <18"	HH	3/10/10	20	O						Sample NO. 1	I.1-STP
	6 7- 8-		CH: CLAY with GI reddish brown; CL <1/2" subround to	RAVEL (Fill-SC); firm AY medium to high p angular GRAVEL.	n; moist; plasticity;	ĸ	4/9/12	21	30						Sample NO. 1	.2-SPT
2185	9					7								Hollow S	1-11	
	11					÷,	10/12/13	25	100					Stem Auge	Sample NO.	I.3-SPT
2180	13 14 15 16					H H	.5/6/9	15	100						Sample NO. 1	I.4-SPT
2175	17 18 19 20 21	Ï	CH: CLAY with GI (CH-GC); very sof grey; CLAY mediu subround to angul	RAVEL to Gravelly C 't to firm; moist to we m to high plasticity; < ar GRAVEL.	ilay t; dark <1/2"	н	2/16/10	26.	60						Sample NO. 1	5-SPT
2170	22 23 24 25		Weathered Volcar ROCK; hard; CLA Clay medium to hi	iic Rx: NATIVE WEA YEY GRAVEL WITH gh plasticity; <0.375"	ATHERED H SAND;	4								Ť		
2165	26 27 28 29	TATA AN	subangular to ang coarse SAND; we	ular GRAVEL; coars athering decreases v	e to very vith depth.		50: 0.25		-10					Tri-Cone	Sample NO. 1	I.6-SPT
	30 31 32	R.W.W.														
2160	34 35 36				_											
			-		10	R	EPORT TITL	e al In	vestig	gatio	n				BH	E1D -A01
			JEOL	DEEY		D	IST. CO Si ROJECT OR	Skiy		F	ROUTE	2	POS	TMILE	EA	
			- KANAR MANARA	THE REAL FOR	1	Ĺ	akeview	Roa	d Br	idge				_		
				and the	o state	B		BER		KF	PARE	DBY			DATE 7/14/2020	SHEET 5

	PERMIT	Dontenoce	LOCAIN	ON (Lapton	g or No	orth/Eas	st and	Datum	)			HOLE ID
JF & JS	Jan 30th, 2020 Jan 30th, 2020	41.93143	, -122	2.44202								BH-A02
GeoSony Inc	CTOR	BOREHOLE	OCATIO	ON (Offset,	Station	, Line)						SURFACE ELEVATION
DRILLING METHOD		DRILLING RIG	G								-	BOREHOLE DIAMETER
Air Rotary Drill		T1										6" to 10"
SAMPLER TYPE(S	AND SIZES (ID)	STP HAMME	R TYPE	5								HAMMER EFFICIENCY, ERI
SPT 2"		Saftey Hami	TER	DUR	NG DR	ULING	1	AFT	ER DRI	LUNG (D)	ATE)	TOTAL DEPTH OF BORING
Neat Cement, 1/31	/20	READINGS		15.5		1	_	10.	0' (1/31/	20)	10-7	30'
ELEVATION (ft) DEPTH (ft) Material	DESCRIPTION		Sample Location Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Bearing Capacity (psf)	derdrained Shear Strength (psf)	Drilling Method	Remarks
0=3	GW: WELL GRADED AGGREGATE	BASE	1					-		ă.	Т	
185 4	GP: GRAVELS COBBLES, and BOUI (Fill-GP); loose to dense; dry; subangu angular GRAVEL/COBBLE/BOULDEF BOULDER.	LDERS ular to R; <18"										
5 6 7	CH: CLAY with GRAVEL (Fill-CH); firr reddish brown; CLAY medium to high <1/2" subround to angular GRAVEL.	m; moist; plasticity;	R								Hollow S	
80 9			H. H	5/7/11	18	30					Stem Auger	Sample NO. 2.1-SPT
11 12 13			<u>P</u>	4/7/8	15	100					Î	Sample NO. 2.2-SPT
75 14 15 16 17	SC: CLAY with SAND to SAND with C DEBRIS (CH-SC); very soft to firm; mo greenish grey; CLAY medium to high p	DRGANIC oist to wet; blasticity;	F	1/1/2	3	100	-				÷	Sample NO: 2.3-SPT
18	fine to very fine SAND; organic debris up to 1/8"x1/2" in size. Weathered Volcanic Rx: NATIVE VOL	throughout CANIC										
20 21 22 23	WEATHERED ROCK; hard; CLAYEY WITH SAND; Clay medium to high pla <0.375" subangular to angular GRAVE to very coarse SAND; weathering decre depth; preserved amygdules.	GRAVEL asticity; EL; coarse reases with	HC H	18/10/1	8 28	60	-				Tri-Co	Sample NO. 2.4-SPT
65 24 25 26 27											ne	Sample NO. 2.5-SPT
60 29 30 T											1	
ſ			R	EPORT TIT Geotechni DIST.	LE ical In	vesti	gatio	n		Pos	TMILE	HOLEID BH-A02 EA
			F	ROJECT O	R BRID		ME		-			
	The second se		E	BRIDGE NU	MBER		PRE	PARE	D BY		_	DATE SHEET

LOGGE	DBY	-	BEGIN DATE	COMPLETION DATE	BOREHOLE L	OCA	TION	(Lat/Long	or No	th/East	st and	Datum	0		_	HOLE ID
JF & J	NGC	ONTRACT	April 14th, 2020 OR	April 14th, 2020	41.97509	531	, -1:	(Offset S	254	Line)	1				_	BH-SC01 SURFACE ELEVATION
Geo	Serv	, Inc.			NA			(ensert e								2338'
DRILLI	NG M	ETHOD			DRILLING RIG	3	_								-	BOREHOLE DIAMETER
SAMPI	ER T	TYPE(S) A	ND SIZES (ID)		STP HAMMES	R TYP	E								_	6" HAMMER EFFICIENCY ERI
SPT 2		11 2(0)14	ID BILLD (ID)		Safety Hamn	ner	-									
BORE	HOLE	BACKFIL	LAND COMPLETION		GROUNDWAT	ER		DURIN	GDR	ILLING	1	AFT	ER DR	LLING (D/	ATE)	TOTAL DEPTH OF BORING
Bento	nite C	Chip, 4/14/	2020		READINGS		_	ND	_	_	_	ND				7.5'
ELEVATION (ft)	DEPTH (1)	Material Graphics		DESCRIPTION		Sample Location	Sample Number	Blaws per 6 in.	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Bearing Capacity (psf)	Strength (psf)	Dritting Method	Remarks
	0		GW: SANDY GRA BOULDERS (GW medium dense; SA 1.5" dia. and subar <5" dia. and subar 12" dia. and subar	AVELY COBBLES a (); tannish brown; dry AND fine to coarse; ( ngular to rounded; C ngular to rounded; B( ngular to rounded.	nd / to moist; GRAVEL < OOBBLE OULDER <	Ŷ		7/8/9	15	60	19120 290	20 0	3,200	-		
2335	2 3		CL: SANDY CLAY firm; CLAY mediur	′ (CL); reddish browi m plasticity; SAND fi	n; moist; ne.	Ā		3/4/5	9	100	9/7 1/2 12.3			1.407		Medium Drilling Torque/Effort Bulk sample 2'-6' Medium Drilling
	6		GW: CLAYEY GR reddish brown; mo plasticity; SAND fi angular to subangi	AVEL and SAND (O isist; firm; CLAY medi ne to coarse; GRAV ular.	GW); ium EL < 1.5"	Ţ		7/14/7	21	60	21/16 E (29 U	33.7	5,8(5			Torque/Effort
	7-		Weathered Volcan CLAYSTONE/SIL slightly weathered; Volcanics (BOGU undifferentiated)	nic Rx: VOLCANIC S TSTONE; reddish p ; very denseTertia S MOUNTAIN BED;	GILTY urple; ry S,	P		50-0"		0	50/40/0 -/63/D	37.0	17,876	-		Max. Drilling Torque/Effort Auger refusal @ 7.5'
	6	_			27		REP	PORT TITL otechnic	E al In	vesti	gatio	1, Co	pco Re	oad		HOLE ID BH-SC01
					les to		DIS	T. C.	OUNT	YOU	R	OUTE		POS	TMILE	EA
			and the state	The Hart I	N		PRO	DJECT OR	BRID	GEN	AME	-	_		-	
			and the second se	HI HI HALL			SC	OGE NUM	RER	Cul	PRE	PARE	DBY			DATE SHEET
					- AL		NA	1	- and		KF		2			7/14/2020 7

	ED BA	( )	BEGIN DATE	COMPLETION DATE	BOREHOLE	LOCA	TION	(Lat/Long	or No	th/East	st and	Datum	)			HOLE ID	
JF & J	s		April 13th, 2020	April 13th, 2020	41.9751	1937	, -1	22,4399	3749	•						BH-SC02	
DRILLI	NGC	ONTRAC	OR.	-	BOREHOLE	LOCA	TION	I (Offset, St	tation	Line)	-					SURFACE ELEVATION	
Geo	Ser.	V, Inc.			DRILLING R	IG.	_			_					_	2338.1 BOREHOLE DIAMETER	_
Hollow	v Ster	n Auger			Lonestar D	rill										6"	
SAMPI	LERT	YPE(S) A	ND SIZES (ID)		STP HAMME	RTY	PE			-	-					HAMMER EFFICIENCY, ER	
SPT 2					Safety Ham	mer			-								
BORE	HOLE nite C	BACKFIL Chip, 4/14	L AND COMPLETION		GROUNDWA READINGS	TER		ND	GDR	LLING	1	ND	ER DRI	LLING (D)	ATE)	TOTAL DEPTH OF BORING	
ELEVATION (f)	DEPTH (ft)	Material Graphics		DESCRIPTION		Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Bearing Capacity (psf)	Strength (psf)	Drilling Method	Remarks	
	1-		CH: SANDY CLAY ORGANIC DEBRI wet; firm; CLAY m very fine to fine; C subangular to rour 0.5" dia. roots	/ with COBBLES and S (CH); dark brown; edium to high plastici OBBLE <6" dia. and ided; ORGANIC DEB	d moist to ity; Sand BRIS <	X		3/4/14	18	60	18/14,4 /24.5			2.214		Medium Drill Effort/Torque	
2335	3		GW: SANDY GRA tannish brown; mo SAND fine to coar rounded to rounde subrounded to rou	AVEL with COBBLES ist to wet; medium de se; GRAVEL < 1.5" s d; COBBLES < 4" dia nded.	6 (GW); ense; sub a. and	Ā											
	45_		Weathered Volcan CLAYSTONE/SIL slightly weathered; Volcanics (BOGU: undifferentiated)	ic Rx: VOLCANIC S TSTONE; reddish pu very dense,Tertiar S MOUNTAIN BEDS	ILTY Irple; Y	Y		6/14/17	31	100	31728 e 142 2	52.5	9,14N	2)		Max. Drilling Torque/Effort	
	6-					Ď		50-6"	-	0	8040-0 -7120	37.0	17,805			Auger refusal @ 7.0	) )
				) E E V			REI Ge DIS	PORT TITLI otechnic st. co Si	E al In OUNT iskiy	vesti You	gation R	n, Co	pco Ro	oad Pos	TMILE	HOLE ID BH-SC02 EA	
		-	the the	HI HI H	No. of		PR	OJECT OR	BRID	GEN	AME						-
							BR	IDGE NUM	BER	Cul	PRF	PARF	DBY	_	_	DATE SHEFT	-
					E		NA	4	- art		KF		1.5			7/14/2020 8	

JF & JS     April 13th, 2020     April 13th, 2020     41.S       DRILLING CONTRACTOR     BOREI       GeoServ, Inc.     NA       DRILLING METHOD     DRILL       Holtow Stem Auger     Lone       SAMPLER TYPE(S) AND SIZES (ID)     STP H       SPT 2"     Safed       BOREHOLE BACKFILL AND COMPLETION     GROU       Neat Cement, 4/14/2020     DESCRIPTION	HOLE LC LING RIG estar Dril HAMMER ty Hamm INDWATI	602, OCAT	-12 TON	22.43609 (Offset, St.	9419 ation,	) Line)					1		BH-CC01 SURFACE ELEVATION 2332.1'
DRILLING CONTRACTOR     BORE       GeoServ, Inc.     NA       DRILLING METHOD     DRILL       Hollow Stem Auger     Lone       SAMPLER TYPE(S) AND SIZES (ID)     STP H       SPT 2"     Safet       BOREHOLE BACKFILL AND COMPLETION     GROU       Neat Cement, 4/14/2020     DESCRIPTION	HOLE LO	OCAT II R TYP ner ER	E	(Offset, St	ation,	Line)					÷		2332.1
CENTRE     Interview       DRILLING METHOD     DRILL       Hollow Stem Auger     Lone       SAMPLER TYPE(S) AND SIZES (ID)     STP H       SPT 2"     Safet       BOREHOLE BACKFILL AND COMPLETION     GROU       Neat Cement, 4/14/2020     DESCRIPTION	LING RIG estar Dril HAMMER (y Hamm JNDWAT) INGS	R TYP ner ER	E			-							
Hollow Stem Auger Lone SAMPLER TYPE(S) AND SIZES (ID) STP F SPT 2" Safet BOREHOLE BACKFILL AND COMPLETION GROU Neat Cement, 4/14/2020 READ	estar Dril HAMMER ty Hamm INDWAT INGS	II R TYP ner ER	E	-									BOREHOLE DIAMETER
SAMPLER TYPE(S) AND SIZES (ID) STP H SPT 2" Safet BOREHOLE BACKFILL AND COMPLETION READ Neat Cement, 4/14/2020 READ U U U U U U U U U U U U U U U U U U U	HAMMER ty Hamm INDWATI	e TYP ner ER	E									1	6"
BOREHOLE BACKFILL AND COMPLETION Read Cement, 4/14/2020	INDWAT	ER	-										HAMMER EFFICIENCY, ERI
Neat Cement, 4/14/2020  READI	INGS			DURING	3 DRI	LLING		AFT	ER DRI	LLING (D	ATE)		TOTAL DEPTH OF BORING
DESCRIPTION (1) DESCRIPTION Graphics Graphics			_	3.0'				3.0	4	-			20.0'
		Sample Location	Sample Number	Blows per 6 in	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Bearing Capacity (psf)	Inderdrained Shear Strength (p≤f)	Drilling Method	Casing Depth	Remarks
2330 SC: SANDY CLAY TO CLAYEY SAND (CH- tan to dark brown; moist; loose; CLAY medium high plasticity; SAND very fine to fine.	SC); n to	V		2/1/2	3	30	3/24/ -*1	28.4)	355	-			Min. Drill Effort/Torque
		Ì		1/1/1	2	30	5/1.6) 9.7	49.0	196	-			SPT Sample Interference due to sand flowing into auger.
SP: POORLY GRADED SAND (SP): dark growt; loose; SAND coarse to very coarse.	ey;	Ì		2/3/9	12	70	(2)9 U 16	250	2,421	-			Sand flowing up into HSA
		1		16/10/10	10	50							SPT Sample Interference due to sand flowing into auger.
		Y											Sand flowing up into HSA
1315 17													Min. Drill Effort/Torque
SW: WELL GRADED SAND WITH GRAVED (SW); dark grey; wet; medium dense; SAND to to very coarse.	L fine	Ì 1		17/15/19	34	70	34/19 K 754.0	35	6.575	-			Harder Drilling @ 18.5' Max. Drill Effort/Torque
		11						15	2.1		1		
			REP	ORT TITLE	al Inv	/estig	gatio	1, Co	pco Re	oad			HOLE ID BH-CC01
			PRO	T. CO Si DJECT OR	Skiy BRID	OU GE NA	ME	OUTE		POS	STIMIL	E	EA
			Ca	mp Cre	ek C	ulve	ert					_	Louve Law
and the second se			NA	UGE NUME	DER.	- 1	KF	ANE	U BT				7/14/2020 9

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE	OCA	TION	(Lat/Long	ar No	th/Eas	st and	Datum	)	_		HOLE ID	
JF & JS	April 13th, 2020	April 13th, 2020	41.97381	485	, -1:	22.4359	8248	3						BH-CC	02
DRILLING CONTR	ACTOR	-	BOREHOLE	OCA	TION	(Offset, S	tation	Line)	-					SURFACE EI	EVATION
GeoServ, In			NA		_								_	2331'	
Hollow Stem Aug	er		Lonestar Dr	ill										6"	JIAMETER
SAMPLER TYPE	5) AND SIZES (ID)		STP HAMME	RTYP	E			_					_	HAMMER EF	FICIENCY, ERI
SPT 2"			Safety Hami	mer										1.5	
BOREHOLE BACK	FILL AND COMPLETION		GROUNDWAT	TER		DURIN	GDR	LLING		AFT	ER DR	LLING (D	ATE)	TOTAL DEPT	H OF BORING
Neat Cement, 4/1	4/2020		READINGS			4.0'			_	4.0	8			22.0	
ELEVATION (ft) DEPTH (ft) Material	Graphics	DESCRIPTION		Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Bearing Capacity (psf)	Inderdrained Shear Strength (psf)	Dritting Method Casing Depth	Rem	arks
	SC: SANDY CLA' tan to dark brown; high plasticity; Sa	Y TO CLAYEY SAN moist; loose; CLAY nd very fine to fine.	D (CH-SC); medium to			2/1/2	3	30	1/24/ 4.1	27.4	347			Min. Drill	Effort/Torque
2325 6	OL: ORGANIC DI greyish brown; we 0.5" dia. plant mat coarse.	EBRIS WITH SAND t; loose; ORGANIC ter; SAND coarse to	) (OL); DEBRIS < very	H X		1-12'71	1	90	1/0.6/			1231		SPT Sam Interferen due to sai into auger	ple ce nd flowing
7	SP: POORLY GR wet; loose; SAND	ADED SAND (SP): coarse to very coars	dark grey; se.	ð		3/6/8	14	90	14/11.2 V19/D	29 Q	3,005			Sand flow HSA	ing up into
						4/5/5	10	90	10% (V 11 4	3*	1'376	-		SPT Sam Interferen due to sal into auger Sand flow HSA	ple ce nd flowing ing up into
2315 16 - 17 - 18 - 18 -														Min. Drill Harder Di	Effort/Torque
19	SW: WELL GRAI GRAVEL (SW); d SAND fine to very rounded to rounde	DED SAND WITH T lark grey; wet; mediu coarse; GRAVEL < ed.	RACE im dense; 0.75" sub	×		1/2/1	3	50	3/7 4/ 3 0	20/4	×19				
2310 21				÷		1/1/2	3	30	3/2.4/	20/4	A9			Max Drill	Effort/Torque
22				4										Auger Re	fusal @ 22.0'
-			20		REF	PORT TITL otechnic	E al In	vesti	gatio	1, Co	pco Re	oad			HOLE ID BH-CC02
L	JE D	DERV			DIS	IT. CI Si OJECT OR	SUNT Skiy	OU GE NA	ME	OUTE		POS	TMILE		EA
	A dama damana da	曲旗			Ca	mp Cre	ek C	Culve	ert						
		and the fe			BR	IDGE NUM	BER		PRE	PARE	DBY			DATE	SHEET
			10.00		N/				KF	-	_			7/14/20	20 10

OGGED BY	-	BEGIN DATE	COMPLETION DATE	BOREHOLE	LOCA	TION	(Lat/Long	or No	th/Eas	st and	Datum	)	_		HOLE ID	
JF & JS		April 16th, 2020	April 16th, 2020	41.97318	8588	3, -1:	22.3664	3994	4						BH-DG0	3
Coce	Inc	DR		BOREHOLE	LOCA	TION	(Offset, S	tation	Line)	-					SURFACE ELEV	ATION
Geoserv	THOD			DRILLING RI	G	_								_	2345 BOREHOLE DIA	METER
Hollow Stem	Auger			Deere 35G											6"	
SAMPLER TY	PE(S) AN	ID SIZES (ID)		STP HAMME	RTY	PE									HAMMER EFFIC	IENCY, ERI
BOREHOLE	BACKFILL	AND COMPLETION		GROUNDWA	TER	_	DURIN	IG DR	LLING	3	AFT	ER DR	ILLING (D	ATE)	TOTAL DEPTH O	OF BORING
Bentonite Cl	hip, 4/18/	2020		READINGS			ND				ND			r	9.3'	
ELEVATION (ft) DEPTH (ft)	Material Graphics		DESCRIPTION		Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Bearing Capacity (psf)	nderdrained Shear Strength (psf)	Dritling Method Casing Depth	Remark	
1345 0 - - - - - - - - - - - - - - - - - - -		Fill: ARTIFICIAL F GRAVEL with BOU (FILL); light to dark medium dense; CL SAND fine to very angular to subang BOULDERS, 8" di BOULDERS, 8" di CH: SANDY CLAY soft to firm; CLAY SAND coarse to very	FILL-CLAYEY SAND ULDERS and COBE k brown; dry to moist LAY medium to high coarse; GRAVEL < ular; COBBLES and ia., subangular. Y (CH); dark brown; medium to high plas ery coarse; trace org	moist; very sticity; and aLES t; loose to plasticity; 1.5" dia.,	ň										Harder drilli bos	ng @ 13.0'
12		debris.			Ŷ		3/4/5	9	30							
13 	CAR'S	Weathered Rx: Wi weathered to nearl andesite/basalt; lev with depth.	EATHERED ROCK ly fresh fragments of vel of weathering dec	; highly creases											Hard Drilling Max Drill Ef @ 14.0' bgs	] fort/Torque
2330 15	T.M				٥		50:5"		50						Auger Refu bgs below e of road	sal @ 15.3' xisting top
16			1.4			REF		E	Vection	gatic	n Do	ngett i	Road			OLE ID
	樹和		SEDA			DIS	ST. C	OUNT	Y	Jauo	ROUTE	ggenr	POS	TMILE	E	A
	319					DP	SI	iskiy	OU	AME	<u> </u>					
		Land Land	相关下名	10		Fa	II Creek	Cul	Ivert	at D	agg	ett Ro	bad			
			the second se	い、御		BR	IDGE NUM	BER		PRE	PARE	D BY		_	DATE	SHEET
				12-2	7 of	64		1	1	M		_			114/2020	110

LOGGED	BY		BEGIN DATE COMPLETION DATE	BOREHOLE L	OCA	TION	(Lat/Long	or No	th/Eas	st and	Datum	0	_		HOLE ID		
JF & JS	r		April 16th, 2020 April 16th, 2020	41.97665	, -12	22.3	6415								BH-DG01		
DRILLING	G CO	NTRACT	OR.	BOREHOLE	OCA"	TION	(Offset, S	tation,	Line)						SURFACE ELEVATION		
GeoS	erv.	THOD		DRILLING RIC					_					_	2386.0'		
Hollow S	Stem	Auger		Lonestar Drill											6"		
SAMPLE	RTY	PE(S) AN	ND SIZES (ID)	STP HAMMER	TYP	E					_		_		HAMMER EFFICIENCY, ERI		
SPT 2"				Safety Hamn	ner										10.00		
BOREHO Bentoni	DLE I	BACKFILI hip, 4/19/	L AND COMPLETION 2020	GROUNDWATER. DURING DRILLING AFTER DRILLING (DATE READINGS ND ND									NTE)	TOTAL DEPTH OF BORING			
ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION		Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Bearing Capacity (psf)	Strength (psf)	Driting Method Casing Depth	Remarks		
2385	0		Fill: ARTIFICIAL FILL - SANDY GRAV dark brown; dry to moist; medium dense very fine to coarse; GRAVEL< 1.5" dia., angular to subangu CH: CLAY with SANDY GRAVEL: (CH brown; moist; firm; CLAY medium to hig plasticity; sand very fine; GRAVEL < 0.3 angular to subangular, GRAVEL occurs 5.5' bgs.	EL: (GW): e; SAND ular. ); dark gh 375" dia, s below									2				
2380	4				X		3/5/9	14	80						Bulk sample taken @ 1.5'-5.5' bgs		
	9	North Contraction of the second secon	Weathered Rx: WEATHERED ROCK; weathering to nearly fresh fragments of andesite/basalt; level of weathering dec with depth.	high reases	X		5/10/23	33	80	-0					Harder drilling @ 9.5' bgs Auger Refusal @ 10.9' bgs		
		1		_		REP	PORT TITL	E							HOLEID		
		(HAL				Ger	otechnic	OLINT	vesti	gatio	ROLITE		POS	TMUE	BH-DG01		
		. da		and the		013	S	iskiy	ou	ľ			105	WILE	EA		
		and		Sen of		PRO	DJECT OR	BRID	GE NA	AME		Sec. 1	_				
			THE REAL PROPERTY OF THE PROPERTY OF THE REAL PROPE			Fa	II Creek	cul	vert	at S	ubst	ation	ſ		DATE LOUTE		
			Jer.	- 19 A		NA	UGE NUM	BER		KF	PARE	DBY			7/14/2020 13		
				12-29	of l	64			-	1.11	_						

LOGGED	BY		BEGIN DATE	COMPLETION DATE	BOREHOLE	LOCA	TION	I (Lat/Long	or Nor	th/Eas	and	Datum	)				HOLE ID		7	
JF&JS		April 18th, 2020	41.9767	5, -1	22.3	36455	_		1						BH-DG02					
GeoSe	CON	nc	JK.		NA	LOCA	TION	(Onset, St	ation,	Line)							2387.0'			
DRILLING	METH	HOD			DRILLING R	IG				_					-	+	BOREHOLE DIAMETER 6" HAMMER EFFICIENCY, ERI			
Hollow St	em A	uger			Lonestar D	rill														
SAMPLER	TYP	E(S) AN	ID SIZES (ID)		STP HAMME	RTY	PE													
BOREHOL	EBA	CKFILL	AND COMPLETION		GROUNDWA	BOREHOLE LOCATION (LastLong or North/East and Datum) 41.97676, -122,36455 BOREHOLE LOCATION (Offeet, Station, Line) N DERILING RIG Lonestar Drill STP HAMAER TYPE Safety Hammer SROUNDWATER ND				-	TOTAL DEPTH OF BORIN	G	_							
Bentonite	Chip	, 4/19/2	2020		READINGS	IGS ND ND											9.0			
ELEVATION (1)	DEP(H (II)	Material Graphics		DESCRIPTION		Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Bearing Capacity (psf)	nderdrained Shear Strength (psf)	Drilling Method	Casing Depth	Remarks			
2385 1 2385 1 3 3 4 5 2380 6 7 7 8			Fill: ARTIFICIAL SAND (CH): dar very stiff; CLAY coarse; GRAVE subrounded.	FILL - GRAVELLY rk reddish brown; mc medium to high plas L< 1.0" dia., angular CLAY with SAND: noist; stiff to very sti plasticity; SAND coa dia, subrounded to	CLAY with bist; stiff to sticity; SAND to (CH); dark ff; CLAY arse; round.	⊼ ¥		7/14/20	34	30							Easier drilling @ 7 bgs	.0'		
9						Y		7/12/14	26	50						ł	Auger Refusal @ bgs	9.0'		
							1 PP	DOPT THE	_								LUALEIA		_	
			3	10.000			Ge	otechnic	al Inv	vestig	gatio	n					BH-DG0	2		
				SEP			DIS	ST. CO	UNT	-	F	ROUTE		POS	TMIL	E	EA	-	-	
		1.31					DP	SI	Skiy	GEMA	ME	_							_	
			A second second		E S		Fa	II Creek	cul	vert	at S	ubst	ation							
				- Anna month at / Ban	Res all		BR	IDGE NUM	BER		PRE	PARE	DBY		-	-	DATE SHEET	-	-	
					10.0		N/	4			KF						7/14/2020 14			

OGGE	BY		BEGIN DATE	BOREHOLE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)											HOLE ID			
IF & KF April 16th, 2020 April 16th, 2020 41.983								2.3622	E	BH-FL01									
Geos	G COI	Inc	OR		BOREHOLE	LOC	ATION	(Offset, S	Station,	Line)						SU	2494.87		
RILLIN	G MET	THOD			DRILLING R	IG									_	B	DREHOLE DIAMI	ETER	
Hollow	Stem	Auger			Lonestar D	rill			6	•									
AMPLE	RTY	PE(S) AN	ND SIZES (ID)		STP HAMME	P HAMMER TYPE												NCY, ERI	
OREH	DLE B	ACKFILI	LAND COMPLETION		GROUNDWA	TER	-	DURI	VG DRI	LLING		AFT	ER DRI	ILLING (D	ATE)	т	TAL DEPTH OF	BORING	
enton	ite Ch	ip, 4/19/	2020		READINGS	READINGS ND ND											.0'		
DESCRIPTION (1) DESCRIPTION Graphics						Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Bearing Capacity (psf)	Inderdrained Shear Strength (psf)	Drilling Method	casing ueptin	Remarks	1	
			Fill: ARTIFICIAL I GRAVEL WITH E (FILL); light to dar medium dense; C SAND fine to very angular to subang BOULDERS, 12"	FILL-CLAYEY SAN BOULDERS AND rk brown; dry to mc LAY medium to hig y coarse; GRAVEL gular; COBBLES a dia., subangular.	ND AND COBBLES ist; loose to gh plasticity; < 1.5" dia., nd											Bc	pulders and	RSP 0.0'	
-				1			REP	ORT TITL	E	Vestia	ation		DCD P	oad	_	-	HO	FL01	
		Haja		SED	1		DIST	т.   С	OUNT	(	R	OUTE	POO RI	POS	TMILE	-	EA	1999 B	
					·新春		DB/C	S	skiy	OU	ME				1			1.1	
La Strand BH YP2 AN IN I PART							Co	pco R	oad a	It Fal		eek l	Bridg	e					
				Same Proventi Bel (Ball			BRID	DGE NUN	IBER		PRE	PARE	DBY		_		DATE	SHEET	
					10.0		INA			- L	NF						1114/2020	19	

LOGGE	DB	Y		BEGIN DATE COMPLETION DATE	BOREHOLE L	00/	ATION	(Lat/Long	or Nor	th/Eas	and I	Datum	)			1	HOLE ID		
DRILLI	NGC	ONTRA	CTO	R	BOREHOLE L	28	ATION	(Offset, S	ub//	Line)	÷			_			BH-FL02 SURFACE ELEVATION		
Geo	Ser	v, Inc			NA	Č	_									١.,	2494.88'		
Hollow	NG N	METHOD m Auge	) er		DRILLING RIC	in in				BOREHOLE DIAMETER									
SAMPI	LER	TYPE(S	) ANE	D SIZES (ID)	STP HAMMER	STP HAMMER TYPE											HAMMER EFFICIENCY, ERI		
SPT 2					Safety Hami	ner										11			
BORE	HOLE	E BACK	FILL /	AND COMPLETION	READINGS ND ND												TOTAL DEPTH OF BORING		
		1	1		-	T			-	1.1			1	č.		П	6.1		
ELEVATION (f)	DEPTH (II)	Material	Graphics	DESCRIPTION		Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Bearing Capacity (psf)	Underdrained Shear Strength (psf)	Dritting Method	Casing Depth	Remarks		
	0		0	Fill: ARTIFICIAL FILL - CLAYEY SANE GRAVEL with BOULDERS and COBB (FILL); light to dark brown; dry to moist; medium dense; CLAY medium to high p SAND fine to very coarse; GRAVEL < 1 angular to subangular; COBBLES and BOULDERS, 8" dia., subangular.	) and LES loose to blasticity; .5" dia.,												Boulders and RSP		
	1 2-			CH: SILTY CLAY with GRAVEL and Tf COBBLE (CH); reddish brown; moist; n stiff; CLAY medium to high plasticity; G 1" dia., subrounded; COBBLE < 4" dia, subangular.	RACE noderately RAVEL <														
	3-					Ā		2/3/4	7	10							Hand cleared to 3' bgs		
						Y													
490	5-					Ĭ		9/8/6	14	30									
	6-					Y											Refusal @ 6.1' bgs		
1		F	H III	EnCerv	6	1	REP Ger DIS	ORT TITL otechnic		vestig	gation	n, Co	pco R	oad Pos	TMILE	E	HOLEID BH-FL02 EA		
		L	41 <u>1</u> 1 	A A A A A A A A A A A A A A A A A A A			PRO	DJECT OR	BRID ad a	GE NA	ME II Cr	eek	Bridg	e					
				With Star	100		BRI	DGE NUM	BER		PRE KF	PARE	DBY				DATE SHEET 7/14/2020 16		

JF&I			BEGINDATE	COMPLETION DATE	BOREHOLE	LOC	ATION	(Lat/Long	g ar Noi	th/Eas	t and C	Datum	)			HOLE ID			
1	KF		April 16th, 2020	April 16th, 2020	41.9840	697	1, -12	BH-FL03	BH-FL03										
Geo	Serv	Inc	TOR		BOREHOLE	LOC	ATION	(Offset, S	station	Line)						SURFACE ELEVATION 2493.27' BOREHOLE DIAMETER			
DRILLI	ING ME	THOD			DRILLING R	IG									_				
Hand	Cleare	d			Lonestar D	Drill										6**			
SAMP	LER TY	YPE(S) A	ND SIZES (ID)		STP HAMMI	ERTY	PE									HAMMER EFFICIENCY, ERI			
BORE	HOLE	BACKFI	LL AND COMPLETION		GROUNDW	ATER	-	DURI	NG DR	LLING		AFT	ER DRI	LLING (D	ATE)	TOTAL DEPTH OF BORING			
Bento	onite Cl	hip, 4/19	9/2020		READINGS			ND				ND				3.0'			
ELEVATION (f)	DEPTH (ft)	Material Graphics			Sample Location	Sample Number	Blaws per 6 in.	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Bearing Capacity (psf)	Underdrained Shear Strength (psf)	Drilling Method	Remarks				
	0		Fill: ARTIFICIAL GRAVEL with BC (FILL); light to da medium dense; C SAND fine to ver angular to subang BOULDERS, 12"	FILL - CLAYEY SA DULDERS and CO rk brown; dry to mo CLAY medium to hi y coarse; GRAVEL gular; COBBLES a " dia., subangular.	AND and BBLES bist; loose to gh plasticity; < 1.5" dia., nd											Boulders and RSP Hand cleared to 3.0' bgs			
					V		REP Gec DIST	ORT TITI Dtechnie T. C. S	LE cal In Sount	vestig	gation	1, Co.	pco Ro	pad	TMILE	Refusal due to boulders @ 3.0' HOLE 10 BH-FL03 EA			
		1	$- t_{d_{2}} \partial h_{t_{1}}$	81 42	A STATE		PRC	JECT O	R BRID	GE NA	ME	ook I	Brida						
				A REAL PROPERTY OF A REAL PROPER			Co	pco R	oad a	it Fa	II Cre	eek l	Bridge	9		Lours Lours			
					BRIDGE NUMBER PREPARED BY							DATE SHEET 7/14/2020 17							

OGGE	DBY		BEGIN DATE	COMPLETION DATE	BOREHOLE	LOC	ATION	(Lat/Long	g or No	th/Eas	t and I	Datum	)			HOLE ID		
JF&K	F		April 16th, 2020	41.98399	41.98399944, -122.36201060											BH-FL04		
RILLIN	IG CO	NTRACT	OR.		BOREHOLE	LOC	ATION	(Offset, S	Station,	Line)						SURFACE ELEVATION		
Geos	G ME	THOD			DRILLING R	G				_					_	BOREHOLE DIAMETER		
Hand C	leare	đ			Lonestar D	rill										6"		
SAMPL	ERTY	PE(S) AN	ND SIZES (ID)		STP HAMME	RTY	PE			_					_	HAMMER E	FFICIENCY, ERI	
SPT 2		ACKET			Saftety Han	men		DUIDIN	12 00	1100		457	EP DE	LING IN	TEL	TOTAL DEC	TH OF BORING	
Bentor	NOLE E	Nip, 4/19/	2020		READINGS	READINGS ND ND										2.0'	TH OF BORING	
ELEVATION (R)	DEPTH (ft)	Material Graphics		Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	N/ N60/ N1,60	Friction Angle	Calc. Bearing Capacity (psf)	Inderdrained Shear Strength (psf)	Driting Method Casing Depth	Ren	narks			
	0		Fill: ARTIFICIAL I GRAVEL with BC (FILL); light to dar medium dense; C SAND fine to very angular to subang BOULDERS, 12"	FILL - CLAYEY S/ DULDERS and CO rk brown; dry to mo :LAY medium to hi / coarse; GRAVEL gular; COBBLES a dia., subangular.	AND and BBLES obst; loose to gh plasticity; _< 1.5" dia., nd											Boulders Hand cle bgs	and RSP ared to 2.0'	
	2					1	REP	ORT TITL	E							Persona a	HOLEID	
		相利		2			Geo	technie C. I.C.	Cal In	vestig 7	jation	OUTE	pco Re	POS	TMILE		BH-FL04	
		. In						S	iskiy	ou								
			the straight	EL YE	AL AL		PRC	DCO R	a BRID	GE NA		eek	Brida	e				
				加加加加加加加加加			BRID	DGE NUN	IBER	a	PRE	PARE	DBY	-	_	DATE	SHEET	
					10.0		NA	-		1	KF					7/14/20	020 18	



**Copco Road at Dry Creek Bridge Photo 1 –** BH-DR02 Sample 2.2 from 8-9.5 ft bgs.



Copco Road at Dry Creek Bridge Photo 2 – BH-DR03 Sample 3.2 from 8-9.5 ft bgs.



Copco Road at Dry Creek Bridge Photo 3 – BH-DR04 Sample 4.2 from 9.5-11 ft bgs.



**Copco Road at Dry Creek Bridge Photo 4 –** BH-DR02 (far cone) location viewed from BH-DR03 looking to the northwest, Copco Road at Dry Creek Bridge in background.



Lakeview Road Bridge Photo 1 – BH-AB01 Sample 1.1 from 7-9.5 ft bgs.



Lakeview Road Bridge Photo 2 – BH-AB01 Sample 1.2 from 10-11.5 ft bgs.



Lakeview Road Bridge Photo 3 – BH-AB01 Sample 1.3 from 15-16.5 ft bgs.



Lakeview Road Bridge Photo 4 – BH-AB01 Sample 1.4 from 20-21.5 ft bgs.



Lakeview Road Bridge Photo 5 – BH-AB01 Sample 1.5 from 25-25.25 ft bgs.



Lakeview Road Bridge Photo 6 – BH-AB02 Sample 2.3 from 15-16.5 ft bgs.



Lakeview Road Bridge Photo 7 – BH-AB2 Sample 2.4 from 20-21.5 ft bgs.



Lakeview Road Bridge Photo 8 – BH-AB01 location looking south.



Lakeview Road Bridge Photo 9 - BH-AB02 Location looking southwest.



Scotch Creek Culvert Photo 1 – BH-SC01 Sample 1.1 from 0-1.5 ft bgs.



Scotch Creek Culvert Photo 2 – BH-SC02 Sample 2.1 from 0-1.5 ft bgs.#



Scotch Creek Culvert Photo 3 – BH-SC02 Sample 2.2 from 3.5-5 ft bgs.



Scotch Creek Culvert Photo 4 – BH-SC02 Sample 2.3 from 6-7.5 ft bgs.



Scotch Creek Culvert Photo 5 – BH-SC01 location looking south.



Scotch Creek Culvert Photo 6 – BH-SC02 Location looking southwest.



Camp Creek Culvert Photo 1 – BH-CC01 Sample 1.3 from 7-8.5 ft bgs.



Camp Creek Culvert Photo 2 – BH-CC02 Sample 2.2 from 4-6 ft bgs.



**Camp Creek Culvert Photo 3 –** BH-CC01 immediately after drilling completion, ground water present in borehole.



**Camp Creek Culvert Photo 4 –** BH-CC02 location looking North East, Camp Creek Culvert to the right of picture frame (not pictured).



Fall Creek at Daggett Road Photo 1 – BH-DG03 looking west.



Fall Creek at Daggett Road Photo 2 – BH-DG03 looking south.



**Fall Creek at Daggett Road Photo 3 –** BH-DG04 bulk sample at 5 ft bgs.



Fall Creek at Daggett Road Photo 4 – BH-DG04 looking south-east.



Fall Creek at Substation Road Photo 1 – BH-DG02 Sample 1.1 from 3.5-5 ft bgs.



Fall Creek at Substation Road Photo 2 – BH-DG02 Sample 1.3 from 8.5-10 ft bgs.


Fall Creek at Substation Road Photo 3 – BH-DG01 Sample 2.1 from 3.5-5 ft bgs.



Fall Creek at Substation Road Photo 4 – BH-DG01 location in foreground to the left (white circle), BH-FCSSR-01 location at back of drill rig trailer behind stop sign in background, looking west-northwest.



Fall Creek at Copco Road Photo 1 – BH-FC03 in foreground, BH-FC01 and BH-FC02 across the bridge in background on left and right respectively, view is looking west-southwest.



**Fall Creek at Copco Road Photo 2 –** BH-FC04 in foreground, BH-FC02 across the bridge in background, view is looking west-southwest, Fall Creek upstream to the right.















	3000	Results PRIVILEGED AND CONFIDENTIA							
		C nsf 39	13		1				
		6. deg 43.4							
		Tan(d) 0.95							
	2000			/					
ress, psf	2000		2						
	ý.			1					
S.									
10			/						
LL.	1000	- A							
		/							
	D								
		0 100	0 200	0	3000	4000	5000	6000	
	Normal Stress nef								
					Normai Otiess, psi				
	3000			5	Sample No.	1	2	3	
	-			F	Water Content %	15.0	15.0	15.0	
	2500 2000 1500 1000 500	-/			Dov Density, nof	90.0	00.0	15.0	
					T Cotraction %	90.0	90.0	90.0	
		/		- 10	Saturation, %	46.2	46.2	46.2	
5		/			- Void Ratio	0.8803	0.8803	0.8803	
Shear Stress, p			2		Diameter, in.	1.94	1.94	1.94	
					Height, in.	1.00	1.00	1.00	
		1			Water Content, %	26.4	24.6	25.8	
				1000	Dry Density, pcf	87.4	88.3	88.4	
					Saturation, %	76.6	72.8	76.4	
			1		Void Ratio	0.9356	0.9169	0.9145	
					Diameter in	1 94	1.94	1 94	
		/			Height in	1.03	1.02	1.02	
				- 6	Vormal Strees, nef	1000	2000	3000	
	V				Fail Stress nef	979	1030	2860	
	0	0.05 0.1	0.15 0.2		Displacement in	0.13	0.10	0.15	
		Horiz Displacement in			lit Stress osf	0.15	0.10	0.15	
		Hone. Displace	strietit, in.	Displacement in					
				1	Strain rate in /min	0.002	0.002	0.002	
						0.002	0.002	0.002	
Sample Type: Remold					lient: GeoServ, Inc.				
Description: Gray Clayey Sand (visual)					Project: KRRP Camp Creek Site Investigation				
					Specific Gravity= 2.71				
Remarks: Material tested in accordance with A STM					Sample Number 2 Benth: 7.0/ 20.0/				
D3080					Sample Number: 2 Deptn: 7.0' - 20.0'				
Doubled to 00 = a f @ 150/ Mainten					Proj. No.: 3155-023 Date Sampled: 05/29/2020				
Remolded to 90 p.c.t. @ 15% Moisture.									
					(*( · · , )')				
Figure 0300-004						Strappon 112			



Tested By: John Hubbard

