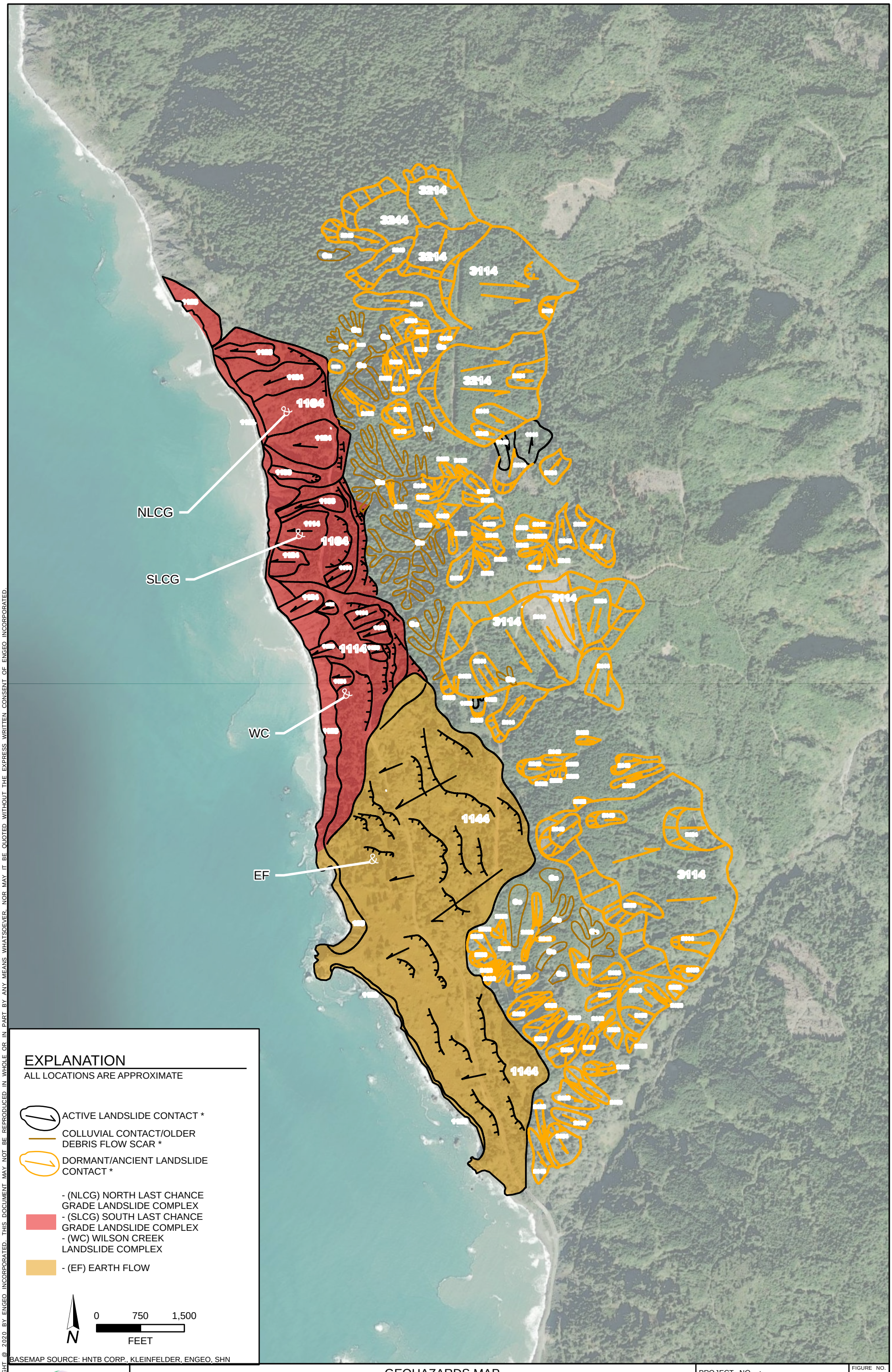
APPENDIX B Geohazards Map



GEOHAZARDS MAP

LAST CHANCE GRADE PROJECT PA/ED

DEL NORTE COUNTY, CALIFORNIA

PROJECT NO. :	FIGURE NO. B-1
SCALE: AS SHOWN	
DRAWN BY: QRL	CHECKED BY: BA

PATH: G:\ACTIVE PROJECTS_16000 TO 17999\17134\17134.000.000\GIS\17134\17134.APRX

ORIGINAL FIGURE PRINTED IN COLOR

APPENDIX C Boring Records

GROUP SYMBOLS AND NAMES

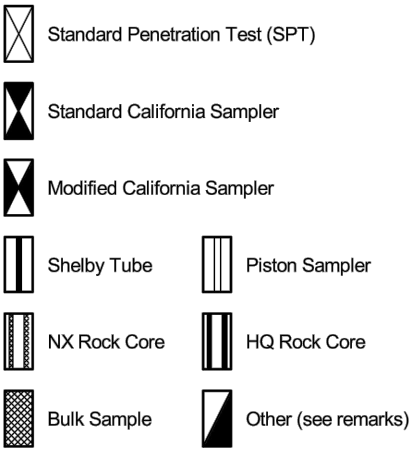
Graphic / Symbol	Group Names
GW	Well-graded GRAVEL Well-graded GRAVEL with SAND
GP	Poorly graded GRAVEL Poorly graded GRAVEL with SAND
GW-GM	Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND
GW-GC	Well-graded GRAVEL with CLAY (or SILTY CLAY) Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GP-GM	Poorly graded GRAVEL with SILT Poorly graded GRAVEL with SILT and SAND
GP-GC	Poorly graded GRAVEL with CLAY (or SILTY CLAY) Poorly graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GM	SILTY GRAVEL SILTY GRAVEL with SAND
GC	CLAYEY GRAVEL CLAYEY GRAVEL with SAND
GC-GM	SILTY, CLAYEY GRAVEL SILTY, CLAYEY GRAVEL with SAND
SW	Well-graded SAND Well-graded SAND with GRAVEL
SP	Poorly graded SAND Poorly graded SAND with GRAVEL
SW-SM	Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL
SW-SC	Well-graded SAND with CLAY (or SILTY CLAY) Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)
SP-SM	Poorly graded SAND with SILT Poorly graded SAND with SILT and GRAVEL
SP-SC	Poorly graded SAND with CLAY (or SILTY CLAY) Poorly graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)
SM	SILTY SAND SILTY SAND with GRAVEL
SC	CLAYEY SAND CLAYEY SAND with GRAVEL
SC-SM	SILTY, CLAYEY SAND SILTY, CLAYEY SAND with GRAVEL
PT	PEAT
	COBBLES COBBLES and BOULDERS BOULDERS

Graphic / Symbol	Group Names
CL	Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
CL-ML	SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND
ML	SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
OL	ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
OL	ORGANIC SILT ORGANIC SILT with SAND ORGANIC SILT with GRAVEL SANDY ORGANIC SILT SANDY ORGANIC SILT with GRAVEL GRAVELLY ORGANIC SILT GRAVELLY ORGANIC SILT with SAND
CH	Fat CLAY Fat CLAY with SAND Fat CLAY with GRAVEL SANDY fat CLAY SANDY fat CLAY with GRAVEL GRAVELLY fat CLAY GRAVELLY fat CLAY with SAND
MH	Elastic SILT Elastic SILT with SAND Elastic SILT with GRAVEL SANDY elastic SILT SANDY elastic SILT with GRAVEL GRAVELLY elastic SILT GRAVELLY elastic SILT with SAND
OH	ORGANIC fat CLAY ORGANIC fat CLAY with SAND ORGANIC fat CLAY with GRAVEL SANDY ORGANIC fat CLAY SANDY ORGANIC fat CLAY with GRAVEL GRAVELLY ORGANIC fat CLAY GRAVELLY ORGANIC fat CLAY with SAND
OH	ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY elastic ELASTIC SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
OL/OH	ORGANIC SOIL ORGANIC SOIL with SAND ORGANIC SOIL with GRAVEL SANDY ORGANIC SOIL SANDY ORGANIC SOIL with GRAVEL GRAVELLY ORGANIC SOIL GRAVELLY ORGANIC SOIL with SAND

FIELD AND LABORATORY TESTS

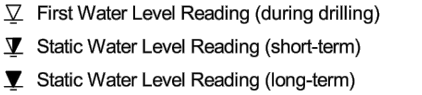
C	Consolidation (ASTM D 2435-04)
CL	Collapse Potential (ASTM D 5333-03)
CP	Compaction Curve (CTM 216 - 06)
CR	Corrosion, Sulfates, Chlorides (CTM 643 - 99; CTM 417 - 06; CTM 422 - 06)
CU	Consolidated Undrained Triaxial (ASTM D 4767-02)
DS	Direct Shear (ASTM D 3080-04)
EI	Expansion Index (ASTM D 4829-03)
M	Moisture Content (ASTM D 2216-05)
OC	Organic Content (ASTM D 2974-07)
P	Permeability (CTM 220 - 05)
PA	Particle Size Analysis (ASTM D 422-63 [2002])
PI	Liquid Limit, Plastic Limit, Plasticity Index (AASHTO T 89-02, AASHTO T 90-00)
PL	Point Load Index (ASTM D 5731-05)
PM	Pressure Meter
PP	Pocket Penetrometer
R	R-Value (CTM 301 - 00)
SE	Sand Equivalent (CTM 217 - 99)
SG	Specific Gravity (AASHTO T 100-06)
SL	Shrinkage Limit (ASTM D 427-04)
SW	Swell Potential (ASTM D 4546-03)
TV	Pocket Torvane
UC	Unconfined Compression - Soil (ASTM D 2166-06) Unconfined Compression - Rock (ASTM D 2938-95)
UU	Unconsolidated Undrained Triaxial (ASTM D 2850-03)
UW	Unit Weight (ASTM D 4767-04)
VS	Vane Shear (AASHTO T 223-96 [2004])

SAMPLER GRAPHIC SYMBOLS



DRILLING METHOD SYMBOLS

WATER LEVEL SYMBOLS



LAST CHANCE GRADE PERMANENT RESTORATION PROJECT

PRELIMINARY GEOTECHNICAL DATA REPORT
APRIL 2022

BORING RECORD LEGEND

APPENDIX C - BORING RECORDS

PLATE

C-1

CONSISTENCY OF COHESIVE SOILS				
Descriptor	**Unconfined Compressive Strength (tsf)**	**Pocket Penetrometer (tsf)**	**Torvane (tsf)**	**Field Approximation**
Very Soft	< 0.25	< 0.25	< 0.12	Easily penetrated several inches by fist
Soft	0.25 - 0.50	0.25 - 0.50	0.12 - 0.25	Easily penetrated several inches by thumb
Medium Stiff	0.50 - 1.0	0.50 - 1.0	0.25 - 0.50	Can be penetrated several inches by thumb with moderate effort
Stiff	1.0 - 2.0	1.0 - 2.0	0.50 - 1.0	Readily indented by thumb but penetrated only with great effort
Very Stiff	2.0 - 4.0	2.0 - 4.0	1.0 - 2.0	Readily indented by thumbnail
Hard	> 4.0	> 4.0	> 2.0	Indented by thumbnail with difficulty

APPARENT DENSITY OF COHESIONLESS SOILS	
Descriptor	**SPT N_{60} - Value (blows / foot)**
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

MOISTURE	
Descriptor	**Criteria**
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

PERCENT OR PROPORTION OF SOILS	
Descriptor	**Criteria**
Trace	Particles are present but estimated to be less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

SOIL PARTICLE SIZE		
Descriptor		**Size**
Boulder		> 12 inches
Cobble		3 to 12 inches
Gravel	Coarse	3/4 inch to 3 inches
	Fine	No. 4 Sieve to 3/4 inch
Sand	Coarse	No. 10 Sieve to No. 4 Sieve
	Medium	No. 40 Sieve to No. 10 Sieve
	Fine	No. 200 Sieve to No. 40 Sieve
Silt and Clay		Passing No. 200 Sieve

PLASTICITY OF FINE-GRAINED SOILS	
Descriptor	**Criteria**
Nonplastic	A 1/8-inch thread cannot be rolled at any water content.
Low	The thread can barely be rolled, and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll, and not much time is required to reach the plastic limit; it cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.

CEMENTATION	
Descriptor	**Criteria**
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

NOTE: This legend sheet provides descriptors and associated criteria for required soil description components only. Refer to Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010), Section 2, for tables of additional soil description components and discussion of soil description and identification.

ROCK GRAPHIC SYMBOLS

IGNEOUS ROCK

SEDIMENTARY ROCK

METAMORPHIC ROCK

BEDDING SPACING

Descriptor	Thickness or Spacing
Massive	> 10 ft
Very thickly bedded	3 to 10 ft
Thickly bedded	1 to 3 ft
Moderately bedded	3-5/8 inches to 1 ft
Thinly bedded	1-1/4 to 3-5/8 inches
Very thinly bedded	3/8 inch to 1-1/4 inches
Laminated	< 3/8 inch

WEATHERING DESCRIPTORS FOR INTACT ROCK

	Diagnostic Features					
	Chemical Weathering-Discoloration-Oxidation		Mechanical Weathering and Grain Boundary Conditions	Texture and Solutioning		
Descriptor	Body of Rock	Fracture Surfaces		Texture	Solutioning	General Characteristics
Fresh	No discoloration, not oxidized	No discoloration or oxidation	No separation, intact (tight)	No change	No solutioning	Hammer rings when crystalline rocks are struck.
Slightly Weathered	Discoloration or oxidation is limited to surface of, or short distance from, fractures; some feldspar crystals are dull	Minor to complete discoloration or oxidation of most surfaces	No visible separation, intact (tight)	Preserved	Minor leaching of some soluble minerals may be noted	Hammer rings when crystalline rocks are struck. Body of rock not weakened.
Moderately Weathered	Discoloration or oxidation extends from fractures usually throughout; Fe-Mg minerals are "rusty"; feldspar crystals are "cloudy"	All fracture surfaces are discolored or oxidized	Partial separation of boundaries visible	Generally preserved	Soluble minerals may be mostly leached	Hammer does not ring when rock is struck. Body of rock is slightly weakened.
Intensely Weathered	Discoloration or oxidation throughout; all feldspars and Fe-Mg minerals are altered to clay to some extent; or chemical alteration produces in situ disaggregation (refer to grain boundary conditions)	All fracture surfaces are discolored or oxidized; surfaces are friable	Partial separation, rock is friable; in semi-arid conditions, granitics are disaggregated	Altered by chemical disintegration such as via hydration or argillation	Leaching of soluble minerals may be complete	Dull sound when struck with hammer; usually can be broken with moderate to heavy manual pressure or by light hammer blow without reference to planes of weakness such as incipient or hairline fractures or veinlets. Rock is significantly weakened.
Decomposed	Discolored of oxidized throughout, but resistant minerals such as quartz may be unaltered; all feldspars and Fe-Mg minerals are completely altered to clay		Complete separation of grain boundaries (disaggregated)	Resembles a soil; partial or complete remnant rock structure may be preserved; leaching of soluble minerals usually complete		Can be granulated by hand. Resistant minerals such as quartz may be present as "stringers" or "dikes".

Note: Combination descriptors (such as "slightly weathered to fresh") are used where equal distribution of both weathering characteristics is present over significant intervals or where characteristics present are "in between" the diagnostic feature. However, combination descriptors should not be used where significant identifiable zones can be delineated. Only two adjacent descriptors shall be combined. "Very intensely weathered" is the combination descriptor for "decomposed to intensely weathered".

RELATIVE STRENGTH OF INTACT ROCK

Descriptor	Uniaxial Compressive Strength (psi)
Extremely Strong	> 30,000
Very Strong	14,500 - 30,000
Strong	7,000 - 14,500
Medium Strong	3,500 - 7,000
Weak	700 - 3,500
Very Weak	150 - 700
Extremely Weak	< 150

ROCK HARDNESS

Descriptor	Criteria
Extremely Hard	Specimen cannot be scratched with pocket knife or sharp pick; can only be chipped with repeated heavy hammer blows
Very hard	Specimen cannot be scratched with pocket knife or sharp pick; breaks with repeated heavy hammer blows
Hard	Specimen can be scratched with pocket knife or sharp pick with heavy pressure; heavy hammer blows required to break specimen
Moderately Hard	Specimen can be scratched with pocket knife or sharp pick with light or moderate pressure; breaks with moderate hammer blows
Moderately Soft	Specimen can be grooved 1/6 in. with pocket knife or sharp pick with moderate or heavy pressure; breaks with light hammer blow or heavy hand pressure
Soft	Specimen can be grooved or gouged with pocket knife or sharp pick with light pressure, breaks with light to moderate hand pressure
Very Soft	Specimen can be readily indented, grooved, or gouged with fingernail, or carved with pocket knife; breaks with light hand pressure

CORE RECOVERY CALCULATION (%)

$$\frac{\Sigma \text{ Length of the recovered core pieces (in.)}}{\text{Total length of core run (in.)}} \times 100$$

RQD CALCULATION (%)

$$\frac{\Sigma \text{ Length of intact core pieces > 4 in.}}{\text{Total length of core run (in.)}} \times 100$$

FRACTURE DENSITY

Descriptor	Criteria
Unfractured	No fractures
Very Slightly Fractured	Lengths greater 3 ft
Slightly Fractured	Lengths from 1 to 3 ft, few lengths outside that range
Moderately Fractured	Lengths mostly in range of 4 in. to 1 ft, with most lengths about 8 in.
Intensely Fractured	Lengths average from 1 in. to 4 in. with scattered fragmented intervals with lengths less than 4 in.
Very Intensely Fractured	Mostly chips and fragments with few scattered short core lengths

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
M. Porter	**9-23-20**	**9-28-20**	**2489208.417 ft / 5985460.159 ft NAD83**	**D-20-002**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
Gregg Drilling			**Alignment A2/G2, Sta. 162+00**	**834.46 ft NAVD88**
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Rotary Core			**Geoprobe 3230**	**4.5 in**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4"), HQ Core (2.5")			**Automatic; 140 lbs / 30-inch drop**	
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING / AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
VWP, TDR, Inclinometer; cement-bentonite			**Not Determined** / **Not Determined**	**100.0 ft**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	0		Fat CLAY (CH); very stiff; reddish brown; moist; trace SAND; high plasticity; abundant rootlets; weak cementation (COLLUVIUM); PP = 4.0 tsf					36		1.00			
			1.9 feet: reddish yellow		C01								
830	5		5.2 feet: red brown and yellow brown		S02	3 6 9	15	67		0.00			
			6.5 feet: PP = 2.5 tsf					12	0	2.44			
			7.0 feet: trace angular fine GRAVEL; weak to moderate cementation; faint relic rock structure (COLLUVIUM / RESIDUAL SOIL)		C03								
825	10		SEDIMENTARY ROCK (ARGILLITE); very thinly bedded; reddish brown, yellowish brown, gray; decomposed; very soft; very intensely fractured; pervasively sheared to: (Lean CLAY with SAND (CL)); very soft; moist; mostly fines; little fine to coarse SAND; medium plasticity; no cementation (FRANCISCAN COMPLEX / ANCIENT LANDSLIDE DEPOSIT); PP = 0 tsf		S04	6 11 12	23	40		0.00			
								NR		2.00			
820	15				C05								
								12		0.00			
					C06								
815	20		20.0 feet: advance HWT casing to 20'										
			21.0 feet: stiff; weak cementation; PP = 1.0 tsf		S07	3 8 15	23	53		0.00			
			23.0 feet: PP = 2.5 tsf		C08			93		2.67			
810	25				C09			100	0	7.00			

(continued)

KLEINFELDER
Bright People. Right Solutions.

REPORT TITLE				HOLE ID
BORING RECORD				**D-20-002**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**1 of 4**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	25		SEDIMENTARY ROCK (ARGILLITE); very thinly bedded; dark gray; decomposed; very soft; very intensely fractured; pervasively sheared to: (Sandy lean CLAY (CL)); stiff; mostly fines; some fine to coarse SAND; few fine subangular GRAVEL (ARGILLITE fragments) (FRANCISCAN COMPLEX: ANCIENT LANDSLIDE DEPOSIT)		C10			14	0	7.60			
805	30		30.0 feet: black; fresh; hard; intensely fractured; quartz and calcite veining to 0.1"		C11			24	0	2.40			
			32.5 feet: very intensely fractured		C12			NR		2.94			
800			34.2 feet: drill bit clogged at start of run; did not advance		C13			NR		7.50			
	35		34.8 feet: circulation loss SEDIMENTARY ROCK (ARGILLITE); thinly bedded; dark gray; decomposed; soft to very soft; very intensely fractured; pervasively sheared to: (Sandy fat CLAY with GRAVEL (CH)) stiff; dark gray; moist; mostly fines; some fine to coarse SAND; little subangular fine to coarse GRAVEL (SANDSTONE and ARGILLITE fragments); (FRANCISCAN COMPLEX: ANCIENT LANDSLIDE DEPOSIT)		C14			32	0	3.20			
			36.8 feet: circulation loss		C15			28	0	1.20			
795	40		40.0 feet: equip NQ core for pressure meter test; interval from 40.0-45.0 feet; advance HWT casing to 40'		C16			36	0	3.60			
790			43.5 feet: PMT, maximum pressure 110 psi										
	45		45.0 feet: PMT, maximum pressure 125 psi; water loss 45.2 feet: PP = 0 tsf and 1.0 tsf		C17			47	0	5.88			
			46.5 feet: circulation loss 47.0 feet: very soft to very stiff; PP = 0 tsf and 2.5 tsf 47.4 feet: very hard 1" SANDSTONE clast in shoe; circulation return		C18			24	0	6.97			
785	50				C19			NR		6.80			
			53.0 feet: 4" ARGILLITE clast; slightly weathered; moderately soft		C20			36	0	5.20			
780	55		54.0 feet: rig chatter										

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**D-20-002**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**2 of 4**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	55		SEDIMENTARY ROCK (ARGILLITE) 55.0 feet: circulation loss		C21			28	0	7.20			
					C22			NR		24.29			
775					C23			NR		7.78			
	60		60.0 feet: dark gray; intensely weathered to decomposed; very soft; very intensely fractured; with moderately hard ARGILLITE and SANDSTONE clasts; pervasively sheared to: (CLAYEY GRAVEL with SAND (GC)); loose; dark gray; moist to wet; mostly subangular fine to coarse GRAVEL; some moderate to high plasticity fines; little fine to coarse SAND; local chaotic quartz and calcite veining; advance HWT casing to 60.0'		C24			28	0	3.60			
					C25			NR		8.00			
770			63.5 feet: circulation loss										
	65		65.0 feet: continuous circulation loss during drilling		C26			24	0	2.40			
			67.5 feet: intensely fractured		C27			56	0	4.80			F: (68.2'), 40°, open, clean, moderately hard, not healed, slightly rough
765			69.2 feet: rig chatter										
	70		70.0 feet: very intensely fractured		C28			28	0	4.80			
					C29			24	0	9.60			
760			74.0 feet: rig chatter										
	75		75.0 feet: continuous circulation loss during drilling; advance HWT casing to 75.0'		C30			16	0	3.20			
					C31			NR		3.20			
755													
	80		80.0 feet: recovering dominantly moderately hard ARGILLITE and SANDSTONE fragments to 4"; localized zone of disturbed SAND and Fat CLAY (CH); poor recovery; circulation loss		C32			28	0	2.80			
					C33			52	0	4.00			F: (83.6'), 60°, wide, clean, slightly weathered, hard, not healed, moderately rough
750	85												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**D-20-002**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**3 of 4**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	85		SEDIMENTARY ROCK (ARGILLITE); as above (FRANCISCAN COMPLEX: BROKEN FORMATION)		C34			50	50	7.14			
			85.0 feet: unfractured 85.5 feet: very intensely fractured		C35			28	0	2.78			
			87.0 feet: drill bit continually becoming clogged		C36			28	0	2.40			
745	90				C37			24	0	2.40			
					C38			NR		7.14			
					C39			NR		8.89			
740			94.0 feet: rig chatter										
	95				C40			20		7.20			F: (95.3'), 50°, wide, fresh, hard, moderately rough
			97.0 feet: circulation loss		C41			NR		10.00			
								NR		11.00			
735			98.8 feet: circulation loss		C42								
	100		100.0 feet: advance HWT casing to full depth (100.0') Bottom of borehole at 100.0 ft bgs										
730	105												
725	110												
720	115												

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REPORT TITLE				HOLE ID
BORING RECORD				**D-20-002**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**4 of 4**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
M. Parks	**9-23-20**	**9-26-20**	**2487932.195 ft / 5986035.288 ft NAD83**	**RC-20-003**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
Gregg Drilling				**774.80 ft NAVD88**
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Rotary Core			**CME 850 Track**	**4.5 in**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
HQ Core (2.5")			**Automatic; 140 lbs / 30-inch drop**	
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING	AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
VWP, TDR, Inclinometer; cement-bentonite			**Not Determined**	**Not Determined**	**155.0 ft**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	0		SEDIMENTARY ROCK (SANDSTONE) Fine- to medium-grained sand; massive; dark grayish brown; moderately weathered; soft; intensely fractured; mineralization on fracture surfaces (FRANCISCAN COMPLEX / ANCIENT LANDSLIDE DEPOSIT)		C01			60	0	1.20			
			2.6 feet: yellowish brown; very intensely fractured 3.0 feet: intensely fractured 3.6 feet: Lean CLAY (CL) fracture infill 4.1 feet: dark grayish brown; moderately soft										
770	5		4.8 feet: Lean CLAY (CL) fracture infill		C02			60	8	3.80			
			7.1 feet: yellowish brown 7.6 feet: very intensely fractured 7.8 feet: intensely fractured 8.6 feet: very intensely fractured 8.7 feet: intensely fractured 9.1 feet: very intensely fractured										
765	10		9.8 feet: Lean CLAY (CL) fracture infill 10.0 feet: intensely fractured		C03			64	9	1.80			
760	15		14.3 feet: SANDY lean CLAY (CL) fracture infill		C04			58	0	2.40			
			18.0 feet: circulation loss (30-40 gallons)										
755	20		19.8 feet: Sandy lean CLAY (CL) fracture infill		C05			92	23	1.80			
750	25												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-003**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**1 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	25		SEDIMENTARY ROCK (SANDSTONE)		C06			80	15	2.60			
			26.2 feet: calcite crystals; up to 0.5"										
			26.9 feet: calcite crystals up to 0.2"										
			28.0 feet: Lean CLAY (CL) seam 0.5" thick										
			28.7 to 29.1 feet: Lean CLAY (CL) fracture infill										
745	30				C07			62	0	4.67			
			34.0 to 34.5 feet: very intensely fractured with Lean CLAY (CL) fracture infill										
740	35				C08			80	0	5.00			
			35.0 feet: slightly weathered; moderately hard; intensely fractured		C09			95	14	4.00			
			37.5 feet: moderately fractured										
			38.0 feet to 40.0 feet: trace ARGILLITE clasts up to 0.1"										F: (37.8'), 10°, slightly open, very thin, manganese, moderately weathered, moderately hard, not healed, moderately rough
			39.0 feet: 0.25" Lean CLAY (CL) infill; trace ARGILLITE clasts up to 0.1"		C10			100	0	3.00			
735	40		39.5 feet: intensely fractured		C11			85	0	3.71			F: (38.4'), 30°, very thin, manganese, moderately weathered, moderately hard, not healed, rough
			41.2 to 41.5 feet: bluish gray with yellowish brown staining on fracture surfaces										
					C12			93	0	4.67			
730	45		45.0 to 45.2 feet: laminated ARGILLITE interbeds; gray; moderately weathered; moderately soft to moderately hard		C13			43	0	5.14			
			48.5 to 48.7 feet: laminated ARGILLITE interbeds; gray; moderately weathered; moderately soft to moderately hard		C14			100	0	3.33			
725	50		49.8 feet: yellowish brown and bluish gray		C15			90	0	3.60			
			52.0 to 59.2 feet: trace ARGILLITE clasts up to 0.1"										
720	55												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-003**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**2 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	55		SEDIMENTARY ROCK (SANDSTONE)		C16			80	7	2.20			
715	60		59.2 to 59.4 feet: laminated ARGILLITE interbeds; gray; moderately weathered; moderately hard		C17			92	20	4.40			
710	65		61.5 to 64.5 feet: 0.25" vertical quartz veining		C18			81	0	5.95			
705	70		65.9 feet: 2" ARGILLITE clast 67.2 feet: fine to medium grained; massive; bluish gray and grayish brown; slightly weathered; moderately hard; intensely fractured		C19			100	0	3.19			
			69.3 feet: grayish brown; moderately weathered		C20			100	0	2.33			
700	75		72.9 feet: bluish gray and grayish brown; slightly weathered; ARGILLITE clasts up to 0.25" 73.5 feet: grayish brown; moderately weathered 74.7 to 76.5 feet: ARGILLITE clasts up to 0.2"		C21			100	0	2.50			
					C22			100	0	3.68			
695	80		SEDIMENTARY ROCK (SANDSTONE); fine to medium grained sand; massive; bluish gray with grayish brown; slightly weathered; moderately hard to hard; intensely fractured; (FRANCISCAN COMPLEX/ANCIENT LANDSLIDE DEPOSIT) 77.3 to 78.0 feet: 0.25 to 0.75" open dissolution cavities 78.5 feet: 0.5" ARGILLITE bed: dips 40°; very dark gray; slightly weathered; moderately soft; trace ARGILLITE clasts up to 0.2" 78.8 feet: circulation loss (30 gallons)		C23			8	0	7.50			
					C24			5	0	3.50			
690	85		SEDIMENTARY ROCK (SANDSTONE) Fine to medium grained; massive; bluish gray; slightly weathered; moderately hard; intensely fractured; localized convolute; ARGILLITE bed remnants, clasts up to 0.2"; planar and chaotic quartz and calcite veining, up to 0.1" thick (FRANCISCAN COMPLEX/ANCIENT LANDSLIDE DEPOSIT)		C25			66	15	5.00			

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-003**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**3 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	85		SEDIMENTARY ROCK (SANDSTONE)		C26			NR		10.00			
								NR		9.00			
					C27								
					C28			NR		11.33			
			89.0 feet: moderately fractured		C29			100	83	6.00			F: (89.1'), 5°, very thin, calcite, intensely weathered, soft, not healed, rough
685	90							100	45	4.60			F: (89.3'), 45°, very thin, calcite, intensely weathered, soft, not healed, moderately rough F: (90.8'), 20°, moderately open, very thin, calcite, intensely weathered, very soft, not healed, rough
					C30								
			92.6 feet: intensely fractured 92.6 to 94.5 feet: ARGILLITE clasts up to 0.2"										V: (91.2'), 10°, moderately open, very thin, calcite, intensely weathered, very soft, not healed, rough
680	95							100	33	3.60			F: (91.6'), 70°, slightly open, very thin, calcite, intensely weathered, very soft, totally healed, moderately rough F: (92.0'), 75°, slightly open, very thin, calcite, intensely weathered, very soft, not healed, moderately rough
					C31								F: (92.2'), 70°, tight, very thin, calcite, intensely weathered, very soft, not healed, moderately rough
			98.3 feet: moderately fractured										F: (98.3'), 60°, moderately open, very thin, calcite, intensely weathered, soft, not healed, rough
675	100		100.0 feet bluish gray; fresh; moderately hard to hard; slightly fractured; calcite veining					100	95	2.20			F: (99.7'), 80°, moderately open, very thin, calcite, intensely weathered, soft, not healed, moderately rough (99.9'), 15°, moderately open, very thin, calcite, intensely weathered, soft, not healed, rough
					C32								F: (101.0'), 8°, slightly open, very thin, calcite, intensely weathered, soft, not healed, rough
670	105		105.0 feet: equip HQ core for pressure meter test; interval from 105.0 to 110.0'					97	86	4.00			F: (101.6'), 85°, moderately open, moderately thin, calcite, intensely weathered, soft, partly healed, moderately rough
					C33								F: (104.4'), 70°, moderately open, moderately thin, calcite, intensely weathered, soft, partly healed, moderately rough
			108.4 feet; moderately fractured to intensely fractured		C34			39	24	18.33			F: (108.1'), 50°, slightly open, very thin, calcite, intensely weathered, soft, not healed, rough
665	110												F: (108.5'), 60°, slightly open, very thin, calcite, intensely weathered, soft, rough
			110.3 feet: moderately fractured 111.0 feet: trace ARGILLITE clasts up to 0.2"					100	90	3.19			
					C35								
			112.8 feet: intensely fractured										F: (112.8'), 45°, slightly open, very thin, calcite, intensely weathered, soft, not healed, moderately rough
660	115		113.6 feet: moderately fractured										

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-003**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**4 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	115		114.6 feet: intensely fractured SEDIMENTARY ROCK (SANDSTONE) 115.2 feet: moderately fractured		C36			98	84	4.00			F: (114.6'), 40°, slightly open, very thin, calcite, intensely weathered, soft, not healed, moderately rough F: (114.8'), 70°, slightly open, very thin, calcite, intensely weathered, soft, not healed, moderately rough F: (115.8'), 30°, slightly open, clean, not healed, rough F: (116.4'), 25°, slightly open, clean, not healed, rough
655	120		119.6 feet: 0.1" convolute ARGILLITE interbed: dips 30°; dark gray; slightly weathered; moderately hard; mass parts on bedding plane		C37			100	96	4.22			F: (116.7'), 15°, slightly open, clean, not healed, rough F: (118.2'), 70°, slightly open, very thin, calcite, intensely weathered, soft, not healed, moderately rough F: (119.1'), 30°, slightly open, clean, not healed, slightly rough B: (119.6'), 40°, slightly open, clean, not healed, rough
			123.4 feet: intensely fractured										F: (120.7'), 35°, open, clean, not healed, rough
650	125		124.5 feet: moderately fractured; ARGILLITE clasts up to 0.2"		C38			100	100	2.00			F: (121.0'), 80°, moderately open, clean, not healed, rough
			126.5 feet: intensely fractured					100	85	6.00			F: (122.4'), 45°, slightly open, clean, not healed, slightly rough
			127.4 feet: slightly fractured		C39								F: (123.0'), 10°, slightly open, clean, not healed, slightly rough F: (123.4'), 70°, slightly open, clean, not healed, slightly rough
645	130		128.9 feet: 0.5" planar calcite vein: dips 70°; blue mineralization; mass parts on vein										F: (123.6'), 15°, slightly open, clean, not healed, slightly rough
					C40			97	83	6.20			F: (124.2'), 30°, slightly open, clean, not healed, rough F: (124.5'), 40°, clean, not healed, rough F: (125.0'), 45°, slightly open, clean, not healed, slightly rough F: (126.0'), 25°, slightly open, very thin, calcite, intensely weathered, soft, not healed, slightly rough F: (126.3'), 65°, slightly open, very thin, calcite, intensely weathered, soft, not healed, slightly rough
640	135		135.0 feet: gray; slightly weathered; hard					100	88	6.40			F: (127.4'), 40°, slightly open, thin, calcite, intensely weathered, moderately soft, partly healed, rough
			137.5 to 138.1 feet: ARGILLITE interbed remnants/clasts up to 1"; dark gray; slightly weathered to fresh; hard 138.1 feet: ARGILLITE clasts up to 0.2"		C41								F/V: (129.2'), 70°, moderately wide, moderately thick, calcite, intensely weathered, moderately soft, not healed, moderately rough to rough F: (130.1'), 15°, slightly open, clean, not healed, rough
635	140		140.0 feet: moderately fractured										F: (131.5'), 35°, slightly open, very thin, calcite, intensely weathered, soft, not healed, rough
			140.6 feet: parting on 0.1" ARGILLITE interbed					98	98	3.60			F/V: (132.6'), 80°, moderately open, very thin, calcite, slightly weathered, moderately soft, partly healed, slightly rough
			142.0 feet: slightly fractured 142.4 feet: 0.2" calcite vein: dips 80°		C42								F: (134.1'), 75°, slightly open, clean, not healed, rough F: (135.4'), 60°, moderately open, clean, not healed, slightly rough
630	145												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-003**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**5 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
625	145		SEDIMENTARY ROCK (SANDSTONE) 145.6 feet: moderately fractured 146.0 to 146.2 feet: ARGILLITE clasts to 1"; dark gray; slightly weathered; moderately hard to hard		C43			100	87	10.71			F: (139.5'), 70°, moderately open, very thin, calcite, slightly weathered, moderately soft, not healed, moderately rough to rough F: (140.6'), 15°, slightly open, very thin, Argillite, slightly weathered, moderately hard, not healed, moderately rough F: (141.4'), 25°, moderately open, clean, not healed, rough F: (141.5'), 60°, moderately open, clean, not healed, moderately rough B: (141.9'), 50°, very thin, Argillite, totally healed B: (142.8'), 50° F: (145.7'), 25°, moderately open, clean, not healed, moderately rough F: (146.4'), 40°, moderately open, clean, not healed, rough F: (146.6'), 75°, moderately open, clean, not healed, moderately rough F: (148.4'), 25°, moderately open, moderately thin, calcite, slightly weathered, moderately hard, not healed, moderately rough F: (151.2'), 30°, slightly open, clean, not healed, rough F: (151.5'), 65°, slightly open, very thin, calcite, intensely weathered, soft, not healed, moderately rough F: (152.4'), 30°, moderately open, very thin, calcite, slightly weathered, hard, not healed, moderately rough F: (152.8'), 60°, moderately open, very thin, calcite, slightly weathered, hard, partly healed, moderately rough F/B: (153.8'), 60°, slightly open, very thin, Argillite, slightly weathered, moderately hard, not healed, smooth F: (154.5'), 0°, slightly open, very thin, Argillite, slightly weathered, moderately hard, not healed, smooth
			149.4 feet: 8" ARGILLITE interbed; dark gray; fresh; moderately hard		C44			97	88	7.50			
620	150		SEDIMENTARY ROCK (SANDSTONE); fine to medium-grained; gray to dark gray; fresh; hard; moderately fractured; ARGILLITE clasts up to 0.3"; quartz and calcite veining up to 0.2" thick (FRANCISCAN COMPLEX/ANCIENT LANDSLIDE DEPOSIT)		C45			100	76	5.53			
			153.8 feet: 0.1" ARGILLITE interbed: dips 60°; mass parts on bedding		C46			100	100	5.83			
615	155		154.5 feet: 0.1" ARGILLITE interbed: dips 60°; mass parts on bedding 155.0 feet: advance HWT casing to full depth (155.0') Bottom of borehole at 155.0 ft bgs										
610	160												
605	165												
600	170												
	175												

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-003**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**6 of 6**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
J. Klamecki	**9-29-20**	**10-6-20**	**2488300.126 ft / 5985985.573 ft NAD83**	**RC-20-004**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
CRUX Subsurface, Inc.				**793.52 ft NAVD88**
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Rotary Core			**Burley 55-1**	**4.5 in**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4"), HQ Core (2.5")			**Rope and Cathead; 140 lbs / 30-inch drop**	
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING / AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
VWP, TDR, Inclinometer; cement-bentonite			**Not Determined** / **Not Determined**	**185.9 ft**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	0		Lean CLAY (CL); very soft to soft; very dark brown; moist; medium plasticity; medium dry strength; no dilatancy; few rootlets; (SURFACE SOIL/COLLUVIUM)										
			2.0 feet: PP = 0.25 tsf		S01	3 3 4	7	100					
790													
	5												
			7.0 feet: stiff; yellowish brown; PP = 1.0 tsf		S02	2 3 4	7	100					
785													
	10		SEDIMENTARY ROCK (ARGILLITE) Very thickly bedded; grayish brown; decomposed; very soft; (Lean CLAY with GRAVEL (CL); very stiff; grayish brown; moist; mostly fines; little angular fine GRAVEL; few fine to coarse SAND); (FRANCISCAN COMPLEX / ANCIENT LANDSLIDE DEPOSIT)		S03	31 33 40	73	100					
			12.7 feet: decomposed to intensely weathered; soft; very intensely fractured; (Poorly-graded GRAVEL with SILT (GP-GM)); angular fine GRAVEL; few fines)		C04			100	0				
780													
			14.0 feet: decomposed; (CLAYEY GRAVEL with SAND (GC); mostly angular fine GRAVEL; little SAND; little fines; few coarse GRAVEL)		C05			100	0				
	15												
			16.2 feet: 7" block of SANDSTONE: dark gray; slightly weathered; hard; intensely fractured 16.8 feet: 10" zone of ARGILLITE; decomposed; very soft; very intensely fractured; (Lean CLAY (CL); very stiff); PP = 2.5 tsf										
775													
	20				C06			68	0				
			20.5 feet: very dark gray; very intensely fractured; prominent shear fabric; (GRAVELLYFat CLAY with SAND (CH); stiff; some angular fine GRAVEL) 21.0 feet: slightly weathered; hard; intensely fractured; with few SANDSTONE clasts up to 1"										
770													
			24.0 feet: decomposed; soft		C07			98	0				
	25												

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-004**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**1 of 7**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	25		SEDIMENTARY ROCK (ARGILLITE) 25.4 feet: advance HWT casing to 25.4' 26.3 feet: very intensely fractured; PP = 1.5 tsf 26.8 feet: PP = 3.5 tsf		C07			98	0				
765			28.3 feet: intensely weathered; soft to moderately soft; prominent convolute shear fabric					64	0				
	30		29.5 feet: slightly weathered; moderately hard; very intensely fractured		C08								
760								88	0				
	35		34.5 feet: intensely weathered; soft; very intensely fractured; prominent shear fabric 36.0 feet: 2" SANDSTONE clast: fine-grained; very dark gray; fresh; very hard		C09								
755								100	0				
	40		38.5 feet: decomposed; soft; very intensely fractured; (Clayey GRAVEL with SAND (GC); angular fine to coarse GRAVEL; some SAND; little fines); predominant shear fabric orientation: dips 60°		C10								
750								98	0				
	45				C11								
745								100	0				
	50		51.5 feet: 6" zone: slightly weathered; moderately hard; intensely fractured		C12								
740			53.3 feet: slightly weathered; moderately hard; intensely fractured		C13			100	0				
	55												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-004**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**2 of 7**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	55		SEDIMENTARY ROCK (ARGILLITE)		C13			100	0				
			55.8 feet: decomposed; very soft to soft; very intensely fractured; (SILTY GRAVEL with SAND (GM); mostly angular fine GRAVEL; some angular coarse GRAVEL; little SAND; little fines)					86	0				
735					C14								
	60							100	0	6.67			
			62.3 feet: very soft; brittle coarse-sand sized chips in clayey matrix; (CLAYEY SAND (SC); hard; fine to coarse SAND; some fines); PP = 4 tsf										
730			63.6 feet: intensely weathered; moderately soft; intensely fractured		C15								
	65		65.3 feet: PP = 4.5 tsf										
			66.0 feet: very intensely fractured					100	0	6.67			
			67.3 feet: 2" SANDSTONE clast: fine-grained sand; dark gray; slightly weathered; very hard; with calcite veining		C16								
725			67.8 feet: decomposed; soft; (CLAYEY SAND with GRAVEL (SC); dark gray; mostly sand; some fines; little GRAVEL) 68.5 feet: moderately weathered; moderately hard					100	0	6.00			
	70		69.0 feet: intensely fractured										
			70.5 feet: prominent shear: 55°		C17								
			71.0 feet: intensely weathered; soft; very intensely fractured										
720								100	9	6.00			
	75		73.3 feet: decomposed; (CLAYEY SAND with GRAVEL (SC); fine to coarse SAND; some angular fine to coarse GRAVEL; some fines)										
			75.0 feet: 1.7 foot zone: moderately weathered; moderately hard; intensely fractured		C18								
			77.7 feet: 6" SANDSTONE clast; fine-grained sand; slightly weathered; very hard; with calcite veining										
715								100	0	6.00			
	80		79.2 feet: moderately weathered; moderately hard; very intensely fractured to intensely fractured		C19								
			80.0 feet: advance HWT casing to 80.0'										
			81.4 feet: decomposed; soft; very intensely fractured; (CLAYEY GRAVEL with SAND (GC); mostly angular fine GRAVEL; some fines; little SAND)					100	8	7.50			
					C20								
710			83.0 feet: slightly weathered; very hard; 5" SANDSTONE clast: fine-grained; slightly weathered; very hard					100	17	0.00			
			84.1 to 85.1 feet: moderately weathered; moderately hard; with 0.25 to 1" SANDSTONE clasts		C21								
	85												

(continued)

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REPORT TITLE **BORING RECORD**				HOLE ID **RC-20-004**
DIST. **01**	COUNTY **Del Norte**	ROUTE **101**	POSTMILE **12-15.5**	EA **0115000099**
PROJECT OR BRIDGE NAME **Last Chance Grade Bypass**				
BRIDGE NUMBER **--**	PREPARED BY **D. Ross**		DATE **5-11-21**	SHEET **3 of 7**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	85		SEDIMENTARY ROCK (ARGILLITE) 85.1 feet: 8" SANDSTONE clast: fine-grained sand; slightly weathered; very hard		C21			100	17				
705			88.3 feet: moderately weathered; moderately hard; very intensely fractured 88.7 feet: decomposed; very soft; (GRAVELLY Fat CLAY with SAND (CH); some angular fine GRAVEL; little SAND)		C22			100	7	6.00			
	90		90.0 feet: 4" SANDSTONE clast: fine-grained sand; slightly weathered; very hard 91.8 feet: moderately weathered; moderately hard; intensely fractured; with clasts of SANDSTONE up to 3": fine-grained sand; slightly weathered; very hard										
700			93.3 feet: intensely weathered; soft; very intensely fractured; with clasts of SANDSTONE up to 3": fine-grained sand; slightly weathered; very hard		C23			100	0	3.40			
	95		95.0 feet: moderately weathered; moderately hard; very intensely fractured to intensely fractured										
695			97.8 feet: intensely weathered; soft; very intensely fractured 99.0 feet: 7" SANDSTONE clast: fine-grained sand; dark gray; fresh; very hard; intensely fractured		C24			100	0	6.00			
	100		100.0 feet: decomposed; soft; very intensely fractured; with few SANDSTONE clasts to 3"; (CLAYEY SAND with GRAVEL (SC); mostly SAND; little fines; little GRAVEL)										
690			103.3 feet: locally intensely weathered		C25			100	0	6.00			
	105				C26			88	0	6.00			
685			108.3 feet: intensely weathered		C27			100	0	6.00			
	110		110.3 feet: moderately weathered; moderately hard 111.6 feet: packer test performed 111.6' to 130.8' 112.0 feet: intensely fractured										
680					C28			100	0	6.00			
	115												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-004**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**4 of 7**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	115		SEDIMENTARY ROCK (ARGILLITE)										
					C28			100	0				
			116.9 feet: moderately weathered; moderately hard; very intensely fractured; with few very hard SANDSTONE clasts from 0.25 to 2"										
675					C29			92	0	6.00			
	120		120.0 feet: 5" zone of calcite veining 120.4 to 121.3 feet: decomposed; very soft; very intensely fractured; (CLAYEY GRAVEL with SAND (GC); fine to coarse GRAVEL) 121.0 feet: moderately weathered; moderately hard 122.0 feet: prominent shear: dips 45°; striations down dip									
670					C30			100	16	6.00			
	125		123.3 feet: 6" SANDSTONE clast: fine-grained sand; dark gray; fresh; very hard; intensely fractured 123.8 feet: decomposed; soft; (CLAYEY GRAVEL with SAND (GC); angular fine to coarse GRAVEL; some fines; little SAND)										
			126.3 to 128.3 feet: zone of 3 to 12" SANDSTONE clasts: hard to very hard; moderately fractured; minor calcite veining										
665					C31			100	0	6.00			
	130		128.3 feet: intensely weathered										
			130.2 feet: moderately weathered; moderately hard; intensely fractured; with few SANDSTONE clasts from 0.25 to 4": very hard; prominent shear fabric: dips 45°		C32			100	36	6.67			
			131.5 feet: prominent shear: dips 45°; striations strike-parallel										
660					C33			100	21	6.67			
	135		133.3 feet: intensely weathered; soft; very intensely fractured										
			135.5 feet: moderately weathered; moderately hard; intensely fractured; some SANDSTONE clasts to 3"; trace calcite veining										
655					C34			100	29	6.67			
	140		140.6 feet: trace SANDSTONE clasts										
650					C35			100	10	6.67			
	145												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-004**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**5 of 7**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	145		SEDIMENTARY ROCK (ARGILLITE)		C35			100	10				
			147.0 feet: decomposed; very soft; very intensely fractured; (CLAYEY GRAVEL with SAND (GC); mostly angular fine GRAVEL; little angular SAND; little fines)										
645					C36			100	0	6.00			
	150												
640			153.3 feet: intensely weathered; soft		C37			94	20	7.50			
	155		155.0 feet: 2.2 foot SANDSTONE clast: fine-grained sand; dark gray; fresh; very hard; moderately fractured to intensely fractured; calcite veining										
635			159.0 feet: moderately weathered; moderately hard; intensely fractured; with some SANDSTONE clasts from 0.125 to 3": hard to very hard		C38			100	7	7.50			
	160												
			161.4 feet: moderately soft; very intensley fractured										
630			163.0 feet: 10" SANDSTONE clast: fine-grained sand; fresh; very hard; intensely fractured		C39			100	0				
	165		165.0 feet: intensely weathered; soft to moderately soft; very intensley fractured										
			167.0 feet: decomposed; very soft to soft; (CLAYEY GRAVEL with SAND (GC); mostly angular fine GRAVEL; little angular coarse GRAVEL; little SAND; little fines)										
625					C40			100	0				
	170												
620			173.3 feet: intensely weathered; soft		C41			100	0				
	175												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-004**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**6 of 7**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	175		SEDIMENTARY ROCK (ARGILLITE)		C41			100	0				
			175.8 feet: 8" SANDSTONE clast: fine-grained sand; slightly weathered; very hard; intensely fractured; trace ARGILLITE		C42			100	0				
615			177.0 feet: moderately weathered; moderately hard; intensely fractured; trace gravel-sized SANDSTONE clasts		C43			100	0				
	180												
								98	0				
610			183.0 feet: prominent shear plane: dips 75°		C44								
	185		185.9 feet: advance HWT casing to full depth (185.9')										
			Bottom of borehole at 185.9 ft bgs										
605													
	190												
600													
	195												
595													
	200												
590													
	205												

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-004**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**7 of 7**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
C. Tipp	9-30-20	10-7-20	2484488.630 ft / 5984431.755 ft NAD83	RC-20-005
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
CRUX Subsurface, Inc.				859.05 ft NAVD88
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Rotary Core			Burley 6000	4.5 in
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4"), HQ Core (2.5")			Cathead; 140 lbs / 30-inch drop	
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING / AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
VWP, TDR, Inclinometer; cement-bentonite			Not Determined / Not Determined	250.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method / Casing Depth	Discontinuity Description: Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	0		SANDY SILT (ML); very soft; brown to dark brown; moist; mostly fines; some fine SAND; low plasticity; (COLLUVIUM / LANDSLIDE DEPOSIT)									
855			3.0 feet: moist to wet; dark brown; stiff; mostly fines; some fine to medium SAND; few fine subangular GRAVEL; PP = 1.25 tsf		S01	1 1 1	2	17				
	5		SANDY LEAN CLAY (CL); soft; yellowish brown; moist to wet; mostly fines; some coarse to fine SAND; few fine subangular GRAVEL; (COLLUVIUM / LANDSLIDE DEPOSIT)									
850					S02	1 1 1	2	17				
	10		10.0 feet: advance HWT casing to 10.0'; equip HQ core									
			SEDIMENTARY ROCK (ARGILLITE); fine-grained; massive; brown to dark gray; intensely weathered; soft; very intensely fractured; (LANDSLIDE DEPOSIT)		S03	9 34 50/2"	84/8	92				
			10.5 feet: advance HWT casing to 10.5'		C04			76	0	0.00		
			12.0 feet: circulation loss		C05			66	0	0.00		
845					C06			100	0	2.78		
	15		15 feet: laminated; apparent bedding: dips 30°		S07	23 17 17	34					
			SEDIMENTARY ROCK (SANDSTONE) thinly bedded with thin interbeds of ARGILLITE. SANDSTONE; fine-grained sand; thinly bedded; yellowish brown and gray; intensely weathered; soft; very intensely fractured; ARGILLITE; fine-grained; gray; intensely weathered; so		C08			80	0	7.14		
					C09			82	0	5.00		
840					C10			NR		0.00		
	20		SEDIMENTARY ROCK (ARGILLITE); fine-grained; moderately bedded; light brown and gray; intensely weathered; soft; very intensely fractured; (LANDSLIDE DEPOSIT)		S11	38 50/3"	50/3	100				
					C12			110	0	8.33		
					C13			23	0	8.82		
			23.2 feet: advance HWT casing to 23.2'; circulation return		C14			75	0	0.00		
835												
	25		24.3 feet: light brown; decomposed; (Sandy Lean CLAY		S15		50/5.5	83				

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				RC-20-005
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	Del Norte	101	12-15.5	0115000099
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	D. Ross		5-11-21	1 of 9

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	25		(CL); very soft; wet; mostly fines; some fine SAND)					74	13	0.00			
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained sand; massive; gray to yellowish brown; moderately weathered; moderately hard; intensely to very intensely fractured; dominantly planar calcite veining locally (LANDSLIDE DEPOSIT)		C16								
830			28.0 feet: advance HWT casing to 28.0'; equip softer HQ core bit		C17			100	47.3	2.00			
	30				S18		50/3	100					
								94	35.2	3.18			F: (30.5'), 75°, moderately open, moderately thin, clay, very soft, not healed, rough
			30.75 feet: fractures infilled locally with SANDY Lean CLAY (CL), SILT (ML), iron oxide		C19								F: (32.6'), 50°, moderately open, moderately thin, iron oxide/clay, decomposed, very soft, not healed, slightly rough
825													
	35				C20			73	0	6.00			F: (33.5'), 5°, slightly open, clean, not healed, smooth
					C21			71	17.6	3.39			
820			38.8 feet: fractures dominantly infilled with iron oxide		C22			83	28.5	2.92			
	40												F: (39.3'), 90°, slightly open, very thin, iron oxide, intensely weathered, soft, not healed, moderately rough
			40.6 to 42.0 feet: fractures infilled locally with Sandy SILT (ML), iron oxide		C23			91	9.3	2.78			F: (40.2'), 40°, slightly open, very thin, iron oxide/magnesium, intensely weathered, moderately hard, partly healed, slightly rough F: (42.3'), 75°, slightly open, very thin, iron oxide, intensely weathered, moderately hard, not healed, smooth
815													
	45		45.5 feet: shear with Sandy SILT (ML) infill		C24			95	23.2	3.19			F: (45.5'), 20°, tight, thin, silt, very soft, not healed, slightly rough
			SEDIMENTARY ROCK (SANDSTONE/ARGILLITE BRECCIA); fine-grained sand; massive; gray, dark gray, yellowish brown; slightly to moderately weathered; moderately hard; intensely fractured; angular SANDSTONE and ARGILLITE fragments, locally rehealed by chaotic calcite veining (LANDSLIDE DEPOSIT)									F: (46.6'), 60°, open, thin, silt, very soft, not healed, smooth F/S: (47.3'), 45°, tight, thin, silt, very soft, not healed, slightly rough
810			48.3 feet: polished shear: dips 25°		C25			88	35	2.35			F: (48.3'), 20°, slightly open, very thin, clay, very soft, not healed, smooth
	50		SEDIMENTARY ROCK (SANDSTONE) Fine-grained; massive; gray and yellowish brown; slightly weathered; hard; moderately fractured; chaotic, locally pitted/vuggy quartz/calcite veining (LANDSLIDE DEPOSIT)		C26			85	0	4.55			
805			53.9 to 54.2 feet: failure zone: subangular SANDSTONE clasts in sheared Lean CLAY (CL) matrix; polished, faintly		C27			85	6.7	3.29			
	55												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-005**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**2 of 9**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	55		striated shear at base of zone SEDIMENTARY ROCK (SANDSTONE) 55.9 to 57.2 feet: abundant heavily pitted calcite veining		C27			85	6.7				F/S: (54.2'), 35°, wide, thick, clay/gravel, soft, not healed, smooth
			57.2 to 57.5 feet: convolute ARGILLITE interbeds to 0.5", locally sheared										F/S: (57.5'), 40°, slightly open, very thin, clay, very soft, not healed, smooth
800			58.5 feet: 1.5" sheared ARGILLITE interbed: dips 25° 58.8 feet: sheared ARGILLITE interbed, convolute		C28			111	90.9	3.33			
	60		60 to 61.2 feet: localized ARGILLITE interbeds to 0.5"; 20°		C29			87	44	3.31			F: (62.3'), 50°, slightly open, very thin, iron oxide, intensely weathered, soft, not healed, smooth
795			61.2 feet: abundant planar, chaotic, and locally ptygmatic quartz and calcite veining										F: (63.0'), 55°, open, thin, iron oxide, intensely weathered, soft, not healed, moderately rough
	65				C30			94	18	3.33			F: (63.4'), 50°, slightly open, very thin, iron oxide/calcite, intensely weathered, soft, not healed, smooth F: (65.3'), 10°, open, thin, iron oxide/silt, intensely weathered, soft, not healed, slightly rough
790													F: (67.7'), 65°, slightly open, very thin, calcite, decomposed, very soft, not healed, slightly rough
	70				C31			96	78.3	3.40			F: (70.4'), 60°, open, thin, silt, very soft, not healed, smooth F: (71.3'), 30°, moderately open, moderately thin, calcite, decomposed, very soft, not healed, smooth F: (72.1'), 30°, moderately open, moderately thin, calcite, decomposed, very soft, not healed, smooth
785			73.7 feet: 0.8" quartz vein										F: (73.7'), 10°, moderately wide, moderately thick, quartz, moderately weathered, moderately hard, partly healed, smooth
	75		74.8 to 80.0 feet: localized ARGILLITE interbeds to 3", convolute bed remnants: dark gray; slightly weathered; moderately hard; intensely fractured; planar to convolute, multiple orientations		C32			89	12.5	3.70			
780			78.1 to 78.4 feet: failure zone: interbedded ARGILLITE and SANDSTONE sheared to: (SILTY SAND with GRAVEL (SM); mostly fine to coarse sand; little fines; little fine subangular gravel); polished shear at upper and lower boundaries		C33			65	17.8	3.91			F/S: (78.1'), 40°, wide, thick, sand/silt, very soft, not healed, smooth F/S: (78.4'), 30°, wide, thick, sand/silt, very soft, not healed, smooth
	80		78.4 feet: moderately weathered; moderately hard SEDIMENTARY ROCK (SANDSTONE) Fine-grained; massive; gray and gray blue; slightly weathered; hard; intensely fractured; planar and chaotic, randomly oriented quartz and calcite veining; (LANDSLIDE DEPOSIT)		C34			94	52.4	2.94			F: (80.4'), 50°, slightly open, very thin, iron oxide, moderately hard, not healed, moderately rough
775			83.0 feet: moderately fractured										F: (83.0'), 50°, slightly open, very thin, iron oxide, intensely weathered, moderately hard, not healed, moderately rough
	85												

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-005**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**3 of 9**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	85		SEDIMENTARY ROCK (SANDSTONE)					96	57.6	2.24			F: (84.4'), 40°, slightly open, very thin, iron oxide, intensely weathered, moderately hard, not healed, moderately rough
					C35								F: (85.9'), 45°, slightly open, very thin, iron oxide, intensely weathered, moderately hard, not healed, slightly rough
770			88.5 feet: PP > 4.5 tsf										F: (87.3'), 40°, slightly open, very thin, iron oxide, intensely weathered, moderately hard, not healed, moderately rough
	90		90.0 feet: intensely fractured					100	66.6	3.00			F: (87.6'), 80°, slightly open, very thin, iron oxide/calcite, intensely weathered, moderately hard, not healed, rough
			91.1 feet: moderately fractured 91.6 feet: slightly fractured		C36								F: (88.5'), 60°, slightly open, very thin, iron oxide/quartz, intensely weathered, moderately hard, not healed, rough
765													F: (91.4'), 60°, slightly open, very thin, iron oxide/silt, intensely weathered, soft, not healed, slightly rough
	95		94.7 feet: intensely fractured					100	81.6	2.60			F: (92.1'), 35°, slightly open, very thin, iron oxide, intensely weathered, moderately hard, not healed, slightly rough
			95.8 feet: moderately fractured		C37								F: (93.2'), 65°, moderately open, moderately thin, iron oxide, intensely weathered, soft, not healed, moderately rough
760													F: (93.7'), 5°, slightly open, very thin, iron oxide/calcite, intensely weathered, soft, not healed, slightly rough
	100		100.0 feet: slightly fractured					100	80	3.00			F: (94.7'), 30°, slightly open, very thin, iron oxide, intensely weathered, moderately hard, not healed, slightly rough
			101.2 feet: moderately fractured 102.3 feet: intensely fractured		C38								F: (95.8'), 45°, slightly open, very thin, iron oxide, intensely weathered, moderately hard, not healed, slightly rough
755			104.0 feet: slightly fractured										F: (96.8'), 60°, slightly open, very thin, iron oxide, intensely weathered, very soft, not healed, rough
	105							98	79.6	3.10			F: (97.6'), 15°, slightly open, very thin, quartz, intensely weathered, soft, not healed, stepped
			106.3 feet: intensely fractured 107.4 feet: moderately fractured		C39								F: (99.4'), 60°, slightly open, very thin, quartz, slightly weathered, hard, moderately healed, slightly rough
750			109.2 feet: slightly fractured										F: (101.2'), 3°, tight, clean, not healed, smooth
	110		110.0 feet: moderately fractured 110.5 feet: few healed calcite fractures up to 0.25" thick					98	88.3	3.00			F: (102.3'), 70°, slightly open, very thin, calcite/quartz, slightly weathered, moderately hard, partly healed, slightly rough
					C40								F: (106.3'), 50°, slightly open, very thin, calcite, slightly weathered, moderately hard, partly healed, slightly rough
745													F: (107.4'), 40°, slightly open, clean, not healed, moderately rough
	115												F: (108.6'), 55°, slightly open, very thin, calcite/quartz, slightly weathered, moderately hard, partly healed, smooth

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-005**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**4 of 9**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	115		SEDIMENTARY ROCK (SANDSTONE) 115.0 feet: intensely fractured 115.8 feet: moderately fractured					90	40	3.00			F: (111.7'), 40°, slightly open, very thin, iron oxide, intensely weathered, moderately hard, not healed, slightly rough
			117.5 feet: intensely fractured		C41								F: (113.1'), 60°, slightly open, very thin, iron oxide, intensely weathered, moderately hard, not healed, slightly rough
740			119.0 feet: moderately fractured										F: (119.0'), 60°, slightly open, very thin, iron oxide, intensely weathered, moderately hard, not healed, slightly rough
	120		120.0 feet: fine to coarse grained; massive; light gray to gray; slightly weathered; hard; moderately fractured; planar to chaotic quartz and calcite veining; PP > 4.5 tsf		C42			94	63.3	3.00			F: (120.4'), 60°, slightly open, very thin, silt, soft, not healed, moderately rough F: (121.0'), 55°, slightly open, very thin, silt, soft, not healed, moderately rough F: (122.2'), 80°, slightly open, very thin, calcite, intensely weathered, very soft, not healed, moderately rough
735													
	125		124.5 feet: intensely fractured					104	50	3.40			F: (123.0'), 60°, slightly open, very thin, calcite/silt, intensely weathered, very soft, not healed, smooth F: (123.6'), 50°, slightly open, very thin, calcite/silt, intensely weathered, very soft, not healed, slightly rough
			127.5 to 128.2 feet: mass readily parts on multiple 0.5" ARGILLITE beds/bed remnants, oriented 0 to 60°		C43								
730			128.5 feet: moderately fractured										F: (128.5'), 60°, slightly open, very thin, calcite/silt, intensely weathered, very soft, not healed, slightly rough
	130		130 to 131.8 feet: multiple convolute ARGILLITE bed remnants to 1": very thinly bedded; black; slightly weathered; moderately hard to hard; intensely fractured; mass generally parts on remnants					72	21.1	3.72			F: (129.3'), 55°, slightly open, very thin, calcite/silt, intensely weathered, very soft, not healed, slightly rough
			131.8 feet: moderately fractured		C44								
725			132.6 to 135.5 feet: multiple convolute ARGILLITE bed remnants to 1": very thinly bedded; black; slightly weathered; moderately hard to hard; intensely fractured; mass generally parts on remnants										F/B: (132.6'), 30°, tight, clean, not healed, smooth
	135							97	20.4	3.24			
			135.5 feet: fine-grained; massive; gray; slightly weathered; hard; intensely fractured		C45								
								100	62.5	4.00			
720			138.9 feet: PP > 4.5 tsf		C46								F: (138.9'), 60°, slightly open, very thin, silt, very soft, not healed, slightly rough
	140		140.0 feet: moderately fractured 140 to 145.1 feet: abundant randomly oriented calcite and quartz veining; mass appears brecciated and rehealed					94	34.4	3.53			F: (139.5'), 50°, slightly open, clean, not healed, slightly rough
			141.7 feet: intensely fractured		C47								F: (141.2'), 65°, slightly open, clean, not healed, stepped
715	145												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-005**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**5 of 9**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	145		SEDIMENTARY ROCK (ARGILLITE); thinly to very thinly bedded; dark gray to black; slightly weathered; moderately soft; intensely fractured; trace SANDSTONE interbeds; fine grained; thinly bedded; dark gray; slightly weathered; moderately hard; bedding is convolute; trace fragmented quartz and calcite veins (LANDSLIDE DEPOSIT)		C48			87	0	4.52			
710					C49			77	0	6.67			
	150				C50			90	0	4.20			
			LANDSLIDE BASAL FAILURE ZONE (ARGILLITE); sheared/brecciated to (CLAYEY GRAVEL with Sand (GC); medium dense; dark gray to black; moist; mostly angular GRAVEL (ARGILLITE fragments); some fines; little coarse to fine SAND)		C51			102	0	3.44			
705													
	155				C52			100	0	4.44			
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained; massive; gray; slightly weathered; moderately hard to hard; very intensely fractured with silty sand infill; local ARGILLITE interbeds to 0.5"; fragmented quartz and calcite veining (FRANCISCAN COMPLEX: BROKEN FORMATION) 158.0 feet: PP > 4.5 tsf		C53			66	0	5.00			
700					C54			87	0	4.38			
	160				C55			100	0	4.23			
695			163.8 feet: intensely fractured; decreased fracture infill		C56			86	0	2.33			
	165		166.6 feet: very intensely fractured 166.9 to 168.9 feet: abundant ARGILLITE interbeds to 0.5": very thinly bedded; dark gray; slightly weathered; moderately soft to moderately hard 168.0 feet: circulation loss		C57			100	0	4.76			
690			FAILURE ZONE (ARGILLITE); sheared/brecciated to (Clayey GRAVEL with Sand (GC); medium dense; dark gray to black; moist; mostly angular GRAVEL (ARGILLITE fragments); some fines; little coarse to fine SAND) (FRANCISCAN COMPLEX: BROKEN FORMATION)		C58			46	0	4.00			
	170				C59			100	0	6.25			
			SEDIMENTARY ROCK (ARGILLITE) Thinly bedded with interbeds/remnants of SANDSTONE up to 5" locally. ARGILLITE; dark gray to black; slightly weathered; intensely fractured; SANDSTONE; fine grained; gray to dark gray; slightly weathered; hard; convolute interbeds/remnants; fragmented quartz, calcite veining (FRANCISCAN COMPLEX: BROKEN FORMATION)		C60			85	0	5.71			
685					C61			100	0	2.00			
	175							85	0	5.71			

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-005**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**6 of 9**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	175		SEDIMENTARY ROCK (ARGILLITE)		C62								
					C63			100	0	8.75			
					C64			100	0	7.06			
			176.7 feet: equip harder HQ core bit										
			177.7 feet: very intensely fractured		C65			82	0	9.13			
680	180				C66			83	0	10.00			
			SEDIMENTARY ROCK (SANDSTONE) Fine- to coarse-grained sand; massive; gray; slightly weathered; hard; very intensely fractured; randomly oriented calcite and quartz veining (FRANCISCAN COMPLEX: BROKEN FORMATION)		C67			89	0	6.58			
675			183.1 feet: intensely fractured		C68			100	0	4.06			
	185												
			186.7 to 189.1 feet: localized convolute ARGILLITE interbeds up to 1": very thinly bedded; black; slightly weathered; moderately hard		C69			96	20	5.60			
			188.1 feet: parting on ARGILLITE bed: dips 25°										F/B: (188.1'), 25°, tight, clean, not healed, smooth
670					C70			88	19.3	5.38			F: (188.6'), 70°, slightly open, very thin, silt, soft, not healed, smooth
	190		190.4 feet: slightly weathered; hard; intensely fractured										
					C71			95	0	4.17			
665								100	31	3.44			
	195		195.0 feet: moderately fractured; circulation loss										
			196.0 feet: intensely fractured		C72								F: (196.0'), 90°, slightly open, very thin, iron oxide, intensely weathered, moderately hard, not healed, slightly rough F: (197.3'), 90°, slightly open, very thin, iron oxide, intensely weathered, moderately hard, not healed, slightly rough
660					C73			100	0	5.26			
	200												F: (197.6'), 40°, moderately open, moderately thin, silt/sand, soft, not healed, slightly rough
			200.9 feet: PP > 4.5 tsf		C74			90	24	4.29			F: (200.5'), 90°, moderately open, moderately thin, silt/sand, very soft, not healed, slightly rough
			202.6 feet: PP > 4.5 tsf 203.1 feet: moderately fractured										F: (201.8'), 80°, slightly open, very thin, calcite, intensely weathered, very soft, not healed, slightly rough
655	205				C75			100	75.5	3.66			F: (203.8'), 50°, tight, clean, not healed, moderately rough

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-005**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**7 of 9**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	205		SEDIMENTARY ROCK (SANDSTONE) 205.2 feet: PP > 4.5 tsf 205.5 feet: intensely fractured		C75			100	75.5				F: (204.5'), 55°, slightly open, very thin, silt, soft, not healed, moderately rough F: (205.5'), 75°, slightly open, very thin, iron oxide, intensely weathered, moderately hard, not healed, moderately rough
					C76			96	35.2	4.29			F: (206.5'), 85°, slightly open, very thin, silt, soft, not healed, slightly rough
650	210		209.9 feet: increased randomly oriented calcite and quartz veining					100	62.7	4.90			
			211.3 feet: moderately fractured		C77								F: (211.3'), 70°, slightly open, very thin, silt, very soft, not healed, rough
645													F: (213.0'), 50°, tight, clean, not healed, slightly rough
	215		214.8 to 224.8 feet: abundant ARGILLITE clasts to 0.25" present within SANDSTONE mass 215.8 to 216.2 feet: brecciated zone: angular SANDSTONE fragments to 1" with SILTY SAND (SM) infill, fragment interlock largely retained 216.2 feet: moderately fractured		C78			100	68.3	3.40			F: (214.5'), 83°, slightly open, very thin, clay, very soft, not healed, slightly rough F: (217.3'), 50°, slightly open, very thin, silt, very soft, not healed, slightly rough
640													F: (219.0'), 75°, slightly open, very thin, silt, very soft, not healed, moderately rough
	220				C79			98	39.6	3.65			F: (220.5'), 60°, moderately open, very thin, calcite, intensely weathered, soft, not healed, slightly rough F: (221.1'), 40°, slightly open, very thin, silt, very soft, not healed, slightly rough
635			223.5 feet: 0.75" ARGILLITE interbed remnant: dips 30° 224.2 feet: 0.5" ARGILLITE interbed remnant: dips 45°										
	225		224.6 feet: 0.75" ARGILLITE interbed remnant: dips 25° SEDIMENTARY ROCK (ARGILLITE); locally thinly bedded with interbeds/remnants of SANDSTONE up to 0.5". ARGILLITE; thinly to very thinly bedded; dark gray to black; slightly weathered; moderately soft to moderately hard; intensely to very intensely fractured; SANDSTONE; fine grained; thinly bedded; gray to dark gray; slightly weathered; moderately hard; intensely to very intensely fractured; trace quartz and calcite veining; mass parts readily on bedding planes (FRANCISCAN COMPLEX: BROKEN FORMATION)		C80			75	0	5.00			
					C81			NR		12.86			
630			226 feet: bedding: dips 15-20°		C82			87	0	6.96			
	230		SEDIMENTARY ROCK (ARGILLITE); sheared/ brecciated to (SILTY SAND with Gravel (SM); loose; gray; wet; mostly coarse to fine SAND; little subangular to subrounded coarse to fine GRAVEL to 1"; little fines) (FRANCISCAN COMPLEX: BROKEN FORMATION) 231.0 feet: caving noted		C83			NR		40.00			
					C84			NR		6.84			
					C85			100	0	9.29			
625			SEDIMENTARY ROCK (SANDSTONE) Fine-grained sand; massive; gray; slightly weathered; hard; very intensely fractured; planar to chaotic quartz and calcite veining (FRANCISCAN COMPLEX: BROKEN		C86			85	0	3.24			
	235												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-005**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**5-11-21**	**8 of 9**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	235		FORMATION) SEDIMENTARY ROCK (SANDSTONE)		C86			85	0				
								100	0	4.00			
			237.8 feet: intensely fractured		C87								
620	240												
					C88			96	14.7	3.92			
			243.5 feet: moderately fractured; PP > 4.5 tsf										F: (243.5'), 90°, slightly open, very thin, calcite, intensely weathered, soft, not healed, rough
615			244.1 feet: intensely fractured										
	245				C89			NR		6.00			
								100	0	4.12			
			246.8 feet: very intensely fractured; PP > 4.5 tsf 247.2 feet: intensely fractured		C90								
610			248.5 feet: moderately weathered; moderately hard; PP > 4.5 tsf										
			249.5 feet: very intensely fractured		C91			100	0	10.00			
	250		250.0 feet: advance HWT casing to full depth (250.0')										
			Bottom of borehole at 250.0 ft bgs										
605													
	255												
600													
	260												
595													
	265												

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REPORT TITLE **BORING RECORD**				HOLE ID **RC-20-005**
DIST. **01**	COUNTY **Del Norte**	ROUTE **101**	POSTMILE **12-15.5**	EA **0115000099**
PROJECT OR BRIDGE NAME **Last Chance Grade Bypass**				
BRIDGE NUMBER **--**	PREPARED BY **D. Ross**		DATE **5-11-21**	SHEET **9 of 9**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
G. Vadurro	**10-1-20**	**10-6-20**	**2482739.493 ft / 5984385.015 ft NAD83**	**RC-20-006**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
CRUX Subsurface, Inc.				**619.28 ft NAVD88**
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Rotary Core			**DMW 45**	**4.5 in**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4"), HQ Core (2.5")			**Cathead; 140 lbs / 30-inch drop**	
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING	AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
VWP, TDR, Inclinometer; cement-bentonite			**Not Determined**	**Not Determined**	**251.3 ft**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method / Casing Depth	Discontinuity Description: Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	0		3" GRAVEL road bed									
			FAT CLAY with SAND (CH); stiff; dark gray with rust staining; moist; mostly fines; little coarse to fine angular SAND; trace fine angular GRAVEL; high plasticity; (LANDSLIDE DEPOSIT)									
615												
	5				S1	3 5 6	11	44				
610												
	10		10.0 feet: medium stiff; dark grayish brown; wet; some SAND; few ARGILLITE-derived GRAVEL		S2	3 2 2	4	33				
605												
	15		15.0 feet: stiff; moist; little SAND		S3	3 3 5	8	44				
600												
	20		CLAYEY SAND with GRAVEL (SC); medium dense; dark grayish brown; wet; mostly coarse to fine angular SAND; some fines; little angular GRAVEL; high plasticity; mostly coarse to fine angular SAND; some high plasticity fines; little angular ARGILLITE-derived GRAVEL (LANDSLIDE DEPOSIT) 20.0 feet: advance HWT casing to 20.0'		S4	3 3 4	7	61				
595												
	25											

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-006**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**1 of 9**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	25		CLAYEY SAND with GRAVEL (SC); medium dense; dark grayish brown; wet; mostly coarse to fine angular SAND; some fines; little angular GRAVEL; high plasticity; mostly coarse to fine angular SAND; some high plasticity fines; little angular ARGILLITE-derived GRAVEL (LANDSLIDE DEPOSIT) 25.0 feet: few fine GRAVEL		S5	2 2 4	6	50					
590													
	30		30.0 feet: moist; increased high plasticity fines content; advance HWT casing to 30.0'		S6	3 6 5	11	61					
585													
	35		35.0 feet: wet; little fines; advanced HWT casing to 35.0'		S7	4 4 6	10	67					
580													
	40		40.0 feet: advanced HWT casing to 40.0'		S8	7 7 11	18	72					
575													
	45		45.0 feet: decreasing fines; circulation loss; advance HWT casing to 45.0'		S9	8 10 16	26	61					
570													
	50		50.0 feet: advanced HWT casing to 50.0'										
			SEDIMENTARY ROCK (SANDSTONE) Fine- to medium-grained sand; massive; light gray; fresh; very hard; intensely fractured; block in landslide (LANDSLIDE DEPOSIT) 50.5 feet: equip HQ core for pressuremeter test; interval from 50.5' to 55.5'		S10		50/3	NR					
					C11			11	0	0.00			
565	55												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-006**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**2 of 9**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	55		SEDIMENTARY ROCK (SANDSTONE)		C11			11	0				
					C12			NR		0.00			
560			SEDIMENTARY ROCK (ARGILLITE); black; intensely weathered; soft; very intensely fractured; block in landslide (LANDSLIDE DEPOSIT) 59.2 to 60.0 feet: poor recovery; soil likely washed out		C13			34	0	0.00			
	60		60.0 feet: decomposed: (SANDY fat CLAY (CH); very stiff; dark gray; moist; mostly high plasticity fines; some coarse to fine SAND; trace GRAVEL)										
			61.5 feet: advance HWT casing to 61.5'; HQ core; interval from 61.5' to 70'		S14	7 9 20	29	78					
555			64.0 feet: increased ARGILLITE-derived coarse SAND and fine GRAVEL		C15			13	0	0.00			
	65		68.0 feet: some angular ARGILLITE GRAVEL		C16			38	0	0.00			
550			70.0 feet: equip HQ core										
	70		SEDIMENTARY ROCK (ARGILLITE) Dark gray to black; decomposed; very soft; very intensely fractured; pervasively sheared to: (CLAYEY SAND with GRAVEL (SC); dark gray to black; moist; mostly SAND; some fines; little GRAVEL; medium plasticity fines) (LANDSLIDE DEPOSIT)		C17			64	0	6.15			
			72.5 feet: trace carbonate		C18			60	0	6.82			
545			73.5 feet: with few SANDSTONE fragments to 2.5": fine-grained sand; with calcite veining		C19			80	0	4.64			
	75		76.7 feet: with SANDSTONE fragments to 1.5"		C20			98	0	4.08			
540			SEDIMENTARY ROCK (ARGILLITE) Dark gray to black; decomposed; very soft; very intensely fractured; pervasively sheared to: (CLAYEY SAND with GRAVEL (SC); dark gray to black; moist; mostly SAND; some fines; little GRAVEL; medium plasticity fines) (FRANCISCAN COMPLEX)										
	80				C21			100	0	4.00			
535	85												

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-006**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**3 of 9**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	85		SEDIMENTARY ROCK (ARGILLITE)		C21			100	0				
								78	0	4.26			
530					C22								
	90							100	0	5.56			
					C23								
525								87	0	6.00			
	95		94.4 feet: 15" SANDSTONE clast: dark gray; fresh; very hard; intensely fractured; dips 80° sheared contact with ARGILLITE		C24								
								90	0	5.10			
			98.4 feet: 17" SANDSTONE clast: coarse- to fine-grained sand; gray to dark gray; slightly weathered; very hard; intensely fractured		C25								
520	100												
			101.2 feet: 2" zone of abundant calcite veining		C26			88	0	7.06			
			102.8 feet: decreasing amount of SANDSTONE clasts					100	0	4.17			
515			104.0 feet: intensely weathered		C27								
	105												
			106.6 feet: 6" SANDSTONE clast: fine-grained sand; dark gray; slightly weathered; hard; intensely fractured; with calcite veining					97	0	3.60			
510					C28								
	110												
								97	0	4.00			
					C29								
505			113.6 feet: 7" SANDSTONE clast: fine-grained sand; dark gray; fresh; very hard; moderately fractured										
	115												

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-006**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**4 of 9**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	115		114.8 feet: decomposed; (CLAYEY SAND with GRAVEL (SC); dark gray; moist; mostly SAND; some fines; little GRAVEL; medium plasticity fines) SEDIMENTARY ROCK (ARGILLITE)		C29			97	0				
								100	0	6.00			
500					C30								
	120		119.5 feet: 11" SANDSTONE clast: fine-grained sand; dark gray; fresh; very hard; with ARGILLITE clasts and pervasive calcite veining										
			121.3 feet: intensely weathered; soft					100	0	4.60			
			122.8 feet: 3" SANDSTONE clast: fine-grained sand; dark gray; fresh; hard; with calcite veining										
495			123.5 to 125.0 feet: shear fabric: dips 30°		C31								
	125												
			126.0 feet: 3" SANDSTONE clast: fine-grained sand; dark gray; fresh; hard; with calcite veining										
			126.3 feet: decomposed; moderately soft; (CLAYEY SAND with GRAVEL (SC); moist; mostly fine to coarse SAND; some medium plasticity fines; little fine to coarse subangular GRAVEL)					93	0	4.00			
490					C32								
	130												
								100	0	4.40			
485					C33								
	135		134.4 feet: with trace SANDSTONE clasts to 2"										
			135.0 feet: intensely weathered; moderately soft										
			136.3 feet: decomposed; soft; few SANDSTONE clasts					78	0	3.41			
			137.7 feet: 7" SANDSTONE clast: medium-grained sand; dark gray; fresh; very hard; with ARGILLITE clasts at contact; trace calcite veining		C34								
480													
	140												
								89	0	4.76			
			141.8 feet: intensely weathered; moderately soft										
					C35								
			143.2 feet: decomposed; soft										
475													
	145												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-006**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**5 of 9**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	145		SEDIMENTARY ROCK (ARGILLITE) 145.0 feet: 6" zone of prominent shearing: dips 35° 145.4: 3" SANDSTONE clast: fine-grained sand; dark gray; fresh; very hard; sheared contact with ARGILLITE		C36			100	0	5.56			
			148.0 feet: intensely weathered; moderately soft		C37			94	0	5.00			
470			149.0 feet: decomposed; soft 149.5 feet: 3" SANDSTONE clast: fine-grained sand; dark gray; fresh; very hard; with calcite veining										
	150		150.3 feet: intensely weathered; moderately soft		C38			77	0	7.69			
					C39			100	0	4.80			
465			153.9 feet: 4" SANDSTONE clast: medium-grained sand; dark gray; fresh; very hard; minor calcite veining; sheared contact with ARGILLITE										
	155		155.5 feet: prominent shear surface: dips 45°										
			156.3 feet: 5" SANDSTONE clast; fine grained sand; dark gray; fresh; very hard; little calcite veining		C40			100	8.3	6.00			
460													
	160												
					C41			100	0	5.00			
455													
	165		165.0 feet: 6" SANDSTONE clast: fine-grained sand; dark gray; fresh; very hard; intensely fractured; very thin calcite veining										
			166.3 to 170.0 feet: few SANDSTONE clasts up to 3"		C42			100	0	5.00			
450													
	170		170.0 feet: decomposed; soft; (CLAYEY SAND with GRAVEL (SC); dark gray; moist; mostly fine to coarse SAND; some fines; little fine subangular GRAVEL)										
			171.5 feet: trace SANDSTONE clasts		C43			100	0	5.00			
445													
	175												

(continued)

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BORING RECORD				**RC-20-006**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**6 of 9**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	175		SEDIMENTARY ROCK (ARGILLITE)		C43			100	0				
								100	0	4.00			
440					C44								
	180		179.0 feet: intensely weathered; moderately soft										
			181.7 feet: few SANDSTONE clasts up to 2"					100	0	3.40			
435					C45								
	185												
								100	0	3.00			
430					C46								
	190		189.1 feet: 6" SANDSTONE clast: fine-grained sand; dark gray; fresh; very hard; intensely fractured; with calcite veining										
								93	0	5.60			
425					C47								
	195												
								100	0	5.00			
			196.8 feet: prominent shear: dips 40° 197.2 feet: 4" SANDSTONE clast: fine-grained sand; dark gray; fresh; very hard										
420					C48								
	200		199.8 feet: prominent shear: dips 30°										
								98	0	4.00			
					C49								
415													
	205												

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-006**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**7 of 9**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	205		SEDIMENTARY ROCK (ARGILLITE)		C49			98	0				
								100	0	3.60			
			207.0 to 208.0 feet: dominant shear fabric: dips 60°; minor striations along dip		C50								
410	210		209.5 feet: SANDSTONE clasts up to 3"										
								100	0	3.00			
			212.2 feet: 14" SANDSTONE clast: fine-grained sand; dark gray; fresh; very hard; intensely fractured		C51								
405	215		215.0 feet: moderately weathered; moderately hard; intensely fractured										
			216.3 feet: intensely weathered; moderately soft					100	0	4.00			
			217.0 feet: decreasing SANDSTONE clasts; some Lean CLAY (CL) fracture infill		C52								
400	220		220.1 to 221.2 feet: SANDSTONE clasts up to 3"										
			221.5 to 226.0 feet: intensely weathered to decomposed					100	0	3.40			
395	225				C53								
								100	0	3.40			
			227.6 feet: 3" SANDSTONE clast: medium-grained sand; dark gray; fresh; very hard		C54								
390	230		229.0 feet: calcite veining 229.0 to 230.0 feet: moderately hard										
								100	0	5.00			
					C55								
385	235												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-006**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**8 of 9**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	235		SEDIMENTARY ROCK (ARGILLITE)		C55			100	0				
								100	0	4.00			
			237.0 feet: 3" SANDSTONE clast: fine-grained sand; dark gray; fresh; very hard; minor calcite veining		C56								
380	240												
			241.3 to 242.3 feet: moderately hard 241.6 feet: trace SANDSTONE clasts					100	0	4.00			
					C57								
375	245												
								100	0	5.00			
			247.0 feet: with calcite veining										
					C58								
370	250												
			251.3 feet: advance HWT casing to full depth (251.3') Bottom of borehole at 251.3 ft bgs										
365													
	255												
360													
	260												
355													
	265												

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REPORT TITLE **BORING RECORD**				HOLE ID **RC-20-006**
DIST. **01**	COUNTY **Del Norte**	ROUTE **101**	POSTMILE **12-15.5**	EA **0115000099**
PROJECT OR BRIDGE NAME **Last Chance Grade Bypass**				
BRIDGE NUMBER **--**	PREPARED BY **D. Ross**		DATE **6-4-21**	SHEET **9 of 9**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
K. Ogbom/T. Morelli	10-5-20	10-8-20	2487641.20 ft / 5985892.459 ft NAD83	RC-20-007
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
Gregg Drilling				751.18 ft NAVD88
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Rotary Core			CME 850	4.5 in
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4"), HQ Core (2.5")			Cathead; 140 lbs / 30-inch drop	
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING	AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
VWP, TDR, Inclinometer; cement-bentonite			Not Determined	Not Determined	150.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
750	0		SANDY SILT (ML); very stiff; brown to dark brown; moist; mostly fines; some fine grained SAND; few fine subangular GRAVEL; rootlets (COLLUVIUM)		C01								
			SILTY/CLAYEY SAND (SC-SM); medium dense to dense; olive yellow to pale olive; moist; mostly fine grained SAND; some low plasticity fines; roots (COLLUVIUM / RESIDUAL SOIL)		S02	15 15 15	30	33					
	5				C03								
745			6.0 feet: large roots 6.5 feet: trace subangular fine to coarse sandstone fragments 7.0 feet: circulation loss		C04			46	0				
			SEDIMENTARY ROCK (SANDSTONE) Fine- to medium-grained sand; massive; yellowish brown to pale olive; decomposed; very soft; very intensely fractured; (SILTY SAND with GRAVEL (SM); medium dense; moist; mostly fine to medium grained SAND; some fines; little subangular fine SANDSTONE fragments) (FRANCISCAN COMPLEX: BROKEN FORMATION)									
	10				S05	9 7 9	16	50					
740					C06				0				
			13.0 feet: pale olive to light brownish gray 14.0 feet: circulation loss										
	15				S07	8 13 13	26	50					
735			SEDIMENTARY ROCK (SANDSTONE) Fine-grained sand; massive; dark brownish gray; intensely weathered; moderately soft to soft; (SILTY/ CLAYEY GRAVEL with SAND (GM-GC); medium dense; moist; mostly subangular fine to coarse SANDSTONE fragments; some low plasticity fines; little fine to medium grained SAND) (FRANCISCAN COMPLEX)		C08				0				
	20				S09	10 10 15	25	33					
730					C10				0				
	25				C11			NR					

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REPORT TITLE				HOLE ID
BORING RECORD				RC-20-007
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	Del Norte	101	12-15.5	0115000099
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	D. Ross		6-4-21	1 of 6

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	25		SEDIMENTARY ROCK (SANDSTONE)		C11			NR					
725					S12	8 9 29	38	55					
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained sand; light grayish brown and brown; intensely weathered; moderately soft; very intensely fractured with minor iron oxide infill (FRANCISCAN COMPLEX)		C13				0				
	30		30.1 feet: 3" ARGILLITE interbed: dips 30-40°; thinly bedded; black; slightly weathered; moderately soft; intensely fractured		C14			24					
720			31.0 feet: equip NQ core for pressure meter test; interval 31.0' to 36.0'		S15		50/3	93	14	15.00			
			SEDIMENTARY ROCK (SANDSTONE) Thickly bedded; gray to dark gray; slightly weathered; moderately hard; intensely fractured; with minimal infill; local ARGILLITE clasts; interbed remnants to 0.25"; planar and chaotic quartz and calcite veining to 0.1" (FRANCISCAN COMPLEX)		C16								
	35		34.0 feet: moderately fractured 34.5 feet: intensely fractured		C17			100	77	0.00			F: (35.0'), 25°, slightly open, clean, not healed, moderately rough
715			36.0 feet: moderately fractured; equip HQ core		C18			93	16	4.80			F: (36.3'), 30°, slightly open, clean, not healed, slightly rough
			37.0 feet: intensely fractured										F: (36.8'), 60°, slightly open, clean, not healed, slightly rough
	40												
710			41.0 to 42.7 feet: ARGILLITE interbed remnants to 4": convolute; dark gray to black; slightly weathered; moderately hard; intensely fractured		C19			95	31	6.50			
			42.8 feet: slightly weathered; moderately hard to hard; intensely fractured										F: (43.8'), 70°, slightly open, clean, not healed, moderately rough
			44.5 feet: intensely fractured										
	45		45.0 feet: performed packer test; interval 45.0' to 46.0'		C20			100		13.00			
705			46.0 feet: moderately fractured 46.0 to 50.0 feet: mass very intensely fractures but calcite rehealed		C21			96	58	5.60			F: (46.5'), 90°, slightly open, very thin, silt, very soft, not healed, moderately rough F: (47.5'), 50°, slightly open, clean, not healed, moderately rough F: (48.1'), 50°, slightly open, very thin, silt, very soft, not healed, moderately rough F: (48.8'), 55°, slightly open, very thin, calcite, fresh to slightly weathered, moderately hard, partly healed, moderately rough
	50		50.0 feet: very intensely fractured										
700			51.5 feet: moderately fractured		C22			100	62	5.33			F: (49.4'), 40°, slightly open, very thin, silt, very soft, not healed, moderately rough
			53.4 feet: slightly weathered; hard 54.0 feet: moderately fractured										F: (50.3'), 55°, slightly open, very thin, silt, very soft, not healed, slightly rough
	55												

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-007**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**2 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	55		SEDIMENTARY ROCK (SANDSTONE)										
					C23			100	100				F: (52.0'), 60°, slightly open, very thin, silt, very soft, not healed, smooth
695								95	66	5.20			F: (53.5'), 60°, slightly open, clean, not healed, slightly rough
					C24								F: (55.2'), 80°, slightly open, very thin, silt/sand, very soft, not healed, moderately rough F: (56.0'), 60°, slightly open, clean, not healed, moderately rough
	60												F: (56.4'), 65°, slightly open, very thin to moderately thin, silt, very soft, not healed, moderately rough to rough
690								99	67	4.26			F: (58.3'), 35°, slightly open, very thin, silt, very soft, not healed, slightly rough
					C25								F: (59.4'), 60°, slightly open, clean, not healed, rough F: (60.0'), 30°, slightly open, clean, not healed, slightly rough
			64.0 feet: intensely fractured										F: (61.2'), 40°, slightly open, very thin, calcite, fresh to slightly weathered, moderately hard, not healed, moderately rough
	65												
685			66.1 feet: moderately fractured					89	16	6.33			F: (61.8'), 55°, slightly open, very thin, calcite, fresh to slightly weathered, moderately hard, not healed, moderately rough
			66.8 feet: intensely fractured 67.0 feet: 1.5" ARGILLITE bed remnant: black; slightly weathered; moderately hard; intensely fractured		C26								F: (62.1'), 70°, slightly open, very thin, calcite, fresh to slightly weathered, moderately hard, not healed, rough
								94	67	4.78			F: (63.1'), 70°, slightly open, very thin, calcite, fresh to slightly weathered, moderately hard, not healed, rough
			69.3 feet: moderately fractured		C27								
	70												F: (66.3'), 45°, slightly open, very thin, calcite, slightly weathered, moderately hard, partly healed, moderately rough
680			70.5 feet: 1" ARGILLITE bed remnant: dips 25°: dark gray; slightly weathered; moderately hard; intensely fractured 71.1 feet: 2" ARGILLITE bed remnant: dark gray; slightly weathered; moderately hard; intensely fractured					96	36	6.00			
			72.0 feet: intensely fractured										F: (72.0'), 40°, slightly open, clean, not healed, slightly rough
			72.6 to 73.9 feet: 2" ARGILLITE bed remnants: convolute dark gray; slightly weathered; moderately hard; intensely fractured		C28								
			72.6 feet: moderately hard to hard										
	75												
675			75.5 feet: 4" ARGILLITE bed remnant: convolute dark gray; slightly weathered; moderately hard; intensely fractured					100	66	5.33			F: (75.7'), 45°, slightly open, clean, not healed, slightly rough
					C29								F: (76.4'), 90°, slightly open, clean, not healed F: (76.9'), 40°, slightly open, clean, not healed
			77.9 feet: bedding: dips 55° 78.2 feet: parting on ARGILLITE remnant										F: (78.5'), 55°, slightly open, very thin, Argillite, fresh to slightly weathered, not healed
			78.5 feet: 4" ARGILLITE bed remnant: convolute dark gray; slightly weathered; moderately hard; intensely fractured					91	45	5.50			
	80		78.6 feet intensely fractured		C30								
670			79.0 to 81.0 feet: abundant 0.1" planar ARGILLITE interbeds: dips 30°: dark gray; slightly weathered; hard; moderately to intensely fractured					99	75	4.76			F: (81.0'), 60°, slightly open, clean, not healed, slightly rough
													F: (81.5'), 35°, slightly open, very thin, calcite, fresh to slightly weathered, partly healed, slightly rough
			82.5 feet: moderately fractured		C31								F: (83.0'), 35°, slightly open, very thin, calcite, slightly weathered, partly healed, slightly rough
			83.9 feet: intensely fractured										
	85												

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-007**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**3 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	85		SEDIMENTARY ROCK (SANDSTONE) thinly bedded with thin interbeds/remnants of ARGILLITE.		C32			42	0	8.75			F: (83.3'), 60°, slightly open, very thin, calcite, slightly weathered, partly healed, slightly rough
665			SANDSTONE; fine grained; thinly bedded; gray to dark gray; slightly weathered; moderately hard; intensely fractured; ARGILLITE; thinly bedded; dark gray to black; slightly weathered; moderately hard; intensely fractured, chaotic quartz and calcite veining to 0.3" (FRANCISCAN COMPLEX)		C33			100	0	5.71			F: (84.0'), 30°, slightly open, clean, not healed, moderately rough
			87.0 feet: circulation loss (20 gallons)										
	90		90.0 feet: intensely to very intensely fractured		C34			100	0	5.33			
660					C35			66	0	12.00			
					C36			92	0	5.43			
	95		94.4 feet: parting on ARGILLITE interbed: dips 40°										
655			95.7 feet: very intensely fractured		C37			86	0	9.20			
			96.8 to 97.3 feet: brecciated zone										
			98.5 feet: moderately to intensely fractured		C38			83	46	4.40			
	100		99.0 feet: parting on ARGILLITE interbed remnant: dips 45°										F/B: (99.0'), 45°, tight, clean, not healed, smooth F: (99.7'), 45°, tight, clean, not healed, rough
650			SEDIMENTARY ROCK (ARGILLITE); thinly bedded; black; fresh; moderately soft; intensely to very intensely fractured; (FRANCISCAN COMPLEX)		C39			89	11	6.00			F: (101.6'), 30°, tight to slightly open, clean, not healed, smooth F: (102.5'), 50°, tight to slightly open, clean, not healed, smooth
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained sand; moderately bedded; very dark gray; fresh; hard; intensely fractured; calcite veining (FRANCISCAN COMPLEX)										
	105		104.0 feet: 6" ARGILLITE clast; thinly bedded; black; fresh; moderately soft		C40			100	29	5.50			F: (104.5'), 45°, tight, clean, not healed, smooth
645			106.0 feet: moderately fractured; decrease in calcite veining		C41			96	20	3.56			F: (106.2'), 45°, tight, clean, not healed, moderately rough F: (106.4'), 40°, tight, clean, not healed, moderately rough
			108.2 feet: increase in calcite veining										F: (106.8'), 25°, tight, clean, not healed, moderately rough F: (107.5'), 50°, tight, clean, not healed, moderately rough
	110		110.4 feet: moderately to intensely fractured		C42			100	38	5.33			F: (108.2'), 45°, tight, clean, not healed, moderately rough
640													F: (110.5'), 60°, tight, clean, not healed, rough F: (111.0'), 60°, tight, clean, not healed, rough F: (111.5'), 60°, tight, clean, not healed, rough
			113.5 feet: moderately fractured 113.8 feet: fine- to medium-grained sand 114.0 to 114.8 feet: intensely to very intensely fractured		C43			100	60	5.60			F: (112.4'), 60°, moderately open, moderately thin, calcite, fresh,
	115												

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BORING RECORD				**RC-20-007**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**4 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	115		calcite rehealed SEDIMENTARY ROCK (SANDSTONE)		C43			100	60				moderately hard, moderately healed, moderately rough
635			115.5 feet: calcite veining					100	58	3.80			F: (112.8'), 75°, slighlty open, very thin, calcite, fresh, moderately healed, moderately rough
			116.8 feet: strike-parallel striations		C44								F: (115.0'), 30°, moderately open, very thin, calcite, fresh, moderately hard, not healed, rough F: (115.8'), 50°, slightly open, very thin, calcite, fresh, moderately hard, not healed, moderately rough
	120		120.0 feet: striations: dips 45°										F: (116.2'), 50°, slightly open, very thin, calcite, fresh, moderately hard, not healed, moderately rough
630			121.0 feet: slightly to moderately fractured 122.0 feet: striations: dips 20°					100	78	4.20			F: (116.8'), 65°, slightly open, clean, not healed, moderately rough
			122.5 feet: 6" ARGILLITE clast: black; fresh; moderately soft to hard; intensely fractured		C45								F: (117.4'), 45°, open to moderately wide, thin to moderately thin, calcite, fresh, moderately hard, totally healed
			124.2 feet: 0.25" ARGILLITE band										F: (118.2'), 60°, tight, very thin, calcite, fresh, moderately hard, moderately healed, moderately rough
	125												F: (120.0'), 60°, slightly open, very thin,
625								100	56	5.60			clay, soft, not healed, moderately rough F: (120.5'), 30°, slightly open, very thin, calcite, fresh, moderately hard, partly healed, rough
			127.5 feet: striations: dips 40°		C46								F: (122.2'), 60°, slightly open, very thin, clay, soft, not healed, slightly rough F: (123.0'), 50°, tight, very thin, calcite, fresh, moderately hard, partly healed, rough
	130												F: (123.5'), 50°, slightly open, very thin,
620								100	55	5.00			calcite, fresh, moderately hard, totally healed F: (124.0'), 45°, tight, clean, not healed, moderately rough
					C47								F: (126.4'), 45°, slightly open, very thin, clay, soft, not healed, slightly rough F: (127.4'), 85°, tight, clean, not healed, slightly rough
	135												F: (128.2'), 40°, tight, very thin, calcite, fresh, moderately hard, partly healed, rough
615			136.0 feet: intensely to very intensely fractured 136.3 to 138.3 feet: ARGILLITE clasts up to 5"		C48			100	17	8.70			F: (129.6'), 45°, tight, very thin, calcite, fresh, moderately hard, partly healed, rough F: (130.0'), 30°, slightly open, very thin, calcite, fresh, moderately hard, partly
			138.3 feet: intensely fractured		C49			100	25	2.59			healed, rough F: (130.6'), 30°, slighlty open, very thin, calcite, fresh, moderately hard, partly healed, moderately rough
	140												F: (130.9'), 45°, slightly open, very thin,
610			141.0 feet: fine-grained sand; moderately fractured		C50			100	51	2.20			calcite, fresh, moderately hard, partly healed, moderately rough F: (131.1'), 35°, slightly open, very thin, calcite, fresh, moderately hard, partly healed, moderately rough to rough
			144.0 feet: intensely fractured										F: (131.3'), 35°, slightly open, very thin, calcite, fresh, moderately hard, partly healed, rough
	145												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-007**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**5 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
605	145		SEDIMENTARY ROCK (SANDSTONE) 145.2 feet: moderately fractured 145.5 feet: 6" zone: medium grained 146.0 feet: moderately to intensely fractured		C50			100	51				F: (131.5'), 25°, slightly open, very thin, calcite, fresh, moderately hard, partly healed, moderately rough F: (131.8'), 35°, slightly open, very thin, calcite, fresh, moderately hard, partly healed, moderately rough
					C51			100	39	2.00			F: (132.0'), 25°, slightly open, very thin, calcite, fresh, moderately hard, partly healed, moderately rough F: (132.6'), 60°, slightly open, very thin, calcite, fresh, moderately hard, partly healed, moderately rough F: (133.4'), 60°, slightly open, very thin, calcite, fresh, moderately hard, partly healed, moderately rough F: (134.7'), 30°, tight, very thin, calcite, fresh, moderately hard, partly healed, slightly rough F: (140.8'), 35°, slightly open, very thin, calcite, fresh, moderately hard, partly healed, moderately rough F: (141.4'), 40°, slightly open, very thin, calcite, fresh, moderately hard, partly healed, rough F: (142.0'), 40°, tight, clean, not healed, moderately rough F: (142.4'), 30°, tight, clean, not healed, moderately rough F: (143.2'), 50°, tight, clean, not healed, moderately rough F: (145.4'), 65°, open, thin, clay, soft, not healed, moderately rough F: (146.1'), 55°, slightly open, very thin, calcite/clay, slightly weathered, moderately hard, partly healed, moderately rough F: (146.8'), 55°, slightly open, very thin, calcite, slightly weathered, moderately hard, partly healed, moderately rough
600	150		148.0 feet: slightly weathered; intensely to very intensely fractured; fractures infilled with calcite and clay 150.0 feet: advanced HWT casing to 152.0' to account for grout valve Bottom of borehole at 150.0 ft bgs										
595	155												
590	160												
585	165												
580	170												
	175												

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-007**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**6 of 6**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
M.Porter	**10-23-20**	**10-24-20**	**2480179.307 ft / 5984998.757 ft NAD83**	**D-20-010**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
Gregg Drilling				**438.92 ft NAVD88**
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Coring			**Sonic Drill Rig**	**4 in**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4"), HQ Core (2.5")			**Cathead; 140 lbs / 30-inch drop**	
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING	AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
VWP, TDR, Inclinometer; cement-bentonite			**Not Determined**	**Not Determined**	**150.0 ft**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	0		Lean CLAY (CL); dark brown; moist; mostly fines; trace fine SAND; low to medium plasticity					37					
			1.0 feet: upper 1' reworked, intermixed with grout										
			2.0 feet: trace block of orange-brown silty sand to 0.3"		S01								
435													
	5							73					
			7.0 feet: variegated orange brown, brown, light gray; mostly fines; trace fine SAND; medium plasticity; localized faint relic shear structure (COLLUVIUM / LANDSLIDE DEPOSIT)		S02							
430													
	10							58					
			11.0 feet: convolute structure, possible sonic drilling disturbance										
			Poorly-graded GRAVEL (GP); gray to grayish brown; dry; mostly coarse GRAVEL; few fines; possible sandstone boulder/clasts brecciated by drilling		S03							
425			Fat CLAY with SAND (CH); variegated orange, brown, and gray; moist to wet; mostly fines; little coarse to fine SAND; trace coarse GRAVEL; (LANDSLIDE DEPOSIT-argillite derived)										
	15							70					
			SANDY fat CLAY with GRAVEL (CH); dark gray; moist to wet; mostly fines; some coarse to fine SAND; little coarse to fine subangular GRAVEL; (LANDSLIDE DEPOSIT - argillite derived)		S04							
420													
	20							61					
			21.0 feet: decreased gravel content		S05								
415													
	25												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**D-20-010**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**1 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	25		SANDY fat CLAY with GRAVEL (CH) 25.0 to 25.8 feet: dominantly subangular SANDSTONE clasts up to 4" 27.0 to 28.5 feet: faint relic shear structure with remolded corestones to 0.5"		S06			68					
410	30		CLAYEY SAND with GRAVEL (SC); dark gray; moist to wet; mostly coarse to fine SAND; little coarse to fine subangular GRAVEL; little fines; (LANDSLIDE DEPOSIT - argillite derived)		S07			42					
405	35		35.0 to 36.0 feet: dominantly angular SANDSTONE fragments to 4"		S08			76					
			POORLY GRADED SAND with GRAVEL AND CLAY (SP-SC); dark gray to black; dry; mostly coarse to fine SAND; little coarse to fine subangular GRAVEL; few fines;(LANDSLIDE DEPOSIT)										
400	40		41.0 feet: wet		S09			27					
395	45		45.0 feet: increased clay content		S10			73					
390	50		47.1 to 48.7 feet: dominantly angular SANDSTONE fragments to 3" in localized clay matrix (brecciated by drilling)										
			SANDY fat CLAY (CH); dark gray to black; moist to wet; mostly fines; some coarse to fine SAND; few coarse to fine subangular GRAVEL; (LANDSLIDE DEPOSIT) 51.7 feet: increased sand and gravel content		S11			34					
385	55												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**D-20-010**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**2 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	55		SANDY fat CLAY (CH)		S11			34					
380	60		CLAYEY SAND with GRAVEL (SC); dark gray to black; wet; mostly coarse to fine SAND; some fines; little coarse to fine subangular GRAVEL; (LANDSLIDE DEPOSIT) 62.0 feet: rapid drilling rate: 62.0' to 67.0'		S12			68					
375	65		66.0 feet: Possible rupture surface/zone		S13			71	0				
370	70		METAMORPHIC ROCK (ARGILLITE); aphanitic; massive; dark gray to black; decomposed; very soft; very intensely fractured; Trace rounded ARGILLITE, SANDSTONE corestone to 0.5", pervasively sheared to:(SANDY fat CLAY (CL); moist; mostly fines; little fine SAND; trace fine subrounded GRAVEL)		S14			63	0				
365	75		72.8 to 73.4 feet: brecciated SANDSTONE clast (drilling disturbance) fine-grained; gray; slightly weathered; hard		S15			80	0				
360	80		SEDIMENTARY ROCK (SANDSTONE); fine-grained; massive; dark gray to black; slightly weathered; moderately hard; very intensely fractured; sheared ARGILLITE matrix, locally (brecciated SANDSTONE and ARGILLITE fragments)		S16			73	0				
355	85		SEDIMENTARY ROCK (ARGILLITE) Massive; dark gray to black; decomposed; very soft; SANDSTONE corestone to 2"; very intensely fractured/pervasively sheared to: (SANDY fat CLAY with GRAVEL (CH); moist to wet; mostly fines; some fine to coarse SAND; few subangular GRAVEL to 2")										

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**D-20-010**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**3 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	85		SEDIMENTARY ROCK (ARGILLITE)					66	0				
			86.0 to 87.0 feet: SANDSTONE corestones up to 3"; slightly weathered; hard		S17								
350													
	90		Decomposed; very soft; very intensely fractured; Sample S18 slough					48	0				
					S18								
345													
	95		95.0 to 95.6 feet: slough					83	0				
					S19								
340													
	100							81	0				
			101.0 feet: decomposed; very soft; very intensely fractured; visible tectonic shear fabric (locally in unaffected sample fragments)		S20								
335													
	105		105.0 feet: decomposed; soft; very intensely fractured; dry, visible tectonic shear fabric in marginally affected sample fragments					80	0				
					S21								
			108.0 to 109.0 feet: light gray to gray; slightly weathered; hard; SANDSTONE fragments present (possible SANDSTONE clast brecciated by drilling)										
330													
	110		110.0 feet: visible tectonic shear fabric in marginally affected sample fragments; few slightly weathered, hard ARGILLITE corestone up to 3" pervasively sheared to: (SANDY fat CLAY with GRAVEL (CH); dark gray; moist; mostly fines; some fine to coarse SAND, few subrounded fine to coarse GRAVEL)					51	0			
					S22								
325													
	115												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**D-20-010**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**4 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	115		SEDIMENTARY ROCK (ARGILLITE)					68	0				
			116.0 feet: few subrounded, slightly weathered, moderately hard ARGILLITE corestones		S23								
320	120							81	0				
			121.0 feet: gray to light gray; slightly weathered; moderately hard to hard fragment of fine grained SANDSTONE, ARGILLITE present		S24								
315	125							73	0				
			126.9 feet: dark gray; decomposed; very soft; few slightly weathered moderately hard ARGILLITE corestones up to 3"		S25								
310	130							63	0				
			131.0 feet: decomposed; soft to very soft; very intensely fractured; visible tectonic shear fabric in marginally affected sample fragments; trace subrounded, slightly weathered, moderately hard to hard ARGILLITE corestones to 2"		S26								
305			133.0 feet: pervasively sheared to: (SANDY fat CLAY with GRAVEL (CH))										
	135							76	0				
			135.8 feet: light gray; slightly weathered; hard SANDSTONE corestone to 3"		S27								
300	140							78	0				
			140.0 feet: decomposed; soft to very soft; very intensely fractured		S28								
295			143.0 feet: light gray to gray; slightly weathered; soft to moderately hard fragments of ARGILLITE, fine grained SANDSTONE present										
	145												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**D-20-010**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**5 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	145		SEDIMENTARY ROCK (ARGILLITE)		S29			78	0				
290													
	150		150.0 feet: advanced HWT casing to full depth (150')										
			Bottom of borehole at 150.0 ft bgs										
285	155												
280	160												
275	165												
270	170												
265	175												

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REPORT TITLE				HOLE ID
BORING RECORD				**D-20-010**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**6 of 6**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
J.Klamecki	**10-20-20**	**11-6-20**	**2485835.49 ft / 5983413.964 ft NAD83**	**RC-20-011**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
CRUX Subsurface Inc.				**698.52 ft NAVD88**
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Mud Rotary			**Burley 55-1**	**4.5 in**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4"), HQ Core (2.5")			**Cathead; 140 lbs / 30-inch drop**	
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING / AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
VWP, TDR, Inclinometer; cement-bentonite			**Not Determined** / **Not Determined**	**302.6 ft**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method / Casing Depth	Discontinuity Description: Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	0		CLAYEY SAND with GRAVEL (SC); yellowish brown; moist; little GRAVEL; little fine subangular GRAVEL; mostly coarse to fine SAND; some medium plasticity fines (FILL)									
					S01	2 1 1	2	28				
550	5		SILT (ML); very soft; dark brown; moist; mostly fines; some coarse to fine SAND; trace fine subangular GRAVEL; (SURFACE SOIL/COLLUVIUM) 5.0 feet: advance HWT casing to 5.0'									
			SILTY CLAY (CL-ML); very soft; dark brown; moist; mostly fines; trace fine GRAVEL; trace SAND (SURFACE SOIL/ COLLUVIUM)									
					S02	1 1 1	2	33				
545	10											
					S03	1 2 3	5	39				
540	15											
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained; massive; yellowish brown; decomposed; very soft; very intensely fractured; with moderately hard gravel size clasts; (GRAVELLY SILT with SAND (ML); medium dense; moist; mostly fines; little to some subangular fine to coarse GRAVEL; little SAND) (LANDSLIDE DEPOSIT)		S04	2 7 8	15	66				
535	20				S05	17 17 10	27					
			21.3 feet: moderately weathered; moderately soft; very intensely fractured 21.5 feet: equip HQ core		C06			100	0			
					S07	50 50/3"	50/3					
530	25				C08			100	0			

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-011**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**1 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	25		SEDIMENTARY ROCK (SANDSTONE)		C08			100	0				
525	30		28.1 feet: yellowish brown; decomposed; very soft; (CLAYEY GRAVEL with SAND (GC); mostly subangular fine to coarse GRAVEL; some fine to coarse SAND; little fines)		C09			97	0				
			32.0 feet: moderately weathered; moderately soft; very intensely fractured 32.5 feet: intensely fractured		C10			100	0				
520	35		35.3 to 36.3 feet: Convolute ARGILLITE interbeds; dark gray; moderately weathered; moderately soft		C11			100	0				
515	40		38.0 to 39.9 feet: healed/indurated brecciated zone; fragments of ARGILLITE and SANDSTONE; dark gray and yellowish brown; decomposed; very soft; intensely fractured 39.9 feet: moderately weathered; moderately soft 40.6 feet: light yellowish brown; slightly weathered; hard; intensely fractured		C12			100	0				
					C13			100	0				
510	45		43.9 to 44.0 feet: laminated ARGILLITE interbeds; grayish brown; moderately weathered; moderately hard; intensely fractured 44.0 to 44.5 feet: gray		C14			98	0				
505	50		48.1 feet: dark grayish brown to yellowish brown; highly weathered to decomposed; moderately soft to very soft; very intensely fractured; with SANDY lean CLAY infill (CLAYEY GRAVEL (GC); mostly subangular fine GRAVEL; little medium plasticity fines; few fine SAND) 48.6 feet: circulation loss		C15			100	0				
			51.6 feet: 6" interbed of very intensely fractured ARGILLITE; decomposed; very soft 52.2 feet: moderately weathered; moderately hard; very intensely fractured		C16			100	0				
500	55		53.6 feet: intensely fractured 53.6 to 55.6 feet: very thin convolute ARGILLITE interbeds; moderately weathered; moderately hard; very		C17			90	0				

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-011**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**2 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	55		intensely fractured SEDIMENTARY ROCK (SANDSTONE)		C17			90	0				
			57.6 feet: intensely fractured										
495	60		58.6 feet: gray and light brown; slightly weathered; moderately hard; intensely fractured 59.0 feet: Lost circulation at top of run		C18			100	18				
490	65		63.6 feet: 2" zone, decomposed; (CLAYEY GRAVEL with SAND (GC); light bluish gray; mostly fine GRAVEL; some SAND; little fines) 63.8 feet: olive gray to light gray; slightly weathered; moderately hard; very intensely fractured with local SANDY lean CLAY fracture infill		C19			84	0				
			68.0 feet: moderate circulation return										
485	70		68.6 feet: light bluish gray to gray; slightly weathered; hard; intensely fractured		C20			100	0				
			71.1 to 72.1 feet: decomposed; very soft; very intensely fractured; (Poorly-graded GRAVEL with SAND (GP); mostly angular fine GRAVEL; little SAND)		C21			100	0				
480	75		73.6 to 74.4 feet: decomposed; very soft; very intensely fractured; (CLAYEY GRAVEL with SAND (GC); mostly fine to coarse GRAVEL; little fine to coarse SAND; little fines) 75.0 feet: advance HWT casing to 75.0' 76.4 feet: intensely fractured 78.0 to 78.6 feet: decomposed; very soft; intensely fractured; (CLAYEY GRAVEL with SAND (GC); mostly fine to coarse GRAVEL; little SAND; little fines)		C22			96	0				
475	80		SEDIMENTARY ROCK (SANDSTONE) Fine-grained; massive; bluish gray; slightly weathered; hard; intensely fractured; quartz and calcite veining <0.1" thick locally (LANDSLIDE DEPOSIT)		C23			100	13	4.80			(78.6'), not healed, slightly rough, Discontinuities at 70, 20, and 60 degrees
			81.1 feet: very intensely fractured; ~2,500 gallons of water used between 48.6' and 81.1' 81.2 feet: moderately fractured		C24			100	24	5.00			F: (81.2'), 45°, open, very thin, clay/iron oxide, slightly weathered, very hard, not healed, smooth
470	85		83.2 feet: very intensely fractured; CLAYEY SAND fracture infill 83.7 feet: moderately fractured		C25			100	72	4.80			F: (83.7'), 35°, open, clean, not healed, slightly rough

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-011**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**3 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	85		SEDIMENTARY ROCK (SANDSTONE) 85.2 feet: very intensely fractured		C25			100	72				F: (84.2'), 70°, open, very thin, manganese, highly weathered, very soft, not healed, slightly rough
			86.1 feet: light bluish gray		C26			84	0	4.60			(78.6'), not healed, slightly rough, Discontinuities at 70, 20, and 60 degrees
			86.9 to 88.1 feet: very thin ARGILLITE interbeds: dips 20-30°; light bluish gray to very dark gray; slightly weathered; hard; intensely fractured										
465	90		88.6 feet: slightly weathered; moderately hard; intensely fractured; equip NQ core for pressure meter test; interval 88.6' to 93.6' 89.2 feet: 1" ARGILLITE interbed: dips 30°; dark gray; slightly weathered; moderately hard		C27			100	25	4.80			
			91.2 to 91.4 feet: laminated ARGILLITE interbeds: 10-20°; dark gray; slightly weathered; moderately hard										
			93.4 to 95.1 feet: ARGILLITE interbeds, interbed remnants to 0.5": dips 20° to convolute; dark gray; slightly weathered; moderately hard; mass parts on interbeds; used ~2000 gallons between 81.1' and 93.6'		C28			63	0	6.02			
460	95		93.6 feet: advance HWT casing to 85.1'		C29			100	41	4.58			
			SEDIMENTARY ROCK (ARGILLITE) Thinly bedded with very thin interbeds of SANDSTONE; ARGILLITE: dark gray to black, slightly weathered, moderately hard, intensely fractured; SANDSTONE: fine to medium grained, gray, slightly weathered, hard, intensely fractured; quartz and calcite veining to 0.1" thick; mass parts on existing bedding planes: dips 20°; locally convolute (LANDSLIDE DEPOSIT)		C30			100	17	6.90			
455	100				C31			100	35	5.60			
			SEDIMENTARY ROCK (SANDSTONE) Fine to medium grained; massive; gray to bluish gray; fresh; hard; moderately fractured; quartz and calcite veining up to 0.1" thick (LANDSLIDE DEPOSIT) 101.2 feet: intensely fractured										F: (100.4'), 20°, tight, clean, not healed, smooth F: (101.2'), 55°, slightly open, clean, not healed, smooth F: (101.8'), 60°, moderately open, moderately thin, calcite, slightly weathered, moderately soft, partly healed, slightly rough
			103.6 feet: slightly fractured										
450	105				C32			100	97	3.80			F: (102.4'), 60°, moderately open, moderately thin, calcite, slightly weathered, moderately soft, partly healed, slightly rough F: (103.6'), 15°, slightly open, clean, not healed, slightly rough F: (105.1'), 30°, slightly open, very thin, calcite, slightly weathered, moderately soft, not healed, slightly rough
			107.7 feet: moderately fractured										
445	110				C33			90	38	4.00			F: (106.6'), slightly open, very thin, calcite, slightly weathered, moderately soft, not healed, slightly rough, Orientation varies from 40-45 degrees F: (107.7'), 40°, slightly open, very thin, calcite, slightly weathered, moderately soft, not healed, slightly rough F: (108.2'), 10°, slightly open, very thin, calcite, slightly weathered, moderately soft, partly healed, slightly rough
			110.4 feet: intensely fractured										
			111.3 to 112.3 feet: very intensely fractured with local Clayey SAND (SC) infill										
440	115		114.3 feet: moderately weathered; soft to moderately soft;		C34			100	12	3.60			F: (108.6'), 10°, slightly open, clean, not healed, slightly rough

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DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**4 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	115		very intensely fractured SEDIMENTARY ROCK (SANDSTONE) 115.6 feet: slightly weathered; moderately hard; moderately fractured 116.2 feet: intensely fractured		C34			100	12				F: (109.2'), 35°, slightly open, very thin, calcite, slightly weathered, moderately soft, partly healed, slightly rough F: (109.6'), 5°, slightly open, very thin, calcite, slightly weathered, moderately soft, partly healed, slightly rough
			118.1 feet: light gray; moderately weathered; moderately soft; very intensely fractured; mass has been partially rehealed but fragments readily with minimal pressure										F: (110.4'), 10°, slightly open, very thin, calcite, slightly weathered, moderately soft, partly healed, smooth
435	120				C35			96	0	3.40			F: (100.4'), 20°, tight, clean, not healed, smooth F: (115.6'), 55°, slightly open, clean, not healed, moderately rough
			121.6 to 122.9 feet: LANDSLIDE FAILURE ZONE: SANDSTONE; sheared to: (Poorly-graded GRAVEL with CLAY and SAND (GP-GC); medium dense; gray to olive gray; moist; mostly fine subangular to subrounded GRAVEL (SANDSTONE fragments); little coarse to fine SAND; few fines)									F: (121.6'), 40°, slightly open, very thin, clay, very soft, not healed, smooth
430	125		122.9 feet: fine to coarse grained; massive; gray; slightly weathered; hard; very intensely fractured		C36			100	0	4.00			F: (122.9'), 80°, open, thick, clay, very soft, not healed, moderately rough
			126.1 to 127.1 feet: light gray to olive gray; moderately weathered; moderately soft; very intensely fractured; with Clayey SAND (SC) infill; used ~3,000 gallons of water used between 93.6' and 126.1' 127.5 feet: intensely fractured		C37			100	30	4.60			
425	130		129.0 feet: moderately fractured 130.0 to 130.6 feet: LANDSLIDE FAILURE ZONE: (SANDSTONE): sheared to: (Poorly-graded GRAVEL with SAND (GP); medium dense; gray; moist; mostly fine subangular GRAVEL; little coarse to fine SAND; 0.3" Lean CLAY(CL))/ seam at base of zone 130.6 feet: 1" thick calcite vein, intensely fractured		C38			100	27	4.50			F: (129.5'), 20°, slightly open, clean, not healed, slightly rough F: (130.0'), 60°, slightly open, very thin, calcite, soft, not healed, slightly rough F: (130.6'), 20°, open, thin, clay, very soft, not healed, smooth
			132.0 to 133.6 feet: ARGILLITE interbed remnants up to 1" thick: dips 30° to convolute; dark gray; slightly weathered; moderately hard; intensely fractured; mass parts readily on bedding planes										
420	135				C39			100	0	5.67			
			135.6 feet: moderately fractured 136.1 feet: intensely fractured		C40			100	25	5.22			
			137.8 to 138.2 feet: ARGILLITE interbeds, interbed remnants up to 0.5": dips 5°; dark gray; slightly weathered; moderately hard; very intensely fractured		C41			100	0	6.00			
415	140		SEDIMENTARY ROCK (ARGILLITE); thinly bedded with very thin interbeds of SANDSTONE; ARGILLITE: dark gray to black, slightly weathered, moderately hard, moderately to intensely fractured; SANDSTONE: fine grained, gray, slightly weathered, hard, moderately to intensely fractured, trace quartz and calcite veining (LANDSLIDE DEPOSIT)		C42			100	25	7.94			
					C43			94	0	7.35			
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained; massive; slightly weathered; hard; very intensely fractured; abundant chaotic quartz and calcite		C44			100	0	5.68			
410	145												

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DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**5 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	145		veining to 0.2" thick, localized ARGILLITE clasts to 0.2" throughout unit (LANDSLIDE DEPOSIT) SEDIMENTARY ROCK (SANDSTONE) 145.5 feet: intensely fractured; ~8,000 gallons used between 120.1' and 145.5'; no circulation return										
					C45			100	0	5.32			
405	150				C46			96	27	4.80			
			152.5 feet: moderately fractured 153.3 feet: intensely fractured 153.8 feet: moderately fractured										F: (153.3'), 50°, slightly open, very thin, calcite, slightly weathered, soft, partly healed, smooth
400	155		154.6 feet: intensely fractured		C47			100	65	5.80			F: (153.8'), 50°, slightly open, very thin, calcite, slightly weathered, moderately soft, not healed, slightly rough
			156.4 feet: moderately fractured										F: (154.8'), 40°, slightly open, very thin, calcite, slightly weathered, moderately soft, not healed, slightly rough F: (156.4'), 60°, slightly open, very thin, calcite, slightly weathered, moderately soft, partly healed, slightly rough
395	160		159.3 feet: intensely fractured		C48			100	37	4.70			F: (157.1'), 40°, slightly open, very thin, calcite, slightly weathered, moderately soft, partly healed, slightly rough F: (158.6'), 60°, slightly open, very thin, calcite, moderately weathered, soft, not healed, smooth F: (159.2'), 40°, slightly open, clean, not healed, slightly rough
			163.6 feet: moderately fractured										F: (160.6'), 35°, slightly open, very thin, calcite, moderately weathered, soft, not healed, slightly rough
390	165				C49			100	90	4.00			F: (161.4'), 80°, slightly open, very thin, calcite, moderately weathered, soft, not healed, slightly rough F: (161.9'), 60°, slightly open, clean, not healed, smooth
			166.1 feet: ~4,000 gallons water used between 145.5' and 166.1' 168.0 feet: intensely fractured		C50			100	100	8.40			F: (164.2'), 70°, slightly open, very thin, calcite, slightly weathered, moderately soft, partly healed, slightly rough F: (165.1'), 0°, slightly open, clean, not healed, slightly rough
385	170		168.8 feet: moderately fractured 169.5 feet: slightly fractured		C51			100	75	5.10			F: (166.1'), 30°, tight, clean, not healed, slightly rough F: (167.1'), 60°, slightly open, very thin, calcite, slightly weathered, moderately hard, partly healed, slightly rough
			170.7 feet: intensely fractured 171.0 feet: 0.5" thick calcite vein: dips 80-90° 171.3 feet: slightly fractured 172.6 feet: moderately fractured										F: (168.2'), 65°, slightly open, very thin, calcite, slightly weathered, moderately hard, partly healed, rough F: (168.8'), 35°, slightly open, very thin, calcite, slightly weathered, soft, partly healed, slightly rough
380	175		174.4 feet: intensely fractured		C52			88	33	4.20			

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PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**6 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	175		SEDIMENTARY ROCK (SANDSTONE)					88	33				F: (169.5'), 20°, slightly open, very thin, calcite, slightly weathered, moderately hard, partly healed, slightly rough
			176.4 to 179.7 feet: LANDSLIDE FAILURE ZONE: SANDSTONE and ARGILLITE sheared to: (Poorly-graded GRAVEL with CLAY (GP-GC); loose; gray to dark gray; moist; mostly fine subangular GRAVEL; little fines; few coarse to fine SAND)		C52							F: (172.6'), 30°, slightly open, very thin, calcite, slightly weathered, moderately soft, partly healed, slightly rough F: (172.9'), 10°, slightly open, very thin, calcite, slightly weathered, moderately soft, partly healed, slightly rough
375								96	0	5.60			
	180		179.2 feet: 3" Clayey SAND (SC) filled shear										F: (173.4'), 40°, slightly open, very thin, calcite, slightly weathered, moderately soft, partly healed, slightly rough F: (179.7'), 70°, slightly open, very thin, clay, very soft, not healed, smooth
			180.9 to 181.8 feet: ARGILLITE interbeds up to 0.5": dips 10-20°; dark gray to black; slightly weathered; moderately hard; intensely fractured; mass parts readily on bedding planes		C53							
370								100	17	5.70			F: (184.0'), 50°, slightly open, clean, not healed, smooth
	185		184.9 feet: intensely fractured										F: (184.5'), 90°, slightly open, clean, not healed, slightly rough
			185.8 feet: 2" ARGILLITE interbed: dips 15°; dark gray; slightly weathered; moderately hard; intensely fractured 186.3 feet: 1" ARGILLITE interbed: dips 10-15°; dark gray; slightly weathered; moderately hard; intensely fractured		C54							F: (184.9'), 50°, slightly open, clean, not healed, slightly rough
365								94	0	5.81			
	190				C55								
			192.0 feet: very intensley fractured 192.9 feet: moderately weathered; moderately hard		C56			100	0	9.23			
360								68	0	4.40			
	195		195.0 feet: intensely fractured		C57								
			197.6 feet: very intensely fractured										
			198.6 to 200.9 feet: ARGILLITE interbeds, interbed remnants up to 0.5": convolute and randomly oriented with general trend: dips 50°; dark gray; slightly weathered; moderately soft to moderately hard; very intensely fractured; mass parts readily on planes		C58			86	0	7.83			
355	200				C59			87.5	0	8.75			
					C60			66	0	7.92			
			202.5 feet: Difficult drilling		C61			0	0	10.00			
			204.0 to 206.2 feet: localized SANDY lean CLAY (CL) fracture infill		C62			92	0	7.14			
350	205												

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DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**7 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	205		SEDIMENTARY ROCK (SANDSTONE)		C63			100	0	8.42			
			206.9 feet: ~12,000 gallons water used between 166.1' and 206.9'		C64			97	0	6.62			
345	210		210.6 to 211.0 feet: ARGILLITE interbed remnants up to 0.5": convolute; dark gray; slightly weathered; moderately hard; very intensely fractured		C65			100	0	5.75			
			213.7 to 214.2 feet: SANDSTONE sheared to: (Poorly-graded GRAVEL with CLAY (GP-GC); dark gray; loose; mostly GRAVEL; little fines; few coarse to fine SAND)		C66			100	0	7.11			
340	215		SEDIMENTARY ROCK (ARGILLITE); thickly bedded; dark gray to black; moderately weathered; moderately hard; very intensely fractured; mass appears locally brecciated and rehealed (LANDSLIDE DEPOSIT)		C67			60	0	5.00			
			~2,000 gallons water used between 206.9' and 214.5 feet; advance HWT casing to 214.5'		C68			100	0	5.79			
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained; massive; gray to bluish gray; slightly weathered; moderately hard; intensely fractured; chaotic quartz and calcite veining (LANDSLIDE DEPOSIT)		C69			100	0	4.17			
335	220		219.6 feet: 2" ARGILLITE interbed remnant: dips 30°; dark gray; slightly weathered; moderately hard		C70			100	0	5.69			
			222.2 feet: 4" ARGILLITE interbed: dips 10°; dark gray; slightly weathered; moderately hard; intensely fractured; ~9,300 gallons water used between 214.5' and 222.2'		C71			100	0	5.26			
330	225		224.8 to 226.0 feet: local SANDY lean CLAY (CL) fracture infill		C72			0		6.36			
			227.1 to 228.9 feet: ARGILLITE interbeds, interbed remnants up to 2": convolute; dark gray to black; slightly weathered; moderately hard; intensely fractured with local SANDY lean CLAY (CL) infill		C73			100	0	7.67			
325	230		230.1 to 230.4 feet: LANDSLIDE FAILURE ZONE: SANDSTONE and ARGILLITE sheared to: (CLAYEY SAND with GRAVEL (SC); loose; dark gray; moist; mostly coarse to medium SAND; little medium plasticity fines; little fine subangular GRAVEL)		C74			100	0	5.67			F: (230.4'), 30°, open, thick, sand/clay, very soft, not healed, smooth
			SEDIMENTARY ROCK (SANDSTONE) Fine to medium grained; massive; bluish gray; slightly weathered; hard; intensely fractured; chaotic quartz and calcite veining (LANDSLIDE DEPOSIT)		C75			100	33	4.75			F: (232.2'), 70°, slightly open, clean, not healed, slightly rough F: (232.8'), 50°, slightly open, clean, not healed, slightly rough
320	235		234.4 to 236.3 feet: ARGILLITE interbeds, interbed		C76			100	17	5.00			

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01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
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BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**8 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	235		remnants up to 3": convolute and randomly oriented; dark gray to black; slightly weathered; moderately hard; intensely fractured SEDIMENTARY ROCK (SANDSTONE)		C76			100	17				F: (230.4'), 30°, open, thick, sand/clay, very soft, not healed, smooth
								100	38	5.50			
					C77								
315	240		238.6 feet: fine to medium grained; massive; light gray to bluish gray; slightly weathered; moderately hard; moderately fractured					100	60	5.12			F: (239.2'), 30°, slightly open, clean, not healed, slightly rough
					C78								
			241.2 feet: 2" ARGILLITE interbed: convolute; dark gray; slightly weathered; moderately soft; intensely fractured										F: (241.2'), 5°, slightly open, thin, slightly weathered, moderately soft, not healed, slightly rough
			242.8 to 243.7 feet: ARGILLITE interbeds, interbed remnants up to 1": convolute; dark gray to black; slightly weathered; moderately hard; intensely fractured					100	0	5.61			
310	245				C79								
			SEDIMENTARY ROCK (SANDSTONE); thinly bedded with thin interbeds ARGILLITE; SANDSTONE: fine to medium grained, gray to dark gray, slightly weathered, moderately hard, intensely fractured; ARGILLITE: dark gray to black, slightly weathered, moderately hard, intensely fractured; interbeds, remnants convolute and randomly oriented; trace chaotic quartz and calcite veining (LANDSLIDE DEPOSIT)		C80			100	0	7.06			
								100	0	4.69			
305	250		249.0 feet: void; circulation loss		C81								
			SEDIMENTARY ROCK (SANDSTONE); fine-grained; thinly bedded; gray to dark gray; slightly weathered; moderately hard; intensely fractured; chaotic quartz and calcite veining (LANDSLIDE DEPOSIT)					100	9	5.00			
					C82								
300	255		254.8 feet: 0.3" Lean CLAY (CL) infilled failure plane										F: (254.8'), 45°, slightly open, moderately thin, clay, very soft, not healed, smooth
			255.5 feet: 3" ARGILLITE interbed: 30°; dark gray; slightly weathered; moderately hard; intensely fractured					66	0	5.56			
			257.1 feet: 1" SANDY lean CLAY (CL) infilled failure plane		C83								
295	260				C84			100	46	4.55			F: (259.3'), 30°, slightly open, very thin, argillite, slightly weathered, moderately soft, not healed, smooth
			SEDIMENTARY ROCK (ARGILLITE) Very thinly to laminated with very thin to laminated interbeds of SANDSTONE; ARGILLITE: dark gray to black, slightly weathered, moderately soft to moderately hard, very intensely fractured; SANDSTONE: fine-grained, gray, slightly weathered, moderately hard, very intensely fractured, trace chaotic quartz and calcite veining; rock mass in unit is moderately hard but extremely brittle (FRANCISCAN COMPLEX; BROKEN FORMATION)		C85			92	0	6.15			F: (259.8'), 30°, slightly open, very thin, argillite, slightly weathered, moderately soft, not healed, smooth
								95	0	6.67			
290	265				C86								

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PROJECT OR BRIDGE NAME				
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ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	265		SEDIMENTARY ROCK (ARGILLITE)		C87			100	0	5.94			
								100	55	4.60			
285	270		SEDIMENTARY ROCK (SANDSTONE); fine-grained; moderately to thinly bedded; gray to dark gray; slightly weathered; moderately hard; moderately fractured; trace chaotic quartz and calcite veining (FRANCISCAN COMPLEX; BROKEN FORMATION) 270.9 to 271.5 feet: ARGILLITE interbeds to 0.3": dips 5-10°; dark gray to black; slightly weathered; moderately hard; moderately to intensely fractured; mass readily parts on bedding planes 273.1 feet: slightly fractured		C88							F: (270.1'), 50°, slightly open, very thin, clay, very soft, not healed, slightly rough F: (271.5'), 10°, tight, clean, not healed, smooth F: (272.0'), 60°, slightly open, very thin, calcite, slightly weathered, moderately hard, partly healed, slightly rough F: (272.9'), 0°, tight, clean, not healed, smooth
280	275		SEDIMENTARY ROCK (ARGILLITE); thinly bedded with thin to very thin interbeds of SANDSTONE; ARGILLITE: dark gray to black, slightly weathered, moderately hard, very intensely fractured; SANDSTONE: fine grained, gray, slightly weathered, moderately hard, very intensely fractured; chaotic quartz and calcite veining; mass parts readily on bedding planes 276.0 feet: getting approximately 80% return on circulation		C89			100	51	4.33			F: (274.5'), 55°, slightly open, very thin, calcite, slightly weathered, moderately hard, partly healed, moderately rough F: (277.0'), 90°, slightly open, clean, not healed, moderately rough
			SEDIMENTARY ROCK (SANDSTONE) Fine to medium grained; thickly bedded; gray to bluish gray; slightly weathered; moderately hard; moderately fractured; planar to chaotic quartz veining less than 0.1" thick 278.3 feet: intensely fractured; ~3,500 gallons water used between 222.2' and 278.3' 279.6 feet: 2" ARGILLITE interbed: dips 0-10°; dark gray; slightly weathered; moderately hard; intensely fractured 281.4 feet: slightly fractured					100	58	5.77			F: (278.5'), 20°, slightly open, clean, not healed, slightly rough
275	280		282.6 feet: intensely fractured 283.5 feet: moderately fractured		C90			100	77	5.20			F: (280.4'), 25°, slightly open, very thin, calcite, slightly weathered, very soft, partly healed, slightly rough F: (281.4'), 40°, slightly open, very thin, silt, very soft, not healed, smooth F: (282.6'), 50°, slightly open, very thin, calcite, slightly weathered, moderately soft, partly healed, slightly rough
270	285		284.7 feet: slightly fractured 285.9 feet: intensely fractured 286.5 feet: moderately fractured		C91								F: (283.5'), 20°, slightly open, very thin, silt, very soft, not healed, slightly rough F: (284.0'), 40°, slightly open, very thin, calcite, slightly weathered, moderately hard, partly healed, slightly rough F: (284.5'), 45°, slightly open, clean, not healed, smooth F: (285.9'), 20°, slightly open, clean, not healed, smooth
265	290		288.6 feet: slightly fractured		C92			100	80	5.60			F: (286.9'), slightly open, clean, not healed, slightly rough, Orientation varies from 80-90 degrees F: (288.6'), 10°, slightly open, clean, not healed, slightly rough F: (291.6'), 50°, slightly open, very thin, calcite, slightly weathered, moderately hard, partly healed, slightly rough F: (292.6'), 45°, slightly open, clean, not healed, smooth
260	295		SEDIMENTARY ROCK (SANDSTONE) Thinly bedded with thin interbeds of ARGILLITE; SANDSTONE: fine grained, gray, slightly weathered to moderately weathered, moderately hard, very intensely fractured; ARGILLITE: dark gray to black, slightly		C93			72	0	6.82			

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-011**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**10 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	295		weathered, moderately hard, very intensely fractured; quartz and calcite veining up to 0.1", mass is brittle and readily fragments		C93			72	0				
			SEDIMENTARY ROCK (SANDSTONE)		C94			85	0	6.07			
255	300		298.6 to 299.1 feet: black; decomposed; very soft pervasively sheared to: (SANDY lean CLAY (CL); stiff; mostly fines; some coarse to fine SAND; trace subrounded fine GRAVEL); visible polished shear surfaces and shear structure		C95			60	0	12.00			
					C96			40	0	6.57			
250	305		302.3 to 302.6 feet: black; decomposed; very soft pervasively sheared to: (SANDY lean CLAY (CL); stiff; mostly fines; some coarse to fine SAND; trace subrounded fine GRAVEL) 302.6 feet: ~1,500 gallons water used between 278.3' and 302.6'; advanced HWT casing to full depth (302.6') Bottom of borehole at 302.6 ft bgs									
245	310												
240	315												
235	320												
230	325												

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REPORT TITLE **BORING RECORD**				HOLE ID **RC-20-011**
DIST. **01**	COUNTY **Del Norte**	ROUTE **101**	POSTMILE **12-15.5**	EA **0115000099**
PROJECT OR BRIDGE NAME **Last Chance Grade Bypass**				
BRIDGE NUMBER **--**	PREPARED BY **D. Ross**		DATE **3-26-21**	SHEET **11 of 11**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
R. Ruded	**10-21-20**	**11-5-20**	**2488457.428 ft / 5983446.153 ft NAD83**	**RC-20-013**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
Gregg Drilling				**830.52 ft NAVD88**
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Rotary Core			**CME 850**	**4.5 in**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4"), HQ Core (2.5")			**Cathead; 140 lbs / 30-inch drop**	
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING / AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
VWP, TDR, Inclinometer; cement-bentonite			**Not Determined** / **Not Determined**	**134.7 ft**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
830	0		ASPHALT CONCRETE (6")					20	0	1.1			
			SANDY lean CLAY (CL); stiff; dark yellowish brown; moist; some fine SAND; few fines; subangular to angular GRAVEL (FILL)		C01								
825	5		SEDIMENTARY ROCK (SANDSTONE); fine-grained sand; massive; gray; moderately weathered; hard; very intensely fractured; very thin iron and manganese infilling; some chaotic 0.06 to 0.13" thick quartz veining; (LANDSLIDE DEPOSIT)										
			Poorly-graded SAND with CLAY AND GRAVEL (SC); very dense; olive brown; moist; mostly fine to medium SAND; some fine to medium GRAVEL; few medium plasticity fines; (LANDSLIDE DEPOSIT)		S02	29 20 34	54	33					
			SEDIMENTARY ROCK (SANDSTONE); fine-grained sand; massive; gray; moderately weathered; hard; very intensely fractured; (LANDSLIDE DEPOSIT)		C03			34	0	3.4			
820	10		Poorly-graded SAND with GRAVEL (SP); very dense; olive brown; moist; mostly fine to medium SAND; some fine to medium angular GRAVEL; trace low plasticity fines; (LANDSLIDE DEPOSIT)		S04	12 15 15	30	47					
			SEDIMENTARY ROCK (SANDSTONE); fine-grained sand; massive; gray; intensely to moderately weathered; moderately hard to hard; very intensely fractured; (LANDSLIDE DEPOSIT)		C05			46	0	5.4			
815	15		SEDIMENTARY ROCK (ARGILLITE); massive; very dark gray; decomposed; soft; very intensely fractured; (SANDY lean CLAY with GRAVEL (CL); medium stiff; moist; little fine to coarse SAND; little fine to medium angular GRAVEL); (FRANCISCAN COMPLEX; BROKEN FORMATION)		S06	4 5 14	19	33					
					C07			65	0	4.4			
810	20		SEDIMENTARY ROCK (SANDSTONE) Fine-grained sand; massive; gray; intensely weathered; moderately hard to hard; very intensely fractured 20.5 to 20.8 feet: ARGILLITE interbed; massive; gray; decomposed; soft; very intensely fractured 20.8 feet: intensely to moderately weathered; moderately hard to hard; very thin to moderately thin CLAY and SILT infill; few chaotic 0.1" thick quartz veining; (FRANCISCAN COMPLEX; BROKEN FORMATION) 24.5 to 25.5 feet: moderately weathered; hard; intensely		S08			NR					
					C09			66	0	5			
	25												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-013**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-11-21**	**1 of 5**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
805	25		fractured SEDIMENTARY ROCK (SANDSTONE) 25.5 to 26.4 feet: intensely weathered; moderately hard; very intensely fractured 26.4 to 35.7 feet: slightly weathered; hard; intensely to moderately fractured; very thin to moderately thin CLAY and SILT infill		C09			66	0				
								81	0	3.6			
					C10								
800	30												
								96	6.7	4.1			
					C11								
795	35		SEDIMENTARY ROCK (ARGILLITE) Massive; very dark gray; intensely weathered; soft to moderately soft; intensely fractured 36.0 to 36.2 feet: decomposed; very soft; very intensely fractured; (SANDY lean CLAY with GRAVEL (CL); medium stiff; moist; some fine to coarse SAND; few angular GRAVEL); (FRANCISCAN COMPLEX; BROKEN FORMATION) 36.2 to 36.5 feet: SANDSTONE interbed; fine-grained sand; massive; gray 36.5 to 41.0 feet: very intensely fractured					40	0	5.6			
					C12								
790	40												
								80	0	8.5			
			41.5 to 43.5 feet: decomposed; soft to very soft; intensely fractured; pervasively sheared to: (GRAVELLY lean CLAY with SAND (CL); stiff; moist; some fine to coarse angular GRAVEL; little fine to coarse SAND)		C13								
								20	0	1.1			
			43.5 to 53.7 feet: intensely weathered; soft; very intensely fractured 44.0 feet: circulation loss (60 gallons)		C14								
785	45												
								52	0	3.4			
			46.0 feet: circulation loss (60 gallons)		C15								
								NR	0	4.4			
					C16								
780	50												
					S17	50/6"	REF	NR					
								100	0	3.2			
					C18								
								88	0	3.9			
	55		53.7 to 59.0 feet: moderately weathered; soft		C19								

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-013**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-11-21**	**2 of 5**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
775	55		SEDIMENTARY ROCK (ARGILLITE) 55.5 feet: calcite veins: 0 to 35°; 0.1 to 0.3" thick		C19			88	0				
					C20			63	0	5.5			
770	60		59.0 to 63.9 feet: decomposed; soft to very soft; intensely fractured; some fracture infill of: (CLAYEY SAND with GRAVEL (SC); moist; fine to coarse SAND; some medium plasticity clay; little fine to medium angular GRAVEL)		C21			86	0	2.8			
					C22			27	0	8.5			
765	65		SEDIMENTARY ROCK (SANDSTONE) Fine-grained sand; massive; gray; moderately weathered; hard; intensely fractured; thin to very thin SILT and SAND infill with calcite cementation; some chaotic 0.1 to 0.3" thick calcite veining (FRANCISCAN COMPLEX; BROKEN FORMATION)		C23			125	0	2.5			
					C24			44	0	6.6			
			67.5 to 67.8 feet: ARGILLITE interbed; massive; dark gray; decomposed; very soft; very intensely fractured; pervasively sheared to: (Poorly-graded GRAVEL with SAND (GP); dense; moist; some fine to coarse SAND; angular fine to coarse GRAVEL)		C25			100	0	6			
760	70		67.8 to 82.0 feet: very intensely fractured		C26			NR	0	2.1			
					S27	28 50/4"	50/4						
					C28			50	0	3.5			
755	75				C29			17	0	3.6			
					C30			48	0	7.2			
750	80				C31			60	0	5.4			
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained sand; massive; gray; moderately weathered; moderately hard to hard; intensely fractured; chaotic 0.1 to 0.3" thick calcite veining; (FRANCISCAN COMPLEX; BROKEN FORMATION)		C32			46	0	4.8			
	85												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-013**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-11-21**	**3 of 5**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	85		SEDIMENTARY ROCK (SANDSTONE)		C32			46	0				
745								100	13.3	4.4			
					C33								
			87.2 to 88.3 feet: ARGILLITE interbed; massive; dark gray; decomposed; very soft; very intensely fractured; pervasively sheared to: (Poorly-graded GRAVEL with SILT and SAND (GP-GM); dense; mostly fine to coarse angular GRAVEL; some fine to coarse SAND; little low plasticity fines)					18	0	2.2			
	90		88.3 to 95.5 feet: very intensely fractured		C34								
740													
					C35			17	0	2.1			
								85	0	4.5			
	95				C36								
735													
			95.5 to 100.5 feet: slightly weathered; intensely fractured; chaotic 0.1" thick calcite veins; very thin calcite cementation on fracture surfaces					96	0	2.2			
					C37								
	100												
730													
			100.5 to 100.8 feet: ARGILLITE interbed; massive; dark gray; moderately weathered; soft; very intensely fractured					100	0	1.7			
					C38								
	105												
725													
			106.4 to 106.5 feet: SILT (ML) fracture infill; nonplastic, weak calcite cementation		C39			80	0	4.8			
								100	20.8	11.6			
			108.0 to 134.7 feet: moderately to slightly weathered; very intensely to intensely fractured; very thin calcite infill		C40								
								10	0	10.4			
	110				C41								
720													
			111.0 feet: circulation loss (60 gallons)		C42			80	0	13			
					C43			90	0	15			
					C44			100	0	5.3			
					C45			NR	0	0.00			
	115												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-013**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-11-21**	**4 of 5**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
715	115		SEDIMENTARY ROCK (SANDSTONE)		C46			13	0	4.7			
					C47			17	0	4.4			
710	120				C48			100	0	5.6			
					C49			80	0	3.2			
705	125				C50			72	0	5.2			
					C51			37	0	7.9			
					C52			NR	0	9.1			
700	130				C53			NR	0	10			
					C54			40	0	4.4			
					C55			14	0	27			
					C56			60	0	16			
695	135		Bottom of borehole at 134.7 ft bgs										
690	140												
	145												

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-013**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-11-21**	**5 of 5**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
D.Sullivan	**10-26-20**	**11-5-20**	**2485183.482 ft / 5983987.610 ft NAD83**	**RC-20-014**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
CRUX Subsurface Inc.				**805.10 ft NAVD88**
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Rotary Core			**DMW 45**	**4.5 in**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4"), HQ Core (2.5")			**Cathead; 140 lbs / 30-inch drop**	
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING	AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
VWP, TDR, Inclinometer; cement-bentonite			**Not Determined**	**Not Determined**	**300.0 ft**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method / Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
670	0		SANDY fat CLAY (CH); soft; light reddish brown and light gray; moist; mostly fines; little coarse to fine SAND; few angular GRAVEL; highly oxidized; PP = 0.5 tsf; abundant organic matter (COLLUVIUM / LANDSLIDE DEPOSIT)									
	5				S01	0 0 0	0	11		8.00		
665	10				S02	2 2 3	5	44		7.40		
660	15		15.0 feet: increased sand content; coarse SANDSTONE gravel in sample shoe		S03	2 4 4	8	44		13.60		
655	20		SEDIMENTARY ROCK (ARGILLITE) Dark gray and dark reddish brown; decomposed; soft; very intensely fractured with clay seams; (Poorly-graded GRAVEL with CLAY and SAND (GP-GC), dark gray, wet, mostly gravel, little sand, few moderately plastic fines) (LANDSLIDE DEPOSIT)		S04	7 8 11	19	33		9.20		
650	25											

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-014**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**1 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	25		SEDIMENTARY ROCK (ARGILLITE) 25.0 feet: increased clay content		S05	12 12 13	25	55		6.40			
645	30				S06	12 14 13	27	61		7.20			
640	35		35.0 feet: pervasively sheared to: (Lean CLAY (CL); medium stiff; dark gray; moist; mostly fines; few fine angular gravel); PP = 1.0 tsf		S07	8 10 8	18	66		8.40			
635	40		40.0 feet: decreased clay content		S08	21 40 50/3"	90/9	26		0.00			
			41.3 feet: grayish black; slightly weathered; hard; intensely fractured; advance HWT casing to 41.3'; equip HQ core		C09			88	0	66.67			
					C10			83	0	18.89			
630	45				C11			91	0	11.36			
			46.2 feet: very intensely fractured		C12			99	0	13.13			
			48.0 feet: moderately weathered; advance HWT casing to 48.0'										
625	50		49.4 feet: slightly weathered; intensely fractured 50.2 feet: very thinly bedded: dips 40°		C13			80	0	7.00			
			53.0 feet: very intensely fractured 53.6 feet: intensely fractured										
620	55				C14			69	0	8.97			

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-014**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**2 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	55		SEDIMENTARY ROCK (ARGILLITE)					69	0				
			56.2 feet: slightly weathered; hard; very intensely fractured with Lean CLAY (CL) fracture infill		C14								
			57.3 to 61.0 feet: intensely fractured with 0.1" to 0.5" SANDSTONE lenses		C15			94	23	15.22			
615	60							98	9	3.27			
			61.0 feet: very intensely fractured 61.4 to 62.2 feet: calcite infill		C16								
			62.2 feet: intensely fractured										
610	65							94	14	4.62			
			67.0 feet: 10" SANDSTONE clast; fine-grained; very thinly bedded; dark gray; slightly weathered; hard; moderately fractured with very thin ARGILLITE interbeds		C17								
			67.5 feet: moderately weathered; moderately soft; intensely fractured					103	0	3.33			
605	70		68.1 feet: very intensely fractured with Lean CLAY (CL) fracture infill; SANDSTONE clasts up to 4"		C18								
								96	15	5.45			
			71.2 feet: Iron oxide mineralization on some fracture surfaces 71.9 feet: intensely fractured		C19								
			73.4 to 73.8 feet: decomposed										
600			73.8 feet: moderately weathered; moderately soft					100	13	7.31			
	75		74.9 feet: intensely weathered; soft; very intensely fractured		C20								
			75.2 feet: moderately weathered; moderately soft; intensely fractured										
			76.0 to 77.2 feet: BASAL LANDSLIDE FAILURE ZONE: intensely weathered; soft; very intensely fractured					100	11	6.55			
			SEDIMENTARY ROCK (SANDSTONE) Fine to medium grained; massive; gray; slightly weathered; hard; intensely fractured; intermittent calcite veining (FRANCISCAN COMPLEX: BROKEN FORMATION)		C21								
595	80		78.4 feet: ARGILLITE clasts throughout rock mass, up to 0.2"					100	12	5.35			
			79.3 feet: slightly weathered; very hard 80.0 feet: very intensely fractured 80.4 feet: intensely fractured		C22								
			81.4 feet: fine grained; moderately weathered; moderately soft; ARGILLITE interbeds and clasts 82.2 feet: moderately hard										
			83.0 feet: moderately soft										
590	85				C23			100	15	6.40			

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-014**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**3 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	85		84.6 feet: moderately hard SEDIMENTARY ROCK (SANDSTONE) 85.0 feet: ARGILLITE interbeds 85.6 feet: fine to medium grained 86.4 feet: slightly weathered; hard; moderately fractured		C23			100	15				F: (86.4'), 45°, slightly open, clean, not healed, slightly rough
			88.0 feet: intensely fractured										
585			88.6 feet: moderately fractured		C24			100	50	4.40			F: (89.4'), 5°, moderately open, very thin, clay, soft, not healed, slightly rough
	90		90.0 feet: intensely weathered; moderately soft; very intensely fractured 90.4 feet: moderately weathered; intensely fractured										F: (90.0'), 20°, moderately open, very thin, clay, soft, not healed, slightly rough
			92.6 feet: moderately hard 93.0 feet: slightly weathered; hard										
580			93.7 feet: moderately weathered 94.0 feet: moderately fractured		C25			100	10	3.60			F: (94.6'), 20°, slightly open, very thin, iron oxide, intensely weathered, moderately hard, not healed, moderately rough
	95		95.0 feet: intensely weathered; soft; very intensely fractured; lean CLAY infilling between fractures 95.2 feet: fine-grained; moderately weathered; intensely fractured 96.4 feet: intensely weathered; very intensely fractured with Lean CLAY (CL) fracture infill										
575			98.6 feet: moderately weathered; hard; moderately to intensely fractured		C26			100	40	3.40			
	100		99.6 feet: moderately soft 100.6 feet: hard 101.3 feet: moderately soft										
			103.1 feet: hard										
570					C27			100	60	4.00			F: (104.0'), 30°, slightly open, clean, not healed, slightly rough
	105		105.6 feet: slightly weathered; hard 106.5 feet: ARGILLITE clasts up to 0.1"										F: (105.1'), 80°, slightly open, very thin, clay/iron oxide, intensely weathered, soft, not healed, slightly rough F: (106.1'), 30°, slightly open, very thin, calcite, slightly weathered, soft, not healed, moderately rough F: (107.0'), 80°, tight, very thin, calcite, slightly weathered, moderately hard, totally healed
565			108.6 feet: 5" ARGILLITE interbed 109.0 to 109.7 feet: zone with abundant ARGILLITE clasts up to 0.2"		C28			100	53	3.20			
	110		109.7 feet: trace ARGILLITE clasts 111.5 to 111.8 feet: zone with abundant ARGILLITE clasts up to 0.2", approximately oriented: 25°. 111.8 feet: little ARGILLITE clasts										F: (108.1'), 80°, tight, very thin, calcite, totally healed F: (108.5'), 50°, slightly open, clean, not healed, moderately rough F: (109.0'), 45°, moderately open, very thin, clay, soft, not healed, moderately rough F: (110.1'), 50°, slightly open, very thin, clay, soft, not healed, moderately rough
			113.3 feet: trace ARGILLITE clasts 113.6 feet: very hard; slightly fractured		C29			100	90	7.78			F: (110.4'), 50°, slightly open, very thin, clay, soft, not healed, slightly rough
560	115							100	63	4.20			

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-014**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**4 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	115		SEDIMENTARY ROCK (SANDSTONE) 115.0 feet: 1" ARGILLITE bed: dips 30° 115.9 feet: 2" ARGILLITE bed: dips 20°		C30			100	63				F: (111.6'), 50°, slightly open, very thin, clay, soft, not healed, slightly rough F: (112.0'), 50°, slightly open, very thin, clay, soft, not healed, slightly rough
					C30								F: (115.1'), 25°, moderately wide, moderately thick, clay, soft, not healed, slightly rough
555			118.6 feet: moderately weathered; moderately hard										F: (116.3'), 20°, moderately open, clean, not healed, moderately rough
	120		119.5 feet: intensely fractured		C31			100	0	3.60			F: (117.1'), 60°, slightly open, very thin, calcite, slightly weathered, soft, not healed, slightly rough F: (119.2'), 30°, slightly open, moderately thin, clay, soft, not healed, slightly rough
550													
	125		124.5 feet: intensely weathered; moderately soft; intensely to moderately fractured 125.4 feet: moderately weathered; moderately hard; intensely fractured		C32			93	28	4.40			
			127.1 to 127.4 feet: sheared calcite veining: dips 80°										
			128.3 feet: moderately soft										
545													
	130		130.9 feet: moderately hard		C33			99	18	5.96			
			133.2 feet: moderately soft 133.5 to 134.2 feet: intensely weathered; soft; very intensely fractured										
540													
	135		134.2 to 135.3 feet: ARGILLITE interbeds: dips 60°; dark gray, slightly weathered, moderately soft to moderately hard, intensely fractured 135.3 feet: moderately hard; moderately to intensely fractured		C34			100	33	5.40			
			135.8 feet: moderately soft 136.9 feet: moderately hard										F: (136.2'), 80°, slightly open, very thin, iron oxide/clay, intensely weathered, soft, not healed, slightly rough F: (137.5'), 45°, tight, moderately thin, calcite, moderately weathered, soft, totally healed
535													F: (137.7'), 45°, slightly open, very thin, calcite, moderately weathered, soft, not healed, slightly rough
	140		139.6 feet: moderately fractured		C35			100	53	6.80			F: (138.3'), 80°, slightly open, very thin, iron oxide, intensely weathered, soft, not healed, slightly rough
			141.4 feet: moderately soft 142.8 to 143.6 feet: chaotic calcite veining										F: (139.6'), 60°, slightly open, very thin, iron oxide/calcite, intensely weathered, soft, not healed, slightly rough F: (140.9'), 70°, slightly open, very thin, calcite, intensely weathered, soft, not healed, slightly rough
530	145		144.2 feet: moderately weathered; moderately soft; intensely fractured; ARGILLITE interbeds		C36			100	63	6.00			

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DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**5 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	145		144.9 feet: slightly weathered SEDIMENTARY ROCK (SANDSTONE) 145.4 to 151.0 feet: trace ARGILLITE clasts up to 0.3"; moderately hard; moderately fractured		C36			100	63				F: (141.3'), 30°, slightly open, very thin, calcite, intensely weathered, soft, not healed, slightly rough F: (143.4'), 70°, tight, moderately thin, calcite, intensely weathered, soft, moderately healed F: (143.6'), 80°, slightly open, very thin, clay, intensely weathered, soft, not healed, smooth
525			147.5 feet: slightly fractured										
	150		149.2 feet: moderately fractured		C37			100	73	4.80			F: (145.7'), 70°, slightly open, very thin, calcite, slightly weathered, moderately soft, not healed, slightly rough F: (146.6'), 60°, slightly open, very thin, calcite, slightly weathered, moderately soft, not healed, slightly rough F: (147.5'), 60°, tight, moderately thin, calcite, intensely weathered, soft, totally healed F: (149.7'), 60°, slightly open, very thin, Cl, soft, not healed, moderately rough
520													
	155		155.1 to 158.1 feet: ARGILLITE clasts up to 0.3"		C38			100	77	4.80			F: (151.6'), 30°, slightly open, moderately thin, calcite, slightly weathered, moderately soft, totally healed F: (152.7'), 80°, tight, moderately thick, calcite, slightly weathered, moderately soft, totally healed F: (153.4'), 60°, slightly open, clean, not healed, smooth F: (154.9'), 60°, slightly open, very thin, clay, not healed, moderately rough
515			159.2 feet: slightly fractured										
	160		160.0 to 163.7 feet: persistent, near vertical Lean CLAY (CL) infilled fracture; moderately weathered; moderately soft 161.2 to 163.0 feet: chaotic ARGILLITE bed remnants		C39			100	60	4.20			F: (155.6'), 60°, tight, very thin, calcite, slightly weathered, moderately hard, totally healed F: (157.1'), 80°, slightly open, clean, not healed, slightly rough F: (158.1'), 75°, open, clean, not healed, slightly rough F: (158.3'), 65°, tight, moderately thin, calcite, slightly weathered, moderately hard, totally healed
			162.8 feet: intensely fractured										
510													
	165		SEDIMENTARY ROCK (SANDSTONE) Moderately bedded with thin to very thin interbeds, bed remnants of ARGILLITE; SANDSTONE: fine grained, moderately bedded, gray to blue gray, moderately weathered, moderately soft, intensely fractured; ARGILLITE: thin to very thinly bedded, dark gray, moderately weathered, moderately soft, intensely fractured; chaotic quartz and calcite veining up to 1" thick, locally (FRANCISCAN COMPLEX: BROKEN FORMATION) 166.6 to 167.0 feet: ARGILLITE interbeds; intensely weathered; soft; sheared to: (SANDY lean CLAY with GRAVEL (CL); hard; moist; mostly fines; little fine subangular gravels; little fine grained sand); PP = 4.25 tsf 167.0 feet: moderately weathered; moderately soft 169.4 feet: slightly weathered; moderately hard; moderately fractured 169.7 feet: 1" CLAYEY GRAVEL (GC) infilled shear: dips 40° 170.5 feet: intensely fractured		C40			100	22	5.00			F: (161.0'), 80°, tight, very thin, clay, soft, not healed, slightly rough
505													
	170				C41			100	24	6.89			F: (169.3'), 40°, slightly open, very thin, clay, soft, not healed, slightly rough F: (169.7'), 40°, wide, thick, clay/calcite, soft, not healed, smooth
500													
	175				C42			100	10	7.00			

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REPORT TITLE				HOLE ID
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01	**Del Norte**	**101**	**12-15.5**	**0115000099**
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Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**6 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	175		174.6 feet: moderately weathered; moderately soft SEDIMENTARY ROCK (SANDSTONE) 175.5 feet: very intensely fractured		C42			100	10				
495	180		SEDIMENTARY ROCK (SANDSTONE) Fine-grained; massive; gray to dark gray; slightly weathered; moderately hard; intensely fractured; chaotic quartz and calcite veining up to 0.5" thick (FRANCISCAN COMPLEX: BROKEN FORMATION) 181.5 feet: very intensely fractured		C43			94	9	5.53			
			182.5 feet: intensely fractured		C44			100	58	5.71			
490	185		185.6 feet: slightly weathered		C45			100	15	6.28			
485	190		190.0 to 192.0 feet: chaotic quartz and calcite veining up to 1" thick 192.3 feet: moderately weathered; moderately soft; very intensely fractured		C46			100	0	7.60			
480	195		194.0 feet: slightly weathered; moderately soft to moderately hard; intensely fractured		C47			98	0	0.00			
			196.3 feet: 1" thick ARGILLITE interbed: dips 50°; slightly weathered; moderately soft		C48			99	0	0.00			
475	200		200.0 feet: moderately hard 200.8 feet: very intensely fractured 201.0 feet: intensely to very intensely fractured		C49			100	0	6.00			
470	205							100	37	8.00			

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DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**7 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	205		204.6 feet: moderately fractured SEDIMENTARY ROCK (SANDSTONE)		C50			100	37				
			206.0 feet: moderately weathered; intensely fractured										
			206.9 to 208.4 feet: calcite rehealed brecciated zone		C50								
			208.4 to 209.3 feet: brecciated zone; decomposed; soft; fractured to: (CLAYEY SAND with GRAVEL (SC); loose mostly fine to coarse sand; some moderate plasticity fines; little fine gravel)										
465	210		209.3 feet: slightly weathered; hard; moderately fractured					100	68	5.60			F: (210.3'), 60°, slightly open, clean, not healed, slightly rough
					C51								F: (211.0'), 70°, tight, very thin, calcite, slightly weathered, moderately hard, totally healed
			212.8 feet: intensely fractured										F: (212.4'), 60°, tight, very thin, calcite, slightly weathered, moderately hard, totally healed
			213.3 feet: moderately fractured										F: (212.7'), 45°, tight, clean, not healed, moderately rough
460	215							100	55	7.78			F: (214.9'), 50°, tight, thin, clay, moderately soft, not healed, slightly rough
			215.4 feet: moderately hard		C52								
			216.4 feet: intensely fractured					99	34	5.63			F: (215.5'), 30°, slightly open, very thin, clay, soft, not healed, moderately rough
			217.7 feet: moderately fractured		C53								F: (215.8'), 80°, moderately open, moderately thin, calcite, decomposed, very soft, not healed, smooth
			218.6 feet: intensely fractured										F: (217.7'), 40°, moderately open, clean, not healed, slightly rough
455	220							100	33	5.80			F: (218.6'), 60°, slightly open, moderately thin, clay/calcite, soft, not healed, slightly rough
					C54								F: (221.1'), 60°, slightly open, very thin, calcite, decomposed, soft, not healed, moderately rough
			223.6 feet: hard										F: (221.8'), 40°, tight to slightly open, moderately thin, calcite, decomposed, soft, partly healed, slightly rough
450	225		224.6 feet: moderately fractured					99	31	6.83			F: (222.5'), 50°, slightly open, moderately thin, clay/calcite, decomposed, soft, not healed, slightly rough
			BRECCIATED ZONE: SANDSTONE with thin ARGILLITE interbeds brecciated to: Poorly-graded GRAVEL with SAND (GP): medium dense, gray and dark gray, dry, mostly subangular to angular gravel (rock fragments), some fine to coarse sand, locally rehealed with chaotic quartz and calcite veining; intensely weathered to decomposed; moderately soft to soft; intensely to very intensely fractured		C55								F: (225.3'), 50°, moderately open, very thin, clay, soft, not healed, smooth
													F: (226.1'), 60°, slightly open, moderately thin, clay, soft, not healed, moderately rough
													F: (227.8'), 60°, slightly open, very thin, clay, soft, not healed, moderately rough
445	230		SEDIMENTARY ROCK (SANDSTONE) Fine grained; massive; gray; slightly weathered; moderately hard; moderately to intensely fractured; chaotic quartz and calcite veining (FRANCISCAN COMPLEX: BROKEN FORMATION)					100	48	5.80			F: (229.2'), 60°, slightly open, very thin, clay, soft, not healed, moderately rough
					C56								F: (229.7'), 60°, slightly open, very thin, calcite, decomposed, soft, not healed, slightly rough
													F: (230.6'), 60°, tight, very thin, calcite, slightly weathered, moderately hard, totally healed
													F: (231.2'), 60°, tight, very thin, calcite, slightly weathered, moderately hard, totally healed
440	235		233.7 feet: hard; moderately fractured		C57			100	60	5.20			

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DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**8 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	235		SEDIMENTARY ROCK (SANDSTONE)					100	60				F: (232.3'), 80°, tight, very thin, calcite, decomposed, soft, moderately healed, slightly rough
					C57								F: (232.7'), 80°, slightly open, very thin, calcite, decomposed, soft, not healed, slightly rough
			237.4 feet: slightly weathered; moderately hard; intensely fractured										F: (234.4'), 70°, tight, very thin, calcite, slightly weathered, moderately hard, totally healed
435			238.7 feet: moderately fractured					100	32	3.20			F: (235.6'), 50°, moderately open, very thin, calcite, slightly weathered, moderately soft, not healed, slightly rough
	240				C58								F: (237.4'), 15°, slightly open, very thin, clay, soft, slightly rough
			241.7 feet: intensely fractured										F: (239.5'), 60°, slightly open, very thin, calcite, decomposed, soft, not healed, slightly rough
430								100	52	3.80			F: (242.3'), 60°, slightly open, very thin, calcite, decomposed, soft, not healed, slightly rough
	245		244.6 to 253.1 feet: mass brecciated and quartz and calcite rehealed with abundant chaotic veining		C59								
			246.8 feet: moderately fractured										F: (246.8'), 70°, moderately open, moderately thick, clay, soft, not healed, slightly rough
			248.7 feet: hard					100	85	5.23			F: (247.7'), 60°, moderately open, very thin, calcite, slightly weathered, soft, not healed, slightly rough
425													
	250		249.7 feet: intensely fractured										F: (249.7'), 60°, tight, very thin, calcite, decomposed, soft, not healed, slightly rough
			250.9 feet: slightly fractured		C60								F: (251.4'), 30°, tight, clean, not healed, smooth
								100	100	6.60			F: (253.1'), 35°, tight, clay, not healed, slightly rough
420													
	255				C61								F: (254.9'), 45°, tight, thin, calcite, slightly weathered, soft, partly healed, smooth
													F: (255.6'), 55°, slightly open, very thin, calcite, moderately weathered, soft, not healed, slightly rough
			258.1 feet: intensely fractured		C62			100	72	12.67			
415													
	260							100	47	7.60			
			260.8 feet: moderately fractured		C63								F: (260.2'), 50°, slightly open, moderately thin, clay, soft, not healed, slightly rough
													F: (261.1'), 60°, tight, very thin, calcite, decomposed, soft, not healed, slightly rough
410													F: (262.4'), 60°, tight, very thin, calcite, decomposed, soft, not healed, slightly rough
	265							100	62	5.40			

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REPORT TITLE				HOLE ID
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DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**9 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	265		264.6 feet: slightly fractured SEDIMENTARY ROCK (SANDSTONE)		C64			100	62				F: (263.0'), 50°, tight, very thin, calcite, totally healed F: (263.2'), 60°, tight, clean, not healed, slightly rough
			266.5 to 267.1 feet: zone with abundant healed fractures, calcite infilling, some fractures offset 266.9 to 268.6 feet: intensely fractured; local SANDY lean CLAY (CL) fracture infill		C64								F: (264.1'), 70°, tight, slightly rough
405			268.8 feet: slightly fractured										F: (268.5'), 85°, tight, very thin, calcite, decomposed, soft, partly healed, moderately rough
	270		269.6 feet: moderately fractured					100	57	4.40			F: (269.8'), 70°, tight, very thin, calcite, decomposed, soft, partly healed, slightly rough
					C65								F: (271.8'), 50°, slightly open, very thin, calcite, decomposed, soft, moderately healed, slightly rough F: (273.2'), 70°, tight, moderately thick to moderately thin, calcite, decomposed, soft, partly healed, smooth
400			274.0 to 274.3 feet: abundant ARGILLITE clasts, up to 0.1": dips 50°										
	275							100	37	5.60			F: (274.2'), 45°, tight, very thin, calcite, decomposed, soft, partly healed, slightly rough
					C66								F: (274.4'), 65°, tight, very thin, calcite, decomposed, soft, partly healed, slightly rough F: (274.9'), 60°, tight, moderately thin, calcite, decomposed, soft, partly healed, smooth
395													
	280		279.8 feet: slightly fractured 280.0 to 285.4 feet: few ARGILLITE clasts up to 0.3"					100	93	0.00			
					C67								F: (281.2'), 80°, tight, very thin, calcite, decomposed, soft, partly healed, rough
			283.0 to 300.0 feet: abundant healed fractures; 0.1" to 0.1" wide, chaotic 283.6 feet: moderately weathered; moderately hard										
390													F: (284.1'), 30°, tight, very thin, calcite, decomposed, soft, partly healed, rough
	285		284.6 feet: moderately fractured					100	100	0.00			
					C68								F: (287.1'), 30°, slightly open, moderately thin, calcite, slightly weathered, moderately soft, moderately healed, moderately rough
385													
	290							100	77	5.00			
					C69								F: (291.8'), 20°, moderately open, thin, clay, soft, not healed, rough F: (293.0'), 50°, slightly open, very thin, calcite, decomposed, soft, not healed, slightly rough
380													
	295							100	33	3.20			

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-014**
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01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**10 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	295		SEDIMENTARY ROCK (SANDSTONE)		C70			100	33				F: (295.8'), 50°, slightly open, very thin, calcite/clay, decomposed, soft, not healed, slightly rough
			297.8 feet: intensely weathered; moderately soft to moderately hard; intensely fractured		C70								F: (296.4'), 70°, tight, very thin, calcite, decomposed, soft, not healed, slightly rough
375			299.0 feet: moderately weathered; moderately hard										F: (299.0'), 70°, slightly open, very thin, calcite, decomposed, soft, not healed, slightly rough
	300		300.0 feet: advance HWT casing to full depth (300.0')		C71			100	100	0.00			
			Bottom of borehole at 300.0 ft bgs										
370	305												
365	310												
360	315												
355	320												
350	325												

KLEINFELDER
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REPORT TITLE **BORING RECORD**				HOLE ID **RC-20-014**
DIST. **01**	COUNTY **Del Norte**	ROUTE **101**	POSTMILE **12-15.5**	EA **0115000099**
PROJECT OR BRIDGE NAME **Last Chance Grade Bypass**				
BRIDGE NUMBER **--**	PREPARED BY **D. Ross**		DATE **4-22-21**	SHEET **11 of 11**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
M.Parks	**11-2-20**	**11-18-20**	**2486022.874 ft / 5983827.999 ft NAD83**	**RC-20-015**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
CRUX Subsurface Inc.				**883.44 ft NAVD88**
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Rotary Core			**Burley 6000**	**4.5 in**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4"), HQ Core (2.5")			**Cathead; 140 lbs / 30-inch drop**	
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING	AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
VWP, TDR, Inclinometer; cement-bentonite			**Not Determined**	**Not Determined**	**301.0 ft**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method / Casing Depth	Discontinuity Description: Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	0		SILTY SAND (SM); very loose to loose; dark brown; dry; mostly fine SAND; little fines; low plasticity; high organic content (roots, tree litter at surface) (SURFACE SOIL/LANDSLIDE DEPOSIT)							0.00		
880												
	5		SANDY SILT (ML); very soft; moist; mostly fines; some fine SAND; few angular GRAVEL; (COLLUVIUM/LANDSLIDE DEPOSIT)		S01	0 0 2	2	33		0.00		
875												
	10		SANDY lean CLAY with GRAVEL (CL); soft to medium stiff; olive yellow; moist; mostly fines; little fine SAND; trace coarse to fine angular GRAVEL; low to medium plasticity; (COLLUVIUM/LANDSLIDE DEPOSIT) 11.0 feet: circulation loss		S02	2 2 5	7	61		0.00		
870												
	15				S03	5 9 14	23	72		0.00		
			CLAYEY SAND (SC); medium dense; yellowish brown; moist; mostly medium to fine SAND; little fines; trace fine angular GRAVEL; decomposed fracture surfaces (COLLUVIUM/LANDSLIDE DEPOSIT) 16.0 feet: GRAVELS / COBBLES of decomposed SANDSTONE with some intact rock structure								
865												
	20		20.0 feet: loose; reddish yellow and yellowish brown		S04	4 4 5	9	22		0.00		
			SANDY lean CLAY (CL); very stiff; yellowish brown; mostly fines; some fine SAND; trace fine angular GRAVEL; low plasticity; maganese mineralization (LANDSLIDE DEPOSIT)									
860												
	25				S05		28	61		0.00		

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-015**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-30-21**	**1 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	25		SANDY lean CLAY (CL)			8 12 16							
855			27.4 feet: decomposed ARGILLITE fragments										
	30		30.0 feet: yellowish brown with dark brown GRAVEL; few fine angular ARGILLITE		S06	19 22 22	44	55		0.00			
850			SEDIMENTARY ROCK (ARGILLITE) Massive; dark gray with light olive brown; decomposed; (Clayey GRAVEL (GC); medium dense; light olive brown with very dark gray; mostly fine to coarse angular GRAVEL (ARGILLITE); some medium plasticity fines; little fine to coarse SAND) (LANDSLIDE DEPOSIT)									
	35		34.0 feet: scattered calcite veining - 0.03"		S07	8 13 13	26	44		0.00			
845													
	40		39.0 feet: very dark gray; intensely weathered; soft; very intensely fractured; pervasively sheared; advance HWT casing to 39.0'; equip HQ core		S08	50/6"	REF	66		0.00			
			40.0 feet: slightly weathered		C09			100	0	3.00			
			41.3 feet: undulating shear surfaces		C10			100	0	16.67			
			42.5 feet: crushed Lean CLAY (CL) fracture infill; iron staning on some fracture surfaces		C11			100	0	5.29			
840			43.4 feet: laminated; moderately soft; intensely fractured					53	0	4.67			
	45		44.5 feet: intensely weathered; soft; very intensely fractured 45.0 feet: 0.5" zone: yellowish brown oxidation staining; undulating laminations: dips 60°		C12								
			46.0 feet: moderately to intensely weathered; intensely fractured; up to 4" zones of red oxidation staining					100	0	4.00			
			47.3 feet: very intensely fractured; Lean CLAY (CL) fracture infill		C13								
835			48.6 feet: moderately soft clasts; some reddish yellow to yellowish brown oxidation staining on corestone surfaces and Lean CLAY (CL) infill					96	0	4.00			
	50				C14								
			51.6 feet: intensely weathered; intensely fractured		C15			40	0	3.00			
			52.2 feet: laminated: dips 40°; moderately weathered; moderately soft					96	0	5.00			
830			53.0 feet: laminated: dips 30°; parting on bedding planes		C16								
			54.0 feet: very intensely fractured										
	55				C17			89	0	5.19			

(continued)

KLEINFELDER
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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-015**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-30-21**	**2 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	55		54.9 feet: laminations: dips 55°SEDIMENTARY ROCK (ARGILLITE)		C17			89	0				
			56.2 feet: laminations: dips 85°										
			57.0 feet: caving noted 57.0' to 59.0'		C18			51	0	7.18			
825			59.0 feet: sample disturbed										
	60		SEDIMENTARY ROCK (SANDSTONE); fine to coarse grained; massive; dark gray; slightly to moderately weathered; moderately hard; intensely fractured; manganese and iron oxide on fracture surfaces; local ARGILLITE clasts up to 0.1" (LANDSLIDE DEPOSIT)		C19			89	0	2.22			
			SEDIMENTARY ROCK (ARGILLITE); very dark gray; moderately weathered; moderately hard; very intensely fractured; with Lean CLAY (CL) fracture infill (LANDSLIDE DEPOSIT)		C20			100	0	5.00			
820			62.2 feet: intensely fractured; no infilling		C21			100	14	7.39			
	65		SEDIMENTARY ROCK (SANDSTONE) Fine-grained; massive; dark gray; slightly weathered; hard; intensely fractured; manganese and iron oxide on fracture surfaces (LANDSLIDE DEPOSIT)										
			65.4 feet: bedding: dips 70°; undulatory		C22			100	0	6.67			
815					C23			100	0	4.00			
	70		70.1 feet: moderately hard; very intensely fractured		C24			81	0	3.23			
			SEDIMENTARY ROCK (ARGILLITE) Laminated; very dark gray; moderately weathered; moderately hard; intensely fractured; (LANDSLIDE DEPOSIT)		C25					3.00			
810	75				C26					4.55			
			76.4 feet: sample disturbed		C27			100	0	5.71			
			77.8 feet: rounded GRAVEL (ARGILLITE); washed from drilling		C28			53	0	3.33			
805			78.8 feet: rounded GRAVEL (ARGILLITE); washed from drilling		C29			80	0	6.00			
	80		SEDIMENTARY ROCK (SANDSTONE); clayey infill Fine to medium grained; massive; very dark bluish gray; slightly weathered; hard; very intensely fractured; iron oxide staining on fracture surfaces and breaks; calcite on some joints (LANDSLIDE DEPOSIT)		C30			100	0	12.14			
					C31			100	0	3.85			
					C32			87	0	4.62			
800													
			84.0 feet: no recovery		C33					5.00			
	85												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-015**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-30-21**	**3 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	85		SEDIMENTARY ROCK (SANDSTONE)		C34					10.00			
					C35			8	0	3.33			
			86.8 to 94.0 feet: recovered ARGILLITE and SANDSTONE fragements; local Lean CLAY (CL) (postulated failure zone)		C36			100	0	8.18			
795					C37			38	0	4.62			
	90				C38			50	0	2.86			
					C39					10.00			
					C40					2.00			
					C41			100	0	10.00			
790					C42					0.71			
					C43			30	0	7.00			
	95		SEDIMENTARY ROCK (ARGILLITE); dark gray; intensely weathered; soft; very intensely fractured; trace calcite veining; clay infills on chaotic fractures; sheared (LANDSLIDE DEPOSIT/FAILURE ZONE) 95.0 feet: moderately soft		C44			100	0	4.38			
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained; very dark bluish gray; slightly weathered; moderately hard; calcite veining (FRANCISCAN COMPLEX: BROKEN FORMATION)		C45			100	0	2.86			
785			97.8 feet: 1" ARGILLITE bed: dips 40°		C46					19.00			
					C47			100	0	1.50			
	100		100.4 feet: 2" ARGILLITE bed: dips 40°		C48			100	0	16.67			
			101.4 feet: fine to medium grained; hard					100	0	3.95			
			102.0 feet: 2" ARGILLITE bed: dips 40°; 70° along		C49								
780													
	105												
					C50			98	18	2.95			
775			108.4 feet: ARGILLITE interbeds undulating parallel to fractures										
			109.6 feet: ARGILLITE clasts up to 0.8"										
	110		110.0 feet: fresh; intensely fractured; calcite veining										
					C51			100	12	5.86			
770			113.5 feet: very intensely fractured		C52			100	0	4.75			
			114.5 feet: intensely fractured										
	115												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-015**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-30-21**	**4 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	115		SEDIMENTARY ROCK (SANDSTONE)		C52			100	0				
			117.0 feet: very intensely fractured 117.5 feet: intensely fractured		C53			100	0	4.21			
765													
	120				C54			100	0	4.55			
			121.0 feet: 2" Lean CLAY (CL) infilled seam		C55			100	0	20.00			
			121.6 feet: Lean CLAY (CL) fracture infill		C56			100	0	4.29			
760													
			123.5 feet: very intensely fractured 124.2 feet: ARGILLITE laminated seams: dips		C57			100	0	6.82			
	125		10-20°										
			126.5 feet: 0.75" calcite bleb		C58			100	0	5.71			
					C59			100	0	13.33			
755			128.0 feet: 2" ARGILLITE layer: dips 10°		C60			100	0	6.36			
					C61			100	0	1.82			
	130				C62			50	0	2.92			
			132.5 feet: moderately hard; Lean CLAY (CL) fracture infill		C63			100	0	6.87			
750													
					C64			100	0	0.00			
			134.4 feet: intensely fractured					100	0	4.67			
	135		135.4 feet: very intensely fractured; Lean CLAY (CL) fracture infill		C65								
					C66			75	0	5.94			
745													
			139.0 feet: fine to coarse grained; moderately weathered; moderately soft; intensely fractured; elongated ARGILLITE clasts up to 0.1" with calcite veining										
	140		140.0 feet: fine-grained; slightly weathered; hard		C67			100	0	16.00			
			141.0 feet: caving noted		C68			100	0	12.73			
			SEDIMENTARY ROCK (ARGILLITE) Very dark gray; slightly weathered; moderately hard; very intensely fractured; (FRANCISCAN COMPLEX: BROKEN FORMATION)		C69			100	0	2.86			
740													
	145				C70					2.86			

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-015**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-30-21**	**5 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	145		SEDIMENTARY ROCK (ARGILLITE)		C70								
					C71					5.00			
			SEDIMENTARY ROCK (SANDSTONE); caving noted Fine to medium grained; massive; very dark gray; moderately weathered; moderately hard; very intensely fractured; very intensely fractured with Lean CLAY (CL) infill; calcite veining (FRANCISCAN COMPLEX: BROKEN FORMATION)		C72			100	0	15.71			
735					C73			100	17	5.00			
	150		148.6 feet: fresh; hard; intensely fractured		C74			100	0	2.00			
			152.0 feet: advance HWT casing to 134.0'		C75					7.33			
730			153.6 feet: fine to medium grained; massive; slightly weathered; hard; intensely fractured; calcite veining (FRANCISCAN COMPLEX: BROKEN FORMATION)		C76			63	21	5.00			
	155		155.0 feet: 1" quartz vein		C77			100	0	1.82			
			156.0 feet: very intensely fractured										
					C78			74	0	5.00			
725					C79					4.44			
	160		159.8 feet: Lean CLAY (CL) fracture infill		C80			100	0	5.29			
					C81			100	0	5.00			
					C82			11	0	2.78			
720					C83			100	0	5.38			
	165				C84			100	0	13.33			
			165.6 feet: thin ARGILLITE interbeds: dips 15° 166.0 feet: 0.25" ARGILLITE interbed: dips 70° 166.5 feet: intensely fractured		C85			100	0	3.68			
					C86			100	61	3.04			
715			168.5 feet: thin ARGILLITE interbeds: dips 20° 169.0 feet: fresh										
	170				C87			100	49	6.67			
					C88			100	0	4.76			
710					C89			100	0	50.00			
					C90			100	10	3.03			
	175												

(continued)

KLEINFELDER
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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-015**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-30-21**	**6 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	175		174.8 feet: light greenish gray; slightly weathered; very intensely fractured with Lean CLAY (CL) fracture infill; very thin calcite veining SEDIMENTARY ROCK (SANDSTONE); caving noted		C90			100	10				
705			177.2 feet: ARGILLITE laminations: dips 60° 177.5 feet: 0.4" calcite: dips 50° 178.5 feet: 1" ARGILLITE interbed: dips 10°		C91			100	0	4.76			
	180		178.8 feet: intensely fractured		C92			100	30	7.08			
			181.1 feet: very dark bluish gray		C93			100	0	5.19			
700			182.8 feet: ARGILLITE laminations: dips 15-20° 183.2 feet: very dark bluish gray; 0.4" clay layer; very dark gray; moderately hard					100	0	3.72			
	185		185.0 feet: very intensely fractured with Lean CLAY (CL) infill		C94								
695					C95			100	0	4.78			
	190		189.8 feet: decomposed: (SANDY lean CLAY with GRAVEL (CL); gray; moist; mostly moderate plasticity fines; some SAND; little GRAVEL)		C96			60	0	5.00			
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained; massive; gray; slightly weathered; hard; very intensely fractured; calcite veining (FRANCISCAN COMPLEX: BROKEN FORMATION)										
690								100	48	4.20			
	195		194.5 feet: intensely fractured		C97								
			196.2 feet: 0.1" to 1" calcite vein/bleb 196.8 feet: 0.5" calcite vein: dips 30°										
685			198.5 feet: very intensely fractured; elongated ARGILLITE clasts up to 0.1"		C98			100	0	12.50			
	200		199.6 feet: scattered calcite veins; pockets up to 0.1"		C99			100	0	5.79			
					C100			100	0	33.33			
					C101			100	0	200.00			
					C102			100	0	5.26			
680			202.8 feet: 0.1" ARGILLITE interbed: dips 15°		C103			94	25	3.00			
	205												

(continued)

KLEINFELDER
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REPORT TITLE **BORING RECORD**				HOLE ID **RC-20-015**
DIST. **01**	COUNTY **Del Norte**	ROUTE **101**	POSTMILE **12-15.5**	EA **0115000099**
PROJECT OR BRIDGE NAME **Last Chance Grade Bypass**				
BRIDGE NUMBER **--**	PREPARED BY **D. Ross**		DATE **3-30-21**	SHEET **7 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	205		SEDIMENTARY ROCK (SANDSTONE) 205.0 feet: intensely fractured		C103			94	25				
675			208.4 feet: no recovery, dropped core from barrel		C104					3.33			
	210				C105			50	0	10.00			
670					C106			64	0	3.64			
	215		214.6 feet: 0.5" calcite bleb		C107			21	0	4.10			
665													
	220		220.0 feet: moderately weathered; moderately hard; very intensely fractured		C108			53	0	25.88			
					C109			100	0	10.00			
			222.5 feet: fine to medium grained; slightly weathered; intensely fractured		C110			100	0	3.33			
660			223.4 feet: decomposed; soft; very intensely fractured;(CLAYEY GRAVEL with SAND (GC); gray; moist; mostly GRAVEL; some medium plasticity fines; some SAND)		C111			93	0	6.67			
	225				C112					15.71			
			225.2 feet: slightly weathered; hard; very intensely fractured		C113					5.00			
			226.6 feet: intensely weathered; moderately hard; very intensely fractured; with Lean CLAY (CL) fracture infill		C114					4.44			
655					C115			25	0	2.94			
	230		229.4 feet: decomposed; (CLAYEY GRAVEL with SAND (GC); gray; wet; mostly GRAVEL; some fines; some SAND) 230.0 feet: fine-grained; dark gray; slightly weathered; hard; intensely fractured; local Lean CLAY (CL) fracture infill 230.5 feet: moderately fractured 231.8 feet: intensely fractured		C116			100	0	5.20			
650					C117			95	0	3.45			F: (232.6'), 70°, slightly open, very thin, clay, moderately soft, moderately healed, moderately rough
	235												

(continued)

KLEINFELDER
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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-015**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-30-21**	**8 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	235		SEDIMENTARY ROCK (SANDSTONE) 235.4 feet: moderately weathered; very intensely fractured		C118			88	0	3.89			
			236.4 feet: intensely weathered; 1" ARGILLITE clast										
645			237.5 feet: decomposed; very soft; (CLAYEY SAND (SC); dark gray; moist; mostly fine to medium sand; some fines); trace calcite veining 238.0 feet: fresh; very hard; slightly fractured; calcite veining		C119			83	34	3.45			
	240		SEDIMENTARY ROCK (ARGILLITE); very dark gray to black; decomposed; very soft; very intensely fractured; (Lean CLAY with SAND (CL); very dark gray; moist to wet; mostly high plasticity fines; little SAND); pervasively sheared (FRANCISCAN COMPLEX: BROKEN FORMATION)		C120			100	0	7.00			
					C121					10.00			
			240.3 feet: moderately weathered; local SANDSTONE clasts 241.0 feet: rig chatter		C122			96	0	3.85			
640			SEDIMENTARY ROCK (SANDSTONE) Fine-grained; dark gray; moderately weathered; moderately hard; very intensely fractured; (FRANCISCAN COMPLEX: BROKEN FORMATION)		C123			90	0	3.08			
	245		243.0 feet: ARGILLITE clast in SANDSTONE matrix; soft 243.6 feet: slightly weathered 244.5 feet: moderately weathered		C124			100	0	8.00			
			246.0 feet: moderately fractured 246.6 feet: ARGILLITE clast		C125			83	43	4.07			F: (246.2'), 50°, moderately open, moderately thin, calcite, slightly weathered, moderately hard, not healed, rough
			247.4 feet: very intensely fractured; 6"sheared ARGILLITE clast		C126			100	0	37.50			
635			249.0 feet: very intensely fractured		C127			35	0	2.11			F: (246.8'), 15°, moderately open, moderately thin, clay, moderately soft, not healed, smooth
	250		249.8 feet: some Lean CLAY (CL) fracture infill		C128			68	0	6.36			
					C129					10.00			
			251.8 feet: 2" ARGILLITE interbed; black to dark gray; slightly weathered; moderately soft		C130			70	0	2.80			
630			253.6 feet: decomposed; breaks down to: (Clayey SAND with GRAVEL (SC); mostly sand; some fines; some GRAVEL)										
	255		SEDIMENTARY ROCK (ARGILLITE); black to dark gray; slightly to moderately weathered; moderately soft; intensely to very intensely fractured; pervasively sheared (FRANCISCAN COMPLEX: BROKEN FORMATION)		C131			75	0	3.33			
					C132			69	0	4.17			
625			258.0 feet: drilling resistance		C133			100	0	110.00			
			SEDIMENTARY ROCK (SANDSTONE); fine-grained; dark gray; slightly weathered; hard; intensely fractured		C134			30	0	0.00			
	260		SEDIMENTARY ROCK (ARGILLITE); dark gray to light gray; moderately weathered; soft; very intensely fractured; calcite veining (FRANCISCAN COMPLEX: BROKEN FORMATION)		C135					11.79			
			261.6 feet: black		C136			58	0	10.00			
620			FAILURE ZONE Sheared to: (Fat CLAY with SAND and GRAVEL (CH); very dark gray; moist; mostly clay; little SAND; little GRAVEL); highly sheared fractures; slickened surfaces; distorted calcite pockets; trace SANDSTONE and ARGILLITE fragments up to 2"		C137			100	0	2.63			
	265												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-015**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-30-21**	**9 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	265		FAILURE ZONE 265.2 feet: light gray; calcite blebs		C137			100	0				
			266.2 feet: ARGILLITE clasts; intensely weathered to decomposed					100	0	2.40			
615					C138								
	270		SEDIMENTARY ROCK (SANDSTONE) Fine-grained; gray; intensely weathered; moderately hard; very intensely fractured; calcite veining (FRANCISCAN COMPLEX: BROKEN FORMATION)					46	0	4.47			
610			272.8 feet: Lean CLAY (CL) fracture infill		C139								
	275							83	8	3.17			
					C140								
			277.6 feet: 6" SANDSTONE clast										
605			278.5 to 279.1 feet: decomposed: (CLAYEY SAND with GRAVEL (SC); very dark gray; moist to wet; mostly SAND; some fines; little GRAVEL)										
	280		279.2 feet: 1" ARGILLITE clast 279.4 feet: moderately hard; moderately fractured 280.2 feet: 3" ARGILLITE clasts 280.4 feet: slightly weathered; intensely fractured		C141			99	20	7.62			F: (279.2'), 70°, slightly open, very thin, calcite, moderately weathered, moderately hard, not healed, moderately rough
			281.2 feet: moderately weathered		C142			90	0	4.81			F: (279.8'), 15°, slightly open, very thin, calcite, moderately weathered, moderately hard, not healed, moderately rough F: (280.2'), 60°, slightly open, very thin, clay, moderately soft, moderately healed, moderately rough
600													
			283.8 to 293.3 feet: 5" ARGILLITE clast; black; decomposed; soft; pervasively sheared		C143			83	0	4.12			
	285		285.2 feet: intensely weathered; moderately hard										
			286.0 feet: moderately fractured; trace ARGILLITE clasts		C144			89	13	4.69			F: (285.8'), 80°, tight, clean, not healed, moderately rough F: (286.2'), 20°, slightly open, very thin, calcite, moderately weathered, moderately hard, not healed, moderately rough
595			SEDIMENTARY ROCK (ARGILLITE) Black to very dark gray; moderately weathered; moderately soft to soft; very intensely to intensely fractured; (FRANCISCAN COMPLEX: BROKEN FORMATION)										
	290		288.6 feet: 2" SANDSTONE clasts 289.0 feet: 3" SANDSTONE clast; fine grained; slightly weathered; hard; sheared contact		C145			93	19	7.22			F: (286.8'), 80°, slightly open, very thin, calcite, moderately weathered, moderately hard, not healed, moderately rough
			290.8 feet: decomposed; sheared to: (Lean CLAY with SAND (CL); very dark gray; moist; mostly fines; some SAND; trace GRAVEL)					100	0	4.00			F: (287.4'), 25°, slightly open, very thin, clay, moderately weathered, moderately soft, not healed, moderately rough
					C146								
590													
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained; gray to dark gray; intensely weathered; soft; very intensely fractured; (FRANCISCAN COMPLEX:										
	295												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-015**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-30-21**	**10 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	295		BROKEN FORMATION) 294.5 feet: moderately weathered; moderately hard SEDIMENTARY ROCK (SANDSTONE) 295.2 feet: slightly weathered; hard; moderately fractured		C147			90	33	5.43			F: (295.2'), 75°, slightly open, very thin, calcite, moderately weathered, moderately hard, not healed, moderately rough F: (295.6'), 65°, slightly open, very thin, calcite, moderately weathered, moderately hard, not healed, moderately rough
585			SEDIMENTARY ROCK (ARGILLITE); black to very dark gray; moderately weathered; moderately soft to soft; very intensely fractured; prominent high angle shear surfaces: 70° (FRANCISCAN COMPLEX: BROKEN FORMATION) 298.2 feet: decomposed: (Lean CLAY with SAND (CL); very dark gray; moist; mostly medium plasticity fines; little SAND)		C148			100	0	9.29			F: (296.4'), 75°, slightly open, very thin, clay, moderately soft, not healed, moderately rough
	300				C149			100	0	1.3			
			301.0 feet: advance HWT casing to full depth (301.0') Bottom of borehole at 301.0 ft bgs										
580	305												
575	310												
570	315												
565	320												
560	325												

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-015**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-30-21**	**11 of 11**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
M.Porter	**11-19-20**	**12-4-20**	**2485154.425 ft / 5983543.472 ft NAD83**	**RC-20-016**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
CRUX Subsurface Inc.				**674.40 ft NAVD88**
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Rotary Core			**Burley 55-1**	**5 in**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4"), HQ Core (2.5")			**Cathead; 140 lbs / 30-inch drop**	
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING	AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
VWP, TDR, Inclinometer; cement-bentonite			**Not Determined**	**Not Determined**	**300.5 ft**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method / Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	0		AGGREGATE BASE; 12" Aggregate base									
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained; massive; red, black, gray, and yellowish brown; intensely weathered; very soft; very intensely fractured; (LANDSLIDE DEPOSIT)		S01	16 18 11	29	66		0.00		
470	5											
			6.8 feet: intensely weathered to decomposed; very soft to soft; (CLAYEY SAND (SC); loose; wet; mostly fine to coarse sand; little medium plasticity fines; trace fine subangular GRAVEL)		S02	4 2 3	5	39		14.00		
465	10		10.2 feet: circulation loss									
					S03	2 2 3	5	39		10.00		
460	15											
			17.3 feet: advance HWT casing to 17.3'; equip HQ core		S04	26 41 23	64			20.00		
			18.2 feet: fine to medium grained; massive; light brownish gray; intensely weathered; moderately soft; very intensely fractured; with CLAYEY SAND (SC) fracture infill		C05			58	0	9.13		
455	20		20.5 feet: intensely fractured		C06			100	0	5.60		
					C07			100	0	5.45		
450	25											

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-016**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**1 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	25		SEDIMENTARY ROCK (SANDSTONE)		C07			100	0				
			26.3 feet: very intensely fractured; advance HWT casing to 26.3'		C08			24	0	5.29			
445	30				C09			55	0	5.79			
			31.8 feet: intensely fractured; chaotic quartz and calcite veining throughout mass, up to 0.1" thick		C10			97	0	11.67			
440	35		34.8 feet: moderately fractured 35.3 feet: intensely fractured 36.0 feet: very intensely fractured 36.4 feet: intensely fractured		C11			100	27	7.94			F: (34.8'), 60°, tight, clean, not healed, slightly rough F: (35.3'), 50°, moderately open, very thin, clay/iron oxide, moderately weathered, moderately hard, not healed, slightly rough
435	40				C12			94	0	7.57			
			41.0 feet: moderately fractured 42.0 feet: intensely fractured		C13			100	31	7.59			
430	45		43.0 feet: very intensely fractured 44.0 feet: intensely fractured 46.4 feet: fine-grained; massive; light brownish gray to gray; moderately weathered; hard; intensely fractured		C14			100	27	6.00			
425	50		49.0 to 51.0 feet: moderately weathered; moderately hard; very intensely fractured; with CLAYEY SAND (SC) fracture infill		C15			100	9	5.33			
			51.0 feet: moderately fractured		C16			100	47	7.60			F: (51.7'), 20°, wide, very thin, clay/magnesium, highly weathered, moderately hard, not healed, slightly rough F: (52.3'), 20°, wide, very thin, clay/manganese, highly weathered, moderately hard, not healed, slightly
420	55		53.4 feet: 0.5" fine SANDSTONE interbed; dark brown; intensely weathered; soft; very intensely fractured										

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-016**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**2 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	55		SEDIMENTARY ROCK (SANDSTONE)		C16			100	47				rough J: (53.4'), 45°, tight, very thin, manganese, highly weathered, moderately hard, not healed, slightly rough
					C17			100	0	5.00			
415	60				C18			100	19	6.05			
410	65		SEDIMENTARY ROCK (SANDSTONE); fine-grained; yellow brown and gray brown; moderately to intensely weathered; moderately soft to moderately hard; mass brecciated and partially rehealed; quartz and calcite veining to 0.1" thick (LANDSLIDE DEPOSIT) 63.0 feet: very intensely fractured		C19			100	12	5.00			
405	70		67.1 feet: intensely fractured 69.1 to 69.3 feet: slightly to moderately weathered; moderately hard; very intensely fractured; with SILTY SAND (SM) fracture infill 69.3 to 69.6 feet: ARGILLITE interbed: dips 20-25°; black; slightly weathered; moderately soft to soft; moderately fractured 70.0 feet: intensely fractured 71.0 feet: very intensely fractured 72.1 feet: moderately weathered; moderately soft; intensely fractured		C20			100	27	4.80			F: (69.3'), 25°, tight, very thin, clay, not healed, smooth F: (69.9'), 25°, tight, very thin, clay, not healed, smooth
					C21			100	0	8.89			
400	75		73.0 feet: intensely weathered; moderately fractured 73.6 feet: intensely fractured 74.2 feet: fresh surface; friable SEDIMENTARY ROCK (SANDSTONE); fine to medium grained; very thinly bedded; dark gray to black; decomposed to intensely slightly weathered; very intensely fractured; locally sheared to: (CLAYEY SAND (SC), loose to medium dense; wet; mostly fine to coarse sand; little medium plasticity fines); abundant ARGILLITE clasts up to 0.1"; within mass, abundant polished shears (LANDSLIDE FAILURE ZONE/ LANDSLIDE DEPOSIT) 77.8 feet: intensely fractured		C22			96	12	6.20			
395	80		SEDIMENTARY ROCK (SANDSTONE); fine-grained; massive; gray and yellow brown; slightly weathered; moderately hard; very intensely fractured; chaotic quartz and calcite veining to 0.1" thick (LANDSLIDE DEPOSIT)		C23			97	0	4.58			
			81.8 feet: chaotic calcite veins		C24			83	16	6.54			
390	85		LANDSLIDE FAILURE ZONE SANDSTONE and ARGILLITE sheared to: (Clayey SAND (SC); loose; dark gray; wet; mostly fine to coarse sand; little medium plasticity fines; trace subangular fine to		C25			37	0	5.20			

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-016**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**3 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	85		coarse gravel (SANDSTONE rock fragments)) 83.7 feet: 2" soft Fat CLAY (CH) seam: dips 35-40° LANDSLIDE FAILURE ZONE		C25			37	0				
					C26			83	0	4.00			
385	90		SEDIMENTARY ROCK (SANDSTONE); fine-grained; massive; gray; slightly weathered; moderately hard; intensely fractured; chaotic quartz and calcite veining 91.6 to 92.0 feet: moderately weathered; very intensely fractured; with CLAYEY SAND (SC) fracture infill 92.4 to 93.4 feet: abundant chaotic calcite veining to 0.3" thick		C27			100	0	6.32			
					C28			100	0	9.29			
380	95		93.5 feet: 1" thick sheared ARGILLITE seam: dips 5°; decomposed; very soft 93.8 feet: slightly weathered; moderately hard; intensely fractured 94.8 feet: moderately fractured 96.0 feet: intensely fractured 97.1 to 97.9 feet: ARGILLITE interbed: dips 60° (top), 5°(bottom); moderately bedded; slightly weathered; soft; very intensely fractured 97.9 feet: slightly weathered; moderately hard to hard; intensely fractured		C29			100	26	3.33			F: (96.1'), 30°, slightly open, thin, calcite, slightly weathered, moderately hard, not healed, slightly rough F: (96.7'), 70°, moderately open, thin, clay, slightly weathered, very soft, not healed, slightly rough
375	100				C30			73	0	2.00			
			LANDSLIDE FAILURE ZONE: SANDSTONE sheared to: (Clayey GRAVEL with SAND (GC); loose; gray to light olive gravel (SANDSTONE fragments); little fine to coarse sand; little medium plasticity fines); chaotic; generally clast supported 101.0 feet: rig chatter		C31			86	0	3.20			
370	105		SEDIMENTARY ROCK (SANDSTONE) Fine to medium grained; massive; gray to dark gray; slightly weathered; moderately hard; very intensely fractured; chaotic quartz and calcite veining (LANDSLIDE DEPOSIT) 105.0 to 110.2 feet: minimal recovery; dominantly blocks less than 1" diameter		C32			83	0	3.20			
					C33			56	0	2.00			
365	110		108 feet: circulation loss		C34			83	0	3.00			
			110.2 feet: 4" calcite bleb 111.1 feet: ARGILLITE interbed: dips 35°; moderately weathered; moderately soft; intensely fractured 111.3 feet: slightly weathered; moderately hard to hard		C35			97	0	9.17			
360	115				C36			96	0	5.16			

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-016**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**4 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	115		SEDIMENTARY ROCK (SANDSTONE)										
			116.0 feet: moderately fractured					100	32	7.20			F: (115.8'), 5°, wide, very thin, clay/iron oxide, intensely weathered, soft, not healed, slightly rough
			116.8 to 118.0 feet: intensely weathered; moderately soft to very soft; very intensely fractured; brecciated with SANDY Lean CLAY (CL) infill		C37								F: (116.6'), 30°, slightly open, moderately thin, clay, slightly weathered, very soft, not healed, slightly rough
			118.0 feet: slightly weathered; moderately hard; intensely fractured					100	0	3.75			
355	120		119.7 feet: hard; moderately fractured										
			120.5 feet: intensely fractured		C38								J: (120.5'), 80°, slightly open, moderately thin, clay, soft, not healed, slightly rough
								100	67	5.40			
			123.5 to 123.8 feet: convolute ARGILLITE bed remnants up to 0.5" thick; slightly weathered; moderately hard; moderately fractured										F: (123.5'), 5°, moderately open, very thin, clay, soft, not healed, slightly rough
350	125		124.3 feet: intensely fractured										F: (123.8'), 5°, moderately open, very thin, clay, soft, not healed, slightly rough
					C39								F: (124.3'), 60°, moderately open, very thin, clay/iron oxide, soft, not healed, slightly rough
			126.0 feet: moderately fractured										F: (124.7'), 50°, moderately open, very thin, clay/iron oxide, soft, not healed, slightly rough
			127.0 feet: intensely fractured										F: (125.3'), 5°, moderately open, very thin, clay, soft, not healed, slightly rough
			127.3 to 128.2 feet: convolute ARGILLITE interbeds and bed remnants up to 0.5" thick; slightly weathered; moderately hard					89	31	6.30			F: (125.8'), 30°, moderately open, very thin, clay, soft, not healed, slightly rough
			128.8 to 130.5 feet: convolute ARGILLITE interbeds and bed remnants up to 0.5" thick; slightly weathered; moderately hard		C40								F: (126.2'), 80°, moderately open, very thin, clay, soft, not healed, slightly rough
345	130		129.9-130.5 feet: ARGILLITE interbeds and bed remnants to 0.2" thick: 15°; slightly weathered; moderately hard; mass parts readily on bedding planes										F: (126.5'), 50°, moderately open, very thin, clay, soft, not healed, slightly rough
			131.0 feet: moderately fractured					100	73	6.80			F: (127.2'), 20°, moderately open, very thin, clay, soft, not healed, slightly rough
			131.4 feet: 2" convolute ARGILLITE bed remnants; slightly weathered; moderately hard		C41								F: (127.7'), 10°, moderately open, very thin, clay, soft, not healed, slightly rough
			133.2 to 133.8 feet: abundant ARGILLITE clasts up to 0.1"					100	0	4.19			F: (131.3'), 5°, slightly open, thin, clay, soft, not healed, slightly rough
			133.8 to 135.0 feet: light gray; moderately weathered; moderately soft to moderately hard; very intensely fractured; with CLAYEY SAND (SC) fracture infill										F: (131.4'), 35°, tight, thin, clay, soft, moderately healed
340	135		SEDIMENTARY ROCK (SANDSTONE); fine-grained; massive; light olive gray; decomposed; very soft; very intensely fractured; (CLAYEY GRAVEL with SAND (GC); loose; wet; mostly fine subangular gravel (SANDSTONE fragments); little medium plasticity fines; little fine to coarse sand); mass maintains semi-coherent structure (LANDSLIDE DEPOSIT)		C42								F: (131.6'), 35°, moderately open, thin, clay, soft, not healed, slightly rough
					C43			95	0	0.00			F: (131.9'), 80°, moderately open, thin, clay, soft, not healed, moderately rough
								100	0	0.00			F: (132.4'), 30°, moderately open, thin, clay, soft, not healed, moderately rough
			LANDSLIDE FAILURE ZONE: SANDSTONE sheared to:(SANDY lean CLAY with GRAVEL (CL), stiff, olive gray, moist, mostly fines, some fine grained SAND, little fine subangular GRAVEL)										F: (132.9'), 60°, moderately open, thin, clay, soft, not healed, moderately rough
335	140		SEDIMENTARY ROCK (SANDSTONE) Fine-grained; massive; light bluish gray; moderately weathered; moderately soft to moderately hard; very intensely fractured; localized zones have been brecciated, partially rehealed; chaotic quartz and calcite veining to 0.1" (LANDSLIDE DEPOSIT)		C44								
			140.2 feet: intensely fractured					100	33	0.00			
330	145				C45								

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BORING RECORD				**RC-20-016**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**5 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	145		SEDIMENTARY ROCK (SANDSTONE) 145.2 feet: very intensely fractured 146.1 feet: intensely fractured 147.0 feet: intensely weathered; soft 147.2 feet: very intensely fractured		C45			100	33				
			148.0 feet: moderately weathered; moderately soft					100	22	0.00			
325	150		151.0 feet: intensely weathered; soft to moderately soft		C46								
			SEDIMENTARY ROCK (SANDSTONE); fine-grained; massive; olive gray; decomposed; soft; very intensely fractured; with CLAYEY SAND (SC) infill: (CLAYEY GRAVEL with SAND (GC)); loose; wet; mostly fine subangular gravel (SANDSTONE fragments); little medium plasticity fines; little fine to coarse sand; (LANDSLIDE DEPOSIT) 154.6 feet: 3" ARGILLITE interbed: dips 10°; decomposed; soft					100	0	0.00			
320	155				C47								
					C48			100	0	0.00			
			158.0 feet: intensely fractured to very intensely fractured 158.5 feet: 2" ARGILLITE interbed; decomposed; soft					100	45	0.00			
315	160		160.0 feet: 1" ARGILLITE interbed remnant; decomposed; soft SEDIMENTARY ROCK (SANDSTONE); fine to medium grained; massive; gray to light gray; slightly weathered; moderately hard; moderately fractured; chaotic quartz and calcite veining (LANDSLIDE DEPOSIT)		C49								F: (160.9'), 75°, slightly open, very thin, calcite, moderately weathered, moderately hard, partly healed, slightly rough
			162.7 to 163.1 feet: mass has been brecciated and rehealed; chaotic ARGILLITE interbed remnants to 0.3"; slightly weathered; moderately hard					100	22	0.00			F: (163.4'), 20°, slightly open, clean, not healed, slightly rough
310	165		163.1 to 164.0 feet: ARGILLITE interbed: dips 25°; intensely weathered; soft; very intensely fractured 163.4 feet: moderately fractured 164.0 feet: intensely fractured to very intensely fractured 165.1 to 166.0 feet: ARGILLITE interbed: dips 20°; decomposed; very soft; pervasively sheared to: (SANDY lean CLAY (CL); soft; black; moist to wet; mostly fines; little fine to coarse sand; trace fine subangular gravel) 166.0 feet: slightly weathered; moderately hard; intensely fractured		C50								
								100	17	0.00			
305	170				C51								
			LANDSLIDE FAILURE ZONE SANDSTONE and ARGILLITE sheared to: (CLAYEY GRAVEL with SAND (GC); loose; dark gray, gray, and whitish gray; wet; mostly fine to coarse subangular gravel; little medium plasticity fines; little fine to coarse sand);					100	0	0.00			
300	175				C52								

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-016**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**6 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	175		local relic structure (LANDSLIDE FAILURE ZONE)										
			SEDIMENTARY ROCK (SANDSTONE); fine-grained; massive; gray and gray blue; slightly weathered; moderately hard; moderately fractured; chaotic quartz and calcite veining to 0.1" (LANDSLIDE DEPOSIT) 176.3 feet: intensely fractured		C53			100	43	0.00			F: (175.6'), 70°, slightly open, very thin, sand/silt, soft, not healed, smooth F: (176.6'), 85°, slightly open, clean, not healed, slightly rough
295	180		178.9 feet: moderately fractured 179.0 feet: 3" ARGILLITE interbed: dips 35°; dark gray; decomposed; very soft 180.7 feet: intensely fractured 181.9 feet: 3" ARGILLITE interbed; slightly weathered; moderately soft; very intensely fractured 182.3 feet: 2" ARGILLITE interbed; decomposed; very soft; very intensely fractured/sheared with CLAYEY SAND (SC) infill 183.3 feet: intensely fractured		C54			100	40	0.00			F: (178.9'), 35°, slightly open, very thin, Argillite, decomposed, very soft, not healed, smooth F: (179.7'), 85°, slightly open, clean, not healed, slightly rough F: (180.7'), 15°, slightly open, clean, not healed, rough
					C55			100	0	5.33			
290	185		185.0 feet: 3" ARGILLITE interbed: 40-60°; slightly weathered; soft; very intensely fractured; mass parts readily on bedding planes 185.2 feet: moderately hard; moderately fractured 186.4 feet: very intensely fractured 186.5 feet: 2" ARGILLITE interbed; slightly weathered; moderately soft; very intensely fractured 186.7 feet: moderately hard; moderately fractured		C56			100	55	6.00			F: (185.2'), 40°, tight, clean, not healed, slightly rough
285	190		187.2 feet: 3" ARGILLITE interbed: 50°; slightly weathered; moderately soft; very intensely fractured; mass parts readily on bedding planes 187.4 feet: moderately hard; intensely fractured 188.1 feet: moderately fractured 190.9 to 191.9 feet: chaotic calcite veining up to 1" thick		C57			100	100	4.88			F: (188.3'), 50°, slightly open, clean, not healed, rough F: (189.0'), 80°, slightly open, clean, not healed, rough F: (189.4'), 50°, slightly open, clean, not healed, rough
			SEDIMENTARY ROCK (SANDSTONE); moderately bedded with very thin interbeds of ARGILLITE; SANDSTONE: fine grained; moderately bedded; light gray to gray; slightly weathered; moderately hard; very intensely fractured; ARGILLITE: very thinly bedded; dark gray to black; slightly weathered; moderately soft; very intensely fractured; chaotic quartz and calcite veining to 0.1" thick (LANDSLIDE DEPOSIT)		C58				0	3.00			
					C59			50	0	5.00			
280	195		195.3 to 195.8 feet: ARGILLITE interbeds sheared to: (CLAYEY GRAVEL with SAND (GC); loose; dark gray; wet; mostly fine subangular gravel; little moderate plasticity fines; little fine to coarse sand) 195.8 feet: slightly weathered; moderately hard		C60			100	0	5.00			
					C61			100	0	1.14			
					C62			100	0	4.44			
275	200		SEDIMENTARY ROCK (ARGILLITE); massive; dark gray to black; decomposed; very soft to soft; very intensely fractured; pervasively sheared to: (CLAYEY SAND with GRAVEL (SM-SC); medium dense; mostly fine to coarse SAND (ARGILLITE fragments); little low to medium plasticity fines; little fine GRAVEL); convolute polished shears throughout (LANDSLIDE DEPOSIT) 200.0 feet: intensely fractured to very intensely fractured		C63			100	0	5.80			
					C64			100	32	5.31			
			SEDIMENTARY ROCK (SANDSTONE) Fine grained; moderately to thinly bedded; light gray, gray, and bluish gray; slightly weathered; moderately hard; intensely fractured; chaotic quartz and calcite veining to 0.1" thick (LANDSLIDE DEPOSIT)		C65			100	50	8.75			
270	205				C66			100	30	5.48			

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-016**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**7 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	205		202.3 to 203.0 feet: convolute ARGILLITE interbeds to 0.75" thick; intensely weathered; soft; very intensely fractured/sheared 203.0 feet: slightly weathered; moderately fractured 203.8 feet: intensely fractured 204.2 feet: moderately fractured SEDIMENTARY ROCK (SANDSTONE)		C66			100	30				F: (204.2'), 80°, slightly open, very thin, clay, very soft, not healed, slightly rough F: (204.5'), 85°, slightly open, very thin, sand/silt, moderately soft, not healed, slightly rough F: (205.0'), 45°, slightly open, very thin, calcite, moderately weathered, moderately soft, partly healed, smooth F: (205.9'), 55°, slightly open, clean, not healed, rough
265					C67				0	5.50			
	210		210.0 feet: slightly weathered; moderately hard; intensely fractured		C68			96	0	4.83			F: (207.4'), 55°, slightly open, clean, not healed, rough
260			213.0 feet: moderately fractured		C69			100	7	4.70			F: (213.0'), 50°, slightly open, clean, clay, not healed, moderately rough F: (213.5'), 60°, slightly open, very thin, sand/silt, soft, not healed, slightly rough F: (214.2'), 70°, slightly open, clean, not healed, moderately rough F: (215.8'), 45°, slightly open, clean, not healed, slightly rough F: (216.8'), 55°, slightly open, very thin, silt, soft, not healed, slightly rough
	215												
			217.8 feet: 2" ARGILLITE interbed: dips 10°; slightly weathered; moderately soft 218.2 feet: light gray and whitish gray; slightly to moderately weathered; moderately soft to moderately hard; intensely fractured		C70				0	4.00			
255	220												
			224.0 feet: slightly weathered; moderately hard; intensely fractured		C71			100	42	4.00			
250	225												
			BRECCIATED ZONE: ARGILLITE and SANDSTONE brecciated and generally rehealed; gray, dark gray, and grayish white; moderately weathered; soft to moderately hard; very intensely fractured with local SANDY CLAY (SC) infill; abundant chaotic calcite veining throughout unit (LANDSLIDE DEPOSIT)		C72			100	13	5.60			
245	230												
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained; thinly bedded; light gray to gray; slightly weathered; moderately hard; intensely fractured; chaotic quartz and calcite veining to 0.1" thick 232.2 feet: moderately fractured 233.4 feet: 11" ARGILLITE interbed: dips 30°; slightly weathered; moderately soft; very intensely fractured 234.3 feet: slightly weathered; moderately hard		C73			100	37	4.40			F: (233'), 55°, slightly open
240	235												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-016**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**8 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	235		SEDIMENTARY ROCK (SANDSTONE)					100	37				
			236.0 feet: moderately fractured		C73								F: (236.0'), 55°, slightly open, clean, not healed, slightly rough F: (236.4'), 40°, slightly open, clean, not healed, slightly rough
			238.0 feet: intensely fractured					100	7	4.40			F: (236.7'), 45°, slightly open, very thin, silt, very soft, not healed, slightly rough F: (238.0'), 50°, slightly open, very thin, silt, very soft, not healed, smooth
235	240				C74								
			240.1 feet: 1" calcite vein fragment										
			243.0 feet: ~7,000 gallons water used between 192.0' and 243.0'; no circulation return					100	0	5.25			
			243.6 to 243.8 feet: convolute ARGILLITE bed remnants to 0.5" thick; slightly weathered; moderately hard		C75								
230	245		245.0 feet: intensely fractured					100	53	4.00			
			245.5 to 250.5 feet: abundant chaotic quartz and calcite veining, vein fragments to 0.2" thick		C76								
								100	17	4.00			
225	250		249.4 feet: moderately fractured		C77								
			250.0 feet: intensely fractured										
			250.6 feet: 2" sheared ARGILLITE interbed: dips 30°; slightly weathered; soft										
			SEDIMENTARY ROCK (SANDSTONE); very thinly bedded with very thin interbeds of (ARGILLITE); SANDSTONE: fine grained; very thinly bedded; gray to dark gray; slightly weathered; moderately hard; intensely fractured; ARGILLITE: very thinly bedded; dark gray; slightly weathered; moderately soft to moderately hard; very intensely fractured; chaotic quartz and calcite veining, mass parts readily on ARGILLITE interbeds (LANDSLIDE DEPOSIT)		C78			100	0	5.50			
								100	0	4.85			
220	255				C79								
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained; massive; gray and bluish gray; slightly weathered; moderately hard; intensely fractured; chaotic quartz and calcite veining to 0.1" thick (LANDSLIDE DEPOSIT)					98	0	4.12			
			255.0 feet: very intensely fractured		C80								
								100	13	1.56			
215	260		259.5 feet: slightly weathered; hard; intensely fractured		C81								
			261.2 feet: ~2,500 gallons water used between 243.0' and 261.2'		C82			100	0	22.50			
					C83			100	0	5.00			
								100	15	3.20			
210	265				C84								

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-016**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**9 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	265		SEDIMENTARY ROCK (SANDSTONE)		C84			100	15				
			268.0 feet: slightly weathered; moderately hard; very intensely fractured; with SILTY SAND (SM) fracture infill		C85			100	0	3.20			
205	270				C86			100	0	3.20			
					C87			101	0	3.93			
200	275		274.7 feet: intensely fractured										
			275.8 to 276.2 feet: LANDSLIDE FAILURE ZONE: SANDSTONE sheared to: (SILTY GRAVEL (GM); medium dense; gray; mostly fine to coarse angular GRAVEL; some low plasticity fines)		C88			100	0	5.56			
			276.7 feet: intensely fractured		C89			100	25	3.85			
			278.0 feet: very intensely fractured					90	0	4.80			
195	280				C90								
			280.8 feet: 10" ARGILLITE interbed; contact diffuse; dark gray; slightly weathered; moderately soft to soft; very intensely fractured locally to coarse sand 281.6 feet: moderately hard; intensely fractured										
			SEDIMENTARY ROCK (SANDSTONE); very thinly bedded with very thin interbed remnants of ARGILLITE; SANDSTONE: fine grained; very thinly bedded; gray; slightly weathered; moderately hard; very intensely fractured; ARGILLITE: very thinly bedded; dark gray to black; slightly weathered; soft; very intensely fractured		C91			100	0	4.88			
190	285		LANDSLIDE FAILURE ZONE: SANDSTONE and ARGILLITE sheared to: (CLAYEY SAND with GRAVEL (SC); loose; dark gray to black; wet; mostly fine to coarse sand; little moderate plasticity fines; little subangular fine to coarse gravel)		C92			100	0	2.22			
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained; massive; gray to dark gray; slightly weathered; moderately hard; very intensely fractured; chaotic quartz and calcite veining to 0.2" thick (FRANCISCAN COMPLEX: BROKEN FORMATION)		C93			100	0	4.40			
185	290		288.4 feet: 2" ARGILLITE interbed: 25°; black; slightly weathered; moderately soft to soft; very intensely fractured 288.6 feet: moderately hard; intensely fractured 290.5 feet: very intensely fractured; with local SILTY to CLAYEY SAND (SM/SC) fracture infill		C94			100	0	3.20			
			293.0 feet: intensely fractured		C95			100	22	4.00			
180	295												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-016**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**10 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	295		SEDIMENTARY ROCK (SANDSTONE) 295.2 feet: 1" convolute ARGILLITE bed remnant: dips 60°; slightly weathered; moderately hard 295.7 feet: moderately weathered; soft to moderately soft 296.6 feet: slightly weathered; moderately hard		C95			100	22				
			298.4 feet: moderately fractured		C96			100	43	4.80			
175	300		299.4 feet: intensely fractured										
			300.5 feet: ~3,600 gallons water used between 273.0' and 300.5'; advance HWT casing to full depth (300.5') Bottom of borehole at 300.5 ft bgs										
170	305												
165	310												
160	315												
155	320												
150	325												

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REPORT TITLE **BORING RECORD**				HOLE ID **RC-20-016**
DIST. **01**	COUNTY **Del Norte**	ROUTE **101**	POSTMILE **12-15.5**	EA **0115000099**
PROJECT OR BRIDGE NAME **Last Chance Grade Bypass**				
BRIDGE NUMBER **--**	PREPARED BY **D. Ross**		DATE **4-22-21**	SHEET **11 of 11**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
D. Sullivan/C. Tipp	12-1-20	12-6-20	2488343.080 ft / 5983459.356 ft NAD83	RC-20-017
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
CRUX Subsurface, Inc.				829.36 ft NAVD88
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Rotary Core			Burley 6000	4.5 in
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4"), HQ Core (2.5")			Cathead; 140 lbs / 30-inch drop	
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING	AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
VWP, TDR, Inclinometer; cement-bentonite			Not Determined	Not Determined	300.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method / Casing Depth	Discontinuity Description: Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	0		SILTY SAND with GRAVEL (SM); dark brownish gray; moist; trace to few organics (FILL)									
			CLAYEY GRAVEL with SAND (GC); medium dense; dark brownish gray; moist; mostly fine to coarse subangular GRAVEL; little coarse to fine SAND; little fines; low plasticity; (FILL)									
825	5		4.5 feet: circulation loss 5.0 feet: advance HWT casing to 5.0'		S01	7 9 8	17	33				
820	10				S02	4 5 6	11	6				
			Poorly-graded GRAVEL with CLAY AND SAND (GP-GC); dense; dark gray and light gray; moist to wet; mostly angular GRAVEL; little SAND; few fines; low plasticity; (LANDSLIDE DEPOSIT)									
815	15				S03	18 14 14	28	44				
810	20				S04	23 24 11	35	44				
805	25		24.5 feet: increased GRAVEL content				32	39				

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				RC-20-017
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	Del Norte	101	12-15.5	0115000099
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	D. Ross		6-4-21	1 of 11

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	25		SEDIMENTARY ROCK (SANDSTONE); fine- to medium-grained sand; massive; dark gray and light gray; slightly weathered; moderately hard; intensely to very intensely fractured; occasional calcite veining (LANDSLIDE DEPOSIT)		S05 S05	23 20 12	32	39					
800	30				S06		50/1	NR					
			31.0 feet: advance casing to 31.0'; equip HQ core		C07			88	0	0.00			
795	35		SEDIMENTARY ROCK (ARGILLITE); massive; very dark gray; decomposed; very soft; very intensely fractured; pervasively sheared to (SANDY lean CLAY (CL); medium stiff; moist; some fine to coarse SAND; trace fine gravel (LANDSLIDE DEPOSIT) 36.7 to 37.2 feet: SANDSTONE interbed: dips 50°		C08			61	0	2.60			
790	40		SEDIMENTARY ROCK (SANDSTONE); fine-grained sand; massive; dark gray; decomposed; moderately soft; very intensely fractured; pervasively sheared to (Poorly-graded GRAVEL with SAND (GP); mostly GRAVEL; little SAND; trace fines (LANDSLIDE DEPOSIT)		C09			61	0	2.62			
785	45		SEDIMENTARY ROCK (ARGILLITE); massive; very dark gray; decomposed; soft; very intensely fractured; (SANDY lean CLAY with GRAVEL (CL); medium stiff; moist; little SAND; little GRAVEL (LANDSLIDE DEPOSIT) SEDIMENTARY ROCK (SANDSTONE); fine-grained sand; massive; dark gray; decomposed; moderately hard; very intensely fractured; pervasively sheared to (Poorly-graded GRAVEL with SAND (GP)); mostly GRAVEL; little SAND; trace fines (LANDSLIDE DEPOSIT) 43.9 to 44.8 feet: ARGILLITE interbed; soft		C10			90	0	3.00			
780	50		47.0 feet: soft SEDIMENTARY ROCK (ARGILLITE); massive; very dark gray; decomposed; very soft; intensely fractured; pervasively sheared to (SANDY Lean CLAY with GRAVEL (CL); medium stiff; moist; little SAND; little GRAVEL (LANDSLIDE DEPOSIT) 50.0 feet: advance HWT casing to 50.0' 53.3 to 53.6 feet: SANDSTONE interbed; moderately hard		C11			71	0	1.80			
					C12			70	0	0.00			
775	55		SEDIMENTARY ROCK (SANDSTONE) Fine-grained sand; massive; dark gray; slightly weathered; moderately hard; very intensely fractured; clay		C13			65	0	3.04			

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-017**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**2 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	55		infill; scattered chaotic calcite veining (LANDSLIDE DEPOSIT) SEDIMENTARY ROCK (SANDSTONE)		C13			65	0				
								83	0	2.80			
770			SEDIMENTARY ROCK (ARGILLITE); massive; very dark gray; decomposed; soft; very intensely fractured; calcite veining; pervasively sheared to (SANDY lean CLAY with GRAVEL (CL)); stiff; moist; little SAND; little angular fine to coarse GRAVEL (LANDSLIDE DEPOSIT)		C14							
	60		61.1 to 61.4 feet: SANDSTONE interbed: slightly weathered; moderately hard; very intensely fractured					100	0	5.00			
765			63.9 to 64.7 feet: SANDSTONE interbed: slightly weathered; moderately hard; very intensely fractured		C15								
	65		65.3 to 67.0 feet: ARGILLITE bed: decomposed to intensely weathered; soft; very intensely fractured		C16			90	0	4.05			
760								68	0	2.42			
	70				C17								
					C18			100	0	8.89			
								85	0	3.16			
755	75		73.0 to 73.6 feet: SANDSTONE interbed: slightly weathered; moderately hard; very intensely fractured		C19								
			75.5 to 76.0 feet: calcite veining					96	0	2.12			
			77.7 to 78.3 feet: SANDSTONE interbed: slightly weathered; moderately hard; intensely fractured; planar calcite veining		C20								
750	80		78.5 to 79.3 feet: SANDSTONE interbed: fresh; moderately hard; intensely fractured 79.3 feet: intensely weathered		C21			95	0	4.29			
			80.6 to 81.0 feet: high angle, planar calcite veining SEDIMENTARY ROCK (SANDSTONE) Very dark gray and dark gray; fresh; hard; intensely fractured; planar calcite veining (FRANCISCAN COMPLEX: BROKEN FORMATION)					93	0	3.27			
745	85				C22								

(continued)

KLEINFELDER
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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-017**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**3 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	85		SEDIMENTARY ROCK (SANDSTONE)		C22			93	0				
			86.6 to 87.4: very intensely fractured zone with planar calcite veining		C23			91	10	4.60			
740	90												
			92.0 to 93.0 feet: ARGILLITE interbeds: laminated to thinly bedded; decomposed; soft: dips 30° to 50°		C24			95	0	8.00			
735	95				C25			100	17	11.05			
					C26			100	20	5.11			
730	100		99.0 to 99.7 feet: very intensely fractured zone with chaotic calcite veining 100.8 to 101.5 feet: planar calcite veining, locally healed										
			SEDIMENTARY ROCK (ARGILLITE); laminated to thinly bedded with laminated to thin interbeds of SANDSTONE. ARGILLITE; thinly bedded; very dark gray; decomposed to intensely weathered; soft to moderately soft; very intensely fractured; locally sheared to: (SANDY lean CLAY (CL); stiff; moist; little SAND; trace GRAVEL); SANDSTONE: fine grained; dark gray slightly weathered; moderately hard; very intensely fractured; chaotic calcite veining (FRANCISCAN COMPLEX: BROKEN FORMATION)		C27			93	0	12.00			
725	105				C28			100	0	3.78			
720	110				C29			100	0	4.23			
					C30			100	0	3.65			
715	115		SEDIMENTARY ROCK (SANDSTONE) Moderately bedded with from very thin to thin interbeds of ARGILLITE. SANDSTONE; fine-grained sand; dark gray; slightly weathered; moderately hard; intensely to very intensely fractured; chaotic and planar calcite veining;										

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-017**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**4 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	115		SEDIMENTARY ROCK (SANDSTONE)		C30			100	0				
			116.8 to 117.4 feet: ARGILLITE interbed: decomposed; soft; very intensely fractured		C31			100	0	3.42			
710			118.9 to 119.1 feet: ARGILLITE interbed: decomposed; soft; very intensely fractured										
	120				C32			92	0	12.63			
			121.3 to 121.4 feet: ARGILLITE interbed: intensely weathered; moderately soft; very intensely fractured 122.0 to 122.3 feet: ARGILLITE interbeds: decomposed; soft; very intensely fractured 122.6 to 122.8 feet: ARGILLITE interbeds: decomposed; soft; very intensely fractured 123.2 to 123.7 feet: moderately fractured		C33			100	10	4.33			F: (123.6'), 35°, open, clean, not healed, moderately rough
705													
	125				C34			100	10	4.00			
			127.4 to 128.3 feet: moderately weathered; moderately hard; moderately fractured										F: (127.4'), 65°, open, clean, not healed, moderately rough
700			128.5 to 129.5 feet: SANDSTONE interbed: soft; very intensely fractured; pervasively sheared		C35			100	0	6.15			F: (127.9'), 30°, slightly open, clean, not healed, moderately rough
	130		129.9 feet: 0.25" ARGILLITE interbed: decomposed; soft; very intensely fractured										F: (128.3'), 45°, open, clean, not healed, moderately rough
			SEDIMENTARY ROCK (SANDSTONE); fine-grained sand; massive; gray; slightly weathered; moderately hard; very intensely to moderately fractured; randomly oriented healed conjugate fractures 0.1 to 0.4" width, planar calcite infill (FRANCISCAN COMPLEX: BROKEN FORMATION)		C36			100	15	3.33			F: (132.2'), 45°, open, moderately thin, calcite, moderately weathered, moderately soft, partly healed, slightly rough
695													
	135		134.4 to 135.2 feet: SANDSTONE bed: dips 60° top, 20°bottom: decomposed; very intensely fractured; clay infill										
			SEDIMENTARY ROCK (ARGILLITE); laminated to thinly bedded with laminated to very thin interbeds of SANDSTONE. ARGILLITE; very dark gray; decomposed to moderately weathered; moderately soft to moderately hard; intensely to very intensely fractured; SANDSTONE: fine grained; gray; moderately weathered; moderately hard; very intensely fractured; quartz and calcite veining (FRANCISCAN COMPLEX: BROKEN FORMATION)		C37			100	0	6.19			
690					C38			100	18.3	4.67			
	140		SEDIMENTARY ROCK (ARGILLITE) Very dark gray; decomposed to moderately weathered; moderately soft to moderately hard; very intensely to intensely fractured; chaotic calcite veining (FRANCISCAN COMPLEX: BROKEN FORMATION)		C39			68	0	8.41			
			143.2 feet: moderately weathered; moderately hard; intensely fractured		C40			59	0	5.00			
685													
	145							75	0	10.00			

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-017**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**5 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	145		SEDIMENTARY ROCK (ARGILLITE) 145.0 feet: decomposed to intensely weathered; soft to moderately soft; very intensely fractured 145.9 to 146.0 feet: 1.5" ARGILLITE bed: decomposed; soft; very intensely fractured; pervasively sheared to (SANDY lean CLAY (CL); stiff; moist; little SAND)		C41								
					C42			100	30	7.62			
			146.0 feet: moderately weathered; moderately hard; moderately fractured 146.3 to 147.0 feet: SANDSTONE interbed: gray; moderately weathered; moderately hard; moderately fractured; planar calcite veining: dips 45° to 75°, 0.1" thick		C43			100	13	6.14			
680	150		SEDIMENTARY ROCK (SANDSTONE); fine-grained sand; thickly bedded; gray; moderately weathered; moderately hard; intensely to moderately fractured; planar calcite veining, 0.1" thick (FRANCISCAN COMPLEX: BROKEN FORMATION)										
			SEDIMENTARY ROCK (ARGILLITE) Massive; dark gray; decomposed to intensely weathered; soft to moderately soft; very intensely to intensely fractured; locally pervasively sheared to (SANDY lean CLAY with GRAVEL (CL); stiff; moist; little SAND; little GRAVEL) (FRANCISCAN COMPLEX: BROKEN FORMATION)		C44			97	0	5.13			
675	155				C45			86	0	5.45			
670	160		159.8 feet: calcite veining: dips 35°, 0.5" thick		C46			100		12.50			
			160.4 feet: calcite veining, totally healed, tight, dips 25° to 65°, 0.13 to 0.5" thick 160.6 feet: intensely to moderately weathered; moderately soft to moderately hard		C47			78	0	2.56			
665	165		164.2 feet: moderately weathered; moderately hard; increasing chaotic calcite veining 164.5 feet: moderately fractured		C48			98	42	4.23			
660	170		169.7 to 170.0 feet: ARGILLITE interbed: decomposed; soft to moderately soft; very intensely fractured; 2" bed pervasively sheared to (SANDY lean CLAY with GRAVEL (CL); stiff; moist; little SAND; little GRAVEL); 1" calcite vein: 15°		C49			100	56	3.67			
655	175		174.4 feet: 2" ARGILLITE bed: decomposed; soft; very		C50			100	23	2.55			F: (173.0'), 45°, slightly open, clean, not healed, moderately rough F: (173.5'), 40°, slightly open, clean, not healed, moderately rough

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-017**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**6 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	175		intensely fractured 174.7 feet: slickensides: dips 20° to 25°, parallel to fracture surfaces SEDIMENTARY ROCK (ARGILLITE) 175.7 feet: bedding: dips 65°; 4" layer thinly bedded; light gray ARGILLITE		C50			100	23				F: (173.9'), 25°, slightly open, clean, not healed, moderately rough
650			178.6 feet: intensely weathered; moderately soft; intensely fractured					100	8	3.06			
	180		180.3 feet: local SANDSTONE interbeds: gray; intensely weathered; moderately hard; intensely fractured; 2 to 3" blocks		C51								
645			SEDIMENTARY ROCK (SANDSTONE) Fine-grained sand; massive; gray; moderately weathered; moderately hard; intensely fractured; open vertical and horizontal fractures; few 0.1", calcite-healed fractures: dip 25° to 75° (FRANCISCAN COMPLEX: BROKEN FORMATION)					98	0	2.94			
	185		184.5 to 184.6 feet: ARGILLITE interbed: very dark gray; decomposed; soft; very intensely fractured 184.6 feet: fine- to medium-grained sand		C52								
			187.4 to 187.8 feet: ARGILLITE interbed: very dark gray; moderately soft 187.8 feet: massive; slightly weathered; intensely to moderately fractured					100	57	3.88			F: (188.5'), 35°, open, clean, not healed, moderately rough
640													F: (189.2'), 65°, open, thin, calcite, fresh, soft, totally healed
	190				C53								F: (189.8'), 35°, open, clean, not healed, moderately rough
													F: (191.5'), 75°, moderately wide, clean, not healed, moderately rough
								100	55	1.96			F: (193.3'), 55°, open, clean, not healed, moderately rough
635													F: (194.0'), 36°, open, clean, not healed, moderately rough
	195		194.8 feet: calcite veining, planar, 0.1" thick		C54								
													F: (196.6'), 35°, open, clean, not healed, moderately rough
								100	80	3.47			F: (197.0'), 65°, open, clean, not healed, slightly rough
630													F: (198.7'), 75°, open, clean, not healed, moderately rough
	200				C55								F: (199.8'), 45°, open, clean, not healed, moderately rough
			200.5 feet: calcite vein: vertical; 0.1" thick 200.8 to 200.9 feet: ARGILLITE laminations										F: (200.5'), 90°, moderately open, moderately thin, calcite/clay, moderately weathered, moderately hard, moderately healed, moderately rough
			202.0 to 202.2 feet: ARGILLITE interbed: smooth polished surfaces 202.8 to 202.9 feet: ARGILLITE laminations					96	0	3.14			F: (201.4'), 60°, open, clean, not healed, moderately rough
625			203.8 to 204.2 feet: ARGILLITE interbed: very dark gray; moderately weathered; moderately hard; moderately fractured		C56								F: (201.7'), 65°, open, clean, not healed, moderately rough
	205												

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-017**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**7 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	205		204.2 to 205.2 feet: ARGILLITE interbed: very dark gray; decomposed; very intensely fractured; broken to crushed relict calcite veining SEDIMENTARY ROCK (SANDSTONE) 205.2 feet: moderately weathered; moderately hard; very intensely fractured		C56			96	0				F: (202.5'), 75°, open, very thin, calcite, slightly weathered, moderately hard, not healed, moderately rough F: (203.4'), 45°, open, very thin, calcite, slightly weathered, moderately hard, not healed, moderately rough
620					C57			100	0	2.59			
	210		211.0 to 211.2 feet: ARGILLITE interbed: dips 45°; very dark gray; moderately weathered; moderately soft; very intensely fractured 212.0 feet: intensely fractured		C58			100	0	5.91			
615			212.9 feet: calcite veining, hairline to 0.1" wide, steeply dipping 213.7 feet: 0.25" ARGILLITE interbed: dips 45°		C59			100	45	2.50			F: (213.1'), 45°, open, clean, not healed, moderately rough F: (214.0'), 70°, open, clean, not healed, moderately rough
	215		215.1 to 215.4 feet: ARGILLITE interbed: dips 40°; very dark gray; intensely weathered; soft; very intensely fractured 215.4 feet: intensely weathered; moderately soft; very intensely fractured; calcite veining, hairline to 0.1" wide		C60			100	0	3.50			
610			SEDIMENTARY ROCK (ARGILLITE); thinly bedded with thin interbeds of SANDSTONE. ARGILLITE; laminated to thinly bedded; very dark gray; intensely weathered; soft to moderately soft; intensely fractured; SANDSTONE; fine-grained sand; thinly bedded; gray; intensely weathered; moderately hard; intensely fractured;									
	220		chaotic calcite veining up to 0.3" thick (FRANCISCAN COMPLEX: BROKEN FORMATION)		C61			100	34	5.00			F: (221.4'), 45°, open, clean, not healed, slightly rough
			SEDIMENTARY ROCK (SANDSTONE); fine-grained sand; thinly bedded and massive; gray; moderately weathered; moderately hard; moderately fractured; calcite veining (FRANCISCAN COMPLEX: BROKEN FORMATION) 221.4 to 224.9 feet: local 1" convolute ARGILLITE interbeds: black; slightly weathered; moderately hard		C62			100	0	3.57			
605	225		SEDIMENTARY ROCK (ARGILLITE) Thinly bedded with thin interbed remnants of SANDSTONE. ARGILLITE; laminated to thinly bedded; dark gray to black; decomposed; very soft to soft; very intensely fractured; pervasively sheared to (CLAYEY GRAVEL with SAND (GC); medium dense; dry to moist; mostly subangular GRAVEL; little fine to coarse SAND; little fines); SANDSTONE: fine to medium grained; thinly bedded; gray; slightly weathered; moderately hard; intensely fractured; convolute quartz and calcite veining up to 0.1" thick (FRANCISCAN COMPLEX: BROKEN FORMATION)		C63			100	0	3.41			
600	230		231.3 to 236.4 feet: very intensely to intensely fractured; very thin SILT with SAND fracture infill		C64			100	0	3.64			
595	235							100	0	4.00			

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-017**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**8 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	235		SEDIMENTARY ROCK (ARGILLITE)		C65			100	0	3.66			
			236.4 to 240.8 feet: very intensely fractured; thin SILT and SAND fracture infill		C66								
590	240		239.5 to 240.1 feet: SANDSTONE bed remnant: fine-grained sand; slightly weathered; hard 240.9 to 242.7 feet: SANDSTONE bed remnant: fine-grained sand; gray; slightly weathered; hard; moderately fractured		C67			100	53	6.94			F: (239.7'), 39°, open, not healed, moderately rough
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained sand; massive; gray; slightly weathered; moderately hard to hard; intensely fractured; very thin SILT with SAND infill; discontinuous, chaotic quartz and calcite veining (FRANCISCAN COMPLEX: BROKEN FORMATION)		C68			100	0	4.84			
585	245		245.8 feet: very intensely fractured; very thin SILT and SAND fracture infill		C69			100	0	2.73			
					C70			97	0	4.06			
580	250				C71			100	25	3.80			
575	255		254.4 feet: 3" convolute ARGILLITE interbed remnant: dark gray; intensely weathered; very soft; very intensely fractured										
			258.0 to 259.6 feet: convolute mass of ARGILLITE, SANDSTONE remnants up to 2": dark gray to black; moderately weathered; moderately soft to moderately hard; very intensely fractured		C72			96	6	3.08			
570	260		SEDIMENTARY ROCK (ARGILLITE) very thinly to thinly bedded with very thin interbeds, bed remnants of SANDSTONE. ARGILLITE; very thinly to thinly bedded; dark gray to black; moderately weathered; moderately soft to moderately hard; intensely fractured; SANDSTONE: fine grained; gray; slightly weathered; moderately hard; intensely fractured (FRANCISCAN COMPLEX: BROKEN FORMATION)		C73			100	0	5.56			
565	265				C74			82	20	2.67			

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-017**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**9 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	265		SEDIMENTARY ROCK (SANDSTONE); fine-grained; massive; gray; slightly weathered; hard; intensely fractured; planar to chaotic quartz and calcite veining, to 0.1" (FRANCISCAN COMPLEX: BROKEN FORMATION) 266.5 feet: moderately fractured		C74			82	20				F: (267.6'), 65°, tight, very thin, calcite/quartz, slightly weathered, hard, not healed, smooth
560			268.6 feet: intensely fractured		C75			100	15	3.04			F: (268.6'), 50°, tight, thin, calcite/quartz, moderately weathered, moderately hard, not healed, smooth
	270		270.4 feet: 5" ARGILLITE interbed: dips 30°: very thinly bedded with interbeds of SANDSTONE black; slightly weathered; moderately soft; intensely fractured 271.4 feet: 12" ARGILLITE interbed: dips 30°: very thinly bedded with convolute bed remnants of SANDSTONE dark gray; slightly weathered; moderately hard; intensely fractured; fragmented planar quartz and calcite veining		C76			100	0	3.08			
555			274.0 feet: calcite veining to 0.5"										
	275		276.0 feet: moderately fractured		C77			100	70	3.23			
			SEDIMENTARY ROCK (ARGILLITE); thinly bedded with thin interbed remnants of SANDSTONE; ARGILLITE; thinly bedded; dark gray to black; decomposed; soft; generally sheared to (CLAYEY GRAVEL with SAND (GC); medium dense; moist; mostly subangular fine to coarse GRAVEL; little fine to coarse SAND; little fines); SANDSTONE: fine grained; gray; slightly weathered; moderately hard to hard; intensely to very intensely fractured; chaotic quartz and calcite veining (FRANCISCAN COMPLEX: BROKEN FORMATION)		C78			92	0	3.29			
550	280												
					C79			100	0	3.57			
545	285												
					C80			100	0	3.53			
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained sand; massive; gray; slightly weathered; hard; intensely fractured; chaotic, planar and chaotic quartz and calcite veining to 0.1" (FRANCISCAN COMPLEX: BROKEN FORMATION) 290.3 feet: intensely to moderately fractured									
540	290				C81			100	41	4.17			F: (290.5'), 45°, open, clean, not healed, moderately rough F: (291.2'), 45°, open, clean, not healed, moderately rough F: (292.3'), 75°, open, clean, not healed, moderately rough
					C82			100	59	3.06			F: (293.2'), 35°, open, clean, not healed, moderately rough
535	295												

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-017**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**10 of 11**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	295		SEDIMENTARY ROCK (SANDSTONE)		C82			100	59				F: (293.8'), 35°, open, clean, not healed, moderately rough F: (295.2'), 40°, open, clean, not healed, moderately rough
530			297.0 feet: 8" ARGILLITE interbed: dips 45° black; slightly weathered; moderately soft; intensely fractured		C83			100	41	6.09			F: (296.5'), 55°, open, clean, not healed, moderately rough F: (298.0'), 45°, open, clean, not healed, moderately rough F: (299.0'), 38°, open, clean, not healed, moderately rough
	300		Bottom of borehole at 300.0 ft bgs										F: (299.8'), 45°, open, clean, not healed, moderately rough
525	305												
520	310												
515	315												
510	320												
505	325												

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BORING RECORD				**RC-20-017**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**6-4-21**	**11 of 11**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
P.Sunberg	**12-15-20**	**12-19-20**	**2480954.393 ft / 5984842.403 ft NAD83**	**RC-20-019**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
CRUX Subsurface Inc.				**474.67 ft NAVD88**
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Rotary Core			**Burley 55-1**	**4.5 in**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4"), HQ Core (2.5")			**Cathead; 140 lbs / 30-inch drop**	
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING **Not Determined** AFTER DRILLING (DATE) **Not Determined**	TOTAL DEPTH OF BORING
VWP, TDR, Inclinometer; cement-bentonite				**150.9 ft**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	0		SILT with SAND (ML); medium dense; light brown with yellowish brown; moist; mostly fines; some fine SAND; low plasticity; trace angular to subangular rock fragments; decomposed sandstone; (LANDSLIDE DEPOSIT)										
					S01	4 7 8	15	100		0.00			
470	5												
			SILT with GRAVEL (ML); loose; light brown and yellowish brown; moist; mostly fines; some coarse to fine angular GRAVEL; few coarse to fine SAND; non-plastic; (LANDSLIDE DEPOSIT)		S02	2 2 4	6	100		0.00		
465	10		10.0 feet: advance HWT casing to 10.0'		C03			0	0	0.00			
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained; massive; yellowish brown; decomposed; very soft; very intensely fractured; pervasively sheared to: (SILT with GRAVEL (ML); yellowish brown; moist; mostly fines; some coarse to fine GRAVEL; few coarse to fine SAND) (LANDSLIDE DEPOSIT)		C04			81	0	9.09		
					C05			100	0	3.81		
460	15				C06			72	0	3.79		
					C07			93	0	7.14		
455	20		20.0 feet: SANDSTONE gravel fragments: fine-grained; massive; intensely weathered; moderately soft		S08	5 5 10	15	72		0.00		
450	25												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-019**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**1 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	25		SEDIMENTARY ROCK (SANDSTONE)		S09	6 8 13	21	83		0.00			
445	30		30.0 feet: low plasticity; increased GRAVEL content		S10	15 13 50/5"	63/11	66		0.00			
440	35		Poorly-graded GRAVEL with SILT AND SAND (GP-GM); dense; gray to dark gray; moist to wet; mostly coarse to fine angular GRAVEL; some fines; low to medium plasticity; sandstone and argillite rock fragments; (LANDSLIDE DEPOSIT)		S11	11 13 27	40	72		0.00			
			SEDIMENTARY ROCK (SANDSTONE) Thinly to moderately bedded with very thinly to thinly bedded ARGILLITE. SANDSTONE; fine grained; gray and brown; intensely weathered; moderately soft to moderately hard; intensely fractured; ARGILLITE: gray; intensely weathered; moderately soft; intensely fractured (LANDSLIDE DEPOSIT)		C12			58	0	5.53			
435	40				C13			100	0	5.38			
			41.3 to 41.8 feet: LANDSLIDE FAILURE ZONE: SANDSTONE sheared to: (Poorly-graded GRAVEL with SILT (GP-GM); gray; moist; mostly medium to fine, angular to subangular GRAVEL; few low plasticity fines; little coarse to fine SAND)		C14			100	0	3.96			
430	45		43.4 to 45.5 feet: LANDSLIDE FAILURE ZONE: SANDSTONE sheared to: (SILTY GRAVEL (GM); dense; gray; moist; mostly medium to fine, angular to subangular GRAVEL; some low plasticity fines; little coarse to fine SAND)		S15	39 42 50/4"	92/10			0.00			
			SEDIMENTARY ROCK (SANDSTONE); thinly bedded with very thinly bedded ARGILLITE. SANDSTONE; fine grained; gray; intensely weathered; moderately hard; intensely fractured; ARGILLITE: gray; intensely weathered; moderately soft; intensely to very intensely fractured (LANDSLIDE DEPOSIT)		C16			80	0	3.78			
			POORLY GRADED GRAVEL with SAND (GP); loose; gray; moist to wet; mostly coarse to fine angular to subangular GRAVEL; little coarse to fine SAND; few fines; non-plastic; (LANDSLIDE DEPOSIT)		S17	44 50/5"	50/5	28		0.00			
425	50							90	0	4.27			
			SEDIMENTARY ROCK (SANDSTONE) Fine-grained; massive; gray and light brown; intensely weathered; moderately soft; intensely fractured; (LANDSLIDE DEPOSIT)		C18								
			52.5 to 52.8 feet: LANDSLIDE FAILURE ZONE: SANDSTONE and ARGILLITE sheared to: (SILT with GRAVEL (ML); soft; wet; mostly non-plastic fines; little fine angular GRAVEL; little coarse to fine sand); dips 40°		S19	50/5.5"	REF	17		36.00			
420	55		53.0 to 53.2 feet: LANDSLIDE FAILURE ZONE: ARGILLITE sheared to: (SANDYSILT (ML); stiff; gray		C20			100	8	3.78			

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DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**2 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	55		and light brown; moist; mostly non-plastic fines; some coarse to fine SAND; trace GRAVEL); 30°					100	8				
			Thinly bedded with very thinly bedded ARGILLITE. SANDSTONE: fine grained; gray; intensely to moderately weathered; moderately hard; intensely fractured. ARGILLITE: dark gray; intensely weathered; moderately hard; intensely fractured (LANDSLIDE DEPOSIT) SEDIMENTARY ROCK (SANDSTONE)		C20								
								100	0	2.80			
415	60				C21								
			62.6 to 63.2 feet: LANDSLIDE FAILURE ZONE: ARGILLITE and SANDSTONE sheared to: (Poorly-graded GRAVEL with SILT (GP-GM); gray and light brown; moist; mostly medium to fine angular gravel; few fines; low plasticity fines)					100	0	3.41			
410	65		63.4 to 64.2 feet: SANDSTONE clast fine to medium grained; massive; brown; intensely weathered; moderately hard; very slightly fractured 64.2 to 64.7 feet: LANDSLIDE FAILURE ZONE: ARGILLITE sheared to: (Poorly-graded GRAVEL with SILT (GP-GM); gray, white, and light brown; moist; mostly coarse to fine angular GRAVEL; few low plasticity fines)		C22							
			SEDIMENTARY ROCK (SANDSTONE); thinly bedded with very thinly bedded ARGILLITE. SANDSTONE: fine grained; gray; intensely to moderately weathered; moderately hard; intensely fractured. ARGILLITE: dark gray; intensely weathered; moderately hard; intensely fractured (LANDSLIDE DEPOSIT)		C23			100	0	3.33			
								100	0	4.20			
405	70		66.9 to 67.5 feet: LANDSLIDE FAILURE ZONE: ARGILLITE sheared to: (Poorly-graded GRAVEL with SILT (GP-GM); gray, white, and light brown; moist; mostly coarse to fine angular GRAVEL; few low plasticity fines)		C24								
			SEDIMENTARY ROCK (SANDSTONE); thinly bedded with very thinly bedded ARGILLITE. SANDSTONE: fine grained; gray; intensely to moderately weathered; moderately hard; intensely fractured. ARGILLITE: dark gray; intensely weathered; moderately hard; intensely fractured (LANDSLIDE DEPOSIT) 71.0 feet: 5" ARGILLITE clast 73.2 to 73.4 feet: LANDSLIDE FAILURE ZONE: ARGILLITE sheared to: (Poorly-graded GRAVEL with SILT (GP-GM); gray, white, and light brown; moist; mostly coarse to fine angular GRAVEL; few low plasticity fines)		C25			80	0	3.67			
400	75		SEDIMENTARY ROCK (ARGILLITE) Fine-grained; thinly bedded; gray to black; decomposed; very soft; isolated zones of moderately soft, very intensely sheared, some subangular to subrounded SANDSTONE clasts, slightly weathered, moderately hard; sheared to: (Poorly-graded GRAVEL with SILT and SAND (GP-GM); moist; mostly coarse to fine subangular to angular GRAVEL; some fine to coarse SAND; little low plasticity fines) (FRANCISCAN COMPLEX) 74.0 feet: calcite vein (0.1" thick), oriented parallel to bedding: 25° 75.0 feet: calcite vein (0.1" thick), oriented parallel to bedding: 25°		C26			80	0	4.00			
								64	0	1.60			
395	80		SEDIMENTARY ROCK (ARGILLITE) Fine-grained; massive; dark gray; decomposed; very soft; very intensely fractured; (CLAYEY SAND (SC); dense; moist; mostly fine grained SAND; some moderate plasticity fines; trace fine subangular GRAVEL) (FRANCISCAN COMPLEX)		C27								
								86	0	3.10			
390	85				C28								

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DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**3 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	85		84.6 to 85.2 feet: SANDSTONE clast; fine-grained; gray; moderately weathered; moderately soft SEDIMENTARY ROCK (ARGILLITE)		C28			86	0				
			87.0 to 87.6 feet: SANDSTONE clast; fine to medium grained; massive; dark gray; moderately weathered; moderately hard; moderately fractured		C29			85	0	3.33			
385	90		SEDIMENTARY ROCK (ARGILLITE) Very fine grained; massive; dark gray; decomposed; very soft; intensely fractured; SANDSTONE clasts up to 5": fine grained, massive, moderately weathered, moderately hard; (CLAYEY SAND with GRAVEL (SC); mostly fine sand; coarse to fine angular GRAVEL; some medium plasticity fines) (FRANCISCAN COMPLEX)		C30			100	0	2.60			
380	95				C31			100	0	2.67			
			96.4 feet: moderately weathered; moderately hard		C32			20	0	4.75			
					C33			29	0	1.82			
375	100				C34			100	0	4.64			
			101.5 feet: decomposed; very soft		C35			80	0	5.20			
			102.8 feet: moderately weathered; moderately hard										
			103.8 feet: decomposed; very soft		C36			100	0	1.80			
370	105				C37			100	14	3.60			
					C38			87	0	4.78			
365	110				C39			92	0	3.08			
					C40			92	0	2.86			
			113.4 feet: abundant calcite mineralization		C41			100	0	2.40			
360	115												

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DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**4 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	115		SEDIMENTARY ROCK (ARGILLITE)		C41			100	0				
355	120		118.4 to 119.5 feet: SANDSTONE clast; fine-grained; dark gray; moderately weathered; moderately hard; calcite veins throughout, randomly oriented		C42			92	24	3.80			
350	125				C43			100	0	3.20			
345	130		128.4 feet: soft		C44			100	0	3.50			
			131.4 feet: very soft		C45			75	0	10.50			
340	135		134.0 feet: possible artesian conditions		C46			82	0	4.20			
335	140				C47			100	0	7.78			
					C48			60	0	5.22			
					C49			71	0	8.57			
330	145				C50			33	0	4.00			

(continued)

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DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**5 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	145		SEDIMENTARY ROCK (ARGILLITE)		C50			33	0				
			145.6 feet: soft					100	0	2.50			
					C51								F: (147.7'), 20°, moderately thick, calcite F: (148.0'), 20°, moderately open, moderately thin, clay
325								100	0	2.60			
	150				C52								
			150.9 feet: advance HWT casing to full depth (150.9')										
			Bottom of borehole at 150.9 ft bgs										
320	155												
315	160												
310	165												
305	170												
300	175												

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01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**6 of 6**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
A.Call	12-18-20	1-5-21	2476836.949 ft / 5986058.169 ft NAD83	RC-20-020
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
CRUX Subsurface Inc.				210.43 ft NAVD88
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Rotary Core			DMW 45	4.5 in
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4"), HQ Core (2.5")			Cathead; 140 lbs / 30-inch drop	
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING / AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
VWP, TDR, Inclinometer; cement-bentonite			Not Determined / Not Determined	150.0 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method / Casing Depth	Discontinuity Description: Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
210	0		SANDY fat CLAY (CH); soft; gray; wet; mostly high plasticity fines; some coarse to fine grained SAND; trace fine subangular GRAVEL (FILL)									
					S01	2 2 3	5	11				
205	5				S02	2 2 2	4	28				
200	10		10.0 feet: advance HWT casing to 10.0'		S03	2 2 4	6	39				
			Lean to Fat CLAY (CL-CH); soft; dark grayish brown with yellow brown oxidation; moist to wet; mostly medium to high plasticity fines; little coarse to fine grained SAND (SURFICIAL SOIL - LANDSLIDE DEPOSIT)									
195	15		Fat CLAY (CH); soft; light brown; wet; mostly high plasticity fines; few fine subangular GRAVEL; few coarse to fine grained SAND (LANDSLIDE DEPOSIT) 15.0 feet: no circulation return		S04	1 1 1	2	50				
190	20				S05	2 2 3	5	55				
			Lean CLAY (CL); thinly layered with thin layers of SILTY SAND (SM); Lean CLAY (CL): soft; yellowish brown; wet; medium plasticity; SILTY SAND (SM): loose; dark gray; wet; fine to medium grained SAND (LANDSLIDE DEPOSIT)									
	25											

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REPORT TITLE				HOLE ID
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DIST.	COUNTY	ROUTE	POSTMILE	EA
01	Del Norte	101	12-15.5	0115000099
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	D. Ross		3-26-21	1 of 6

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method / Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
185	25		CLAYEY SAND with GRAVEL (SC); medium dense; dark gray; wet; mostly coarse to fine grained SAND; little fine subangular GRAVEL; little fines (LANDSLIDE DEPOSIT)		S06	3 5 10	15	50				
			Poorly-graded GRAVEL with SAND (GP); medium dense; wet; mostly coarse to fine subangular GRAVEL; some coarse to medium grained SAND (LANDSLIDE DEPOSIT)									
180	30				S07	3 14 13	27	28				
			CLAYEY SAND (SC); medium dense; dark gray; wet; mostly coarse to fine grained SAND; some medium plasticity fines; trace fine subangular GRAVEL (LANDSLIDE DEPOSIT)									
175	35				S08	7 9 11	20	39				
			38.0 feet: no fluid return									
170	40				S09	8 8 10	18	39				
165	45				S10	10 13 7	20	39				
160	50		50.0 feet: equip NQ core for pressure meter test; interval from 50.0' to 55.0' SEDIMENTARY ROCK ((SANDSTONE))SEDIMENTARY ROCK (SANDSTONE) Fine-grained sand; gray; slightly weathered; moderately hard to hard; quartz and calcite veining to 0.1" (LANDSLIDE DEPOSIT) 51.8 to 57.4 feet: LANDSLIDE FAILURE ZONE: SANDSTONE sheared/brecciated to: Poorly-graded GRAVEL with CLAY (GP-GC): medium dense; gray; wet; mostly fine to coarse subangular GRAVEL; few fines; little fine to coarse grained SAND		C11			60	60	3.40		
	55											

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01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**2 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
155	55		50.0 feet: equip HQ core for pressuremeter test; interval from 50.0' to 55.0' SEDIMENTARY ROCK ((SANDSTONE))SEDIMENTARY ROCK (SANDSTONE) 55.0 feet: equip HQ core; circulation loss; advance HWT casing to 49.0'		C12			48	0	9.17			
			LANDSLIDE FAILURE ZONE: SANDSTONE and ARGILLITE sheared to: (CLAYEY GRAVEL with SAND (GC); loose; gray; moist to wet; mostly coarse to fine subangular GRAVEL; some medium plasticity fines; little coarse to fine grained SAND)		C13			100	0	15.00			
					C14			95	0	7.14			
150	60		60.0 feet: no circulation return		S15	6 5 10	15	NR					
			62.0 feet: becomes difficult to drill										
			SEDIMENTARY ROCK (ARGILLITE) Thinly bedded; gray to black; decomposed; very soft; very intensely fractured/pervasively sheared; chaotic; few subangular to rounded SANDSTONE clasts up to 3": slightly weathered; moderately hard; sheared to (CLAYEY SAND with GRAVEL (SC): dense; moist; mostly fine to coarse SAND; some medium plasticity fines; few subangular to rounded fine to coarse GRAVEL); (FRANCISCAN COMPLEX)										
145	65				C16			97	0	4.17			
					C17			90	0	8.33			
					C18			95	0	14.29			
140	70		70.0 feet: equip NQ core for pressure meter test; interval 70.0-75.0'										
135	75				C19			100	0	6.00			
			75.3 to 76.7 feet: moderately weathered; moderately soft; intensely fractured; equip HQ core; circulation loss										
			76.7 feet: 7" rounded SANDSTONE clast (encountered obliquely): slightly weathered; moderately hard		C20			47	0	8.00			
			78.8 feet: general shear fabric: dips 80°-90°										
130	80							83	10	7.00			
			80.5 feet: 6" SANDSTONE clast: slightly weathered; moderately hard		C21								
	85												

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01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**3 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
125	85		SEDIMENTARY ROCK (ARGILLITE)		C22			100	0	5.88			
					C23			99	0	10.00			
120	90		90.0 feet: 4" rounded SANDSTONE clast (encountered obliquely) slightly weathered; moderately hard to hard 91.1 to 91.6 feet: vertical (obliquely encountered) convolute zone of ARGILLITE and SANDSTONE: slightly weathered; very intensely fractured		C24			83	0	10.00			
					C25			33	0	9.33			
					C26			100	0	8.00			
115	95		96.5 to 97.1 feet: vertical (obliquely encountered) convolute zone of ARGILLITE and SANDSTONE: slightly weathered; very intensely fractured 98.3 feet: 12" SANDSTONE clast: slightly weathered; hard; moderately fractured 99.3 feet: thinly bedded; gray to dark gray; decomposed; soft to very soft; very intensely fractured/pervasively sheared; chaotic; few SANDSTONE clasts to 3": slightly weathered; moderately hard to hard; sheared to: (CLAYEY SAND with GRAVEL (SC): medium dense to dense; moist; mostly fine to coarse SAND; some medium plasticity fines; few fine to coarse subangular GRAVEL);(FRANCISCAN COMPLEX) 100.0 feet: continued circulation loss		C27			90	20	4.80			
110	100				C28			49	0	7.65			
					C29			42	0	8.75			
105	105				C30			74	0	6.96			
100	110				C31			101	0	12.86			
					C32			38	0	6.36			
					C33			37	0	13.33			
	115				C34			42	0	12.50			

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01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**4 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
95	115		SEDIMENTARY ROCK (ARGILLITE)		C35			68	0	7.65			
					C36/37			44	0	16.07			
90	120		119.5 feet: dark gray; slightly weathered; moderately hard; intensely fractured; few SANDSTONE clasts to 3": gray; slightly weathered; hard; trace fragmented quartz veining 121.0 feet: minimal to no circulation return		C38			47	0	20.00			
					C39			83	0	10.67			
					C40			NR		15.00			
					C41			77	0	15.00			
					C42			NR	0	14.55			
85	125				C43			80	0	0.00			
					C44			80	0	6.00			
			127.5 feet: 6" SANDSTONE clast: slightly weathered; hard		C45			100	0	20.00			
			128.0 feet: gray to dark gray; decomposed; very soft; very intensely fractured/pervasively sheared; little subangular to rounded SANDSTONE clasts to 3": gray; slightly weathered; moderately hard to hard; chaotic, fragmented quartz and calcite veining; sheared to: (SANDY lean CLAY with GRAVEL (CL): stiff; moist; mostly fines; some fine to coarse SAND; little subangular to rounded, fine to coarse GRAVEL)		C46			NR		9.44			
80	130				C47			95	0	7.39			
			131.8 feet: slightly weathered; moderately soft to moderately hard; very intensely fractured		C48			100	0	9.50			
					C49			NR		12.22			
75	135				C50			101	0	12.22			
			136.0 feet: decomposed; very soft; very intensely fractured/pervasively sheared to (CLAYEY SAND with GRAVEL (SC): medium dense; moist to wet; mostly fine to coarse SAND; some medium plasticity fines; little fine subangular GRAVEL)		C51			98	0	12.73			
					C52			70	0	5.33			
70	140				C53			91	0	3.60			
	145												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-20-020**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**3-26-21**	**5 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
65	145		SEDIMENTARY ROCK (ARGILLITE)		C54			99	0	4.38			
					C55			NR		4.44			
			150.0 feet: advance HWT casing to full depth (150.0')										
60	150		Bottom of borehole at 150.0 ft bgs										
55	155												
50	160												
45	165												
40	170												
	175												

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REPORT TITLE **BORING RECORD**				HOLE ID **RC-20-020**
DIST. **01**	COUNTY **Del Norte**	ROUTE **101**	POSTMILE **12-15.5**	EA **0115000099**
PROJECT OR BRIDGE NAME **Last Chance Grade Bypass**				
BRIDGE NUMBER **--**	PREPARED BY **D. Ross**		DATE **3-26-21**	SHEET **6 of 6**

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
P.Sunberg	**1-7-21**	**1-9-21**	**2479547.482 ft / 5984956.757 ft NAD83**	**RC-21-001**
DRILLING CONTRACTOR			BOREHOLE LOCATION (Offset, Station, Line)	SURFACE ELEVATION
CRUX Subsurface Inc.				**408.42 ft NAVD88**
DRILLING METHOD			DRILL RIG	BOREHOLE DIAMETER
Mud Rotary			**Burley 55-1**	**4.5 in**
SAMPLER TYPE(S) AND SIZE(S) (ID)			SPT HAMMER TYPE	HAMMER EFFICIENCY, ERi
SPT (1.4"), HQ Core (2.5")			**Cathead; 140 lbs / 30-inch drop**	
BOREHOLE BACKFILL AND COMPLETION			GROUNDWATER READINGS DURING DRILLING	AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING
VWP, TDR, Inclinometer; cement-bentonite			**Not Determined**	**Not Determined**	**150.0 ft**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method / Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
405	0		SANDY FAT CLAY (CH); very soft; reddish brown; moist; mostly fines; little medium to fine SAND; (COLLUVIUM / LANDSLIDE DEPOSIT)									
	5		5.0 feet: PP = 1.25 tsf		S01	2 2 1	3	50		0.00		
400	10		CLAYEY SAND with GRAVEL (SC); very loose; olive brown; moist to wet; mostly coarse to fine SAND; little fine subangular GRAVEL; little fines; medium plasticity; (COLLUVIUM / LANDSLIDE DEPOSIT) 10.0 feet: no circulation return		S02	3 2 1	3	56		0.00		
395	15		SANDY fat CLAY with GRAVEL (CH); soft; dark gray; moist to wet; mostly fines; little fine subangular GRAVEL; little coarse to fine SAND; (LANDSLIDE DEPOSIT) 15.0 feet: PP = 0.5 tsf		S03	1 2 2	4	31		0.00		
390	20		CLAYEY SAND (SC) medium dense; dark gray; wet; mostly coarse to fine SAND; little fines; few fine subangular GRAVEL; (LANDSLIDE DEPOSIT)		S04	6 4 9	13	97		0.00		
385	25											

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-21-001**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**1 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method / Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	25		CLAYEY SAND (SC) 25.0 feet: calcite fragments in sample		S05	3 10 14	24	40		0.00		
380												
	30		30.0 feet: SANDSTONE fragment; slightly weathered, moderately hard		S06	50/1"	REF	100		0.00		
375												
	35				S07	6 4 6	10	50		0.00		
370			39.1 feet: equip HQ core		S08	16 14 18	32	75		0.00		
	40		SEDIMENTARY ROCK (ARGILLITE); massive; black; decomposed; very soft; very intensely fractured; pervasively sheared to: clayey SAND (SC); dense; moist, mostly fine to coarse sand; little to moderate plasticity fines; little subangular fine gravel; some faint relic shear structure (LANDSLIDE DEPOSIT)		C09			90	0	0.00		
365					S10	9 12 10	22	53		0.00		
	45				C11			2	0	3.25		
360					S12	13 10 23	33	0		0.00		
	50		SEDIMENTARY ROCK (ARGILLITE); very fine-grained; massive; dark gray; moderately to intensely weathered; moderately hard; intensely fractured; (LANDSLIDE DEPOSIT)					100	52	3.08		
			SEDIMENTARY ROCK (SANDSTONE) Fine to medium grained; massive; moderately weathered; moderately hard; moderately fractured; chaotic quartz and calcite veining to 0.1" thick (LANDSLIDE DEPOSIT)		C13							F: (51.6'), 60°, moderately open, clean, not healed, moderately rough F: (52.3'), 50°, slightly open, clean, not healed, slightly rough F: (52.8'), 25°, moderately open, moderately thin, Argillite, not healed, smooth
355					S14	50/5""	REF	70		0.00		
	55				C15			100	50	5.00		

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-21-001**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**2 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	55		SEDIMENTARY ROCK (SANDSTONE)		C16			100	28	4.44			F: (54.0'), 35°, open, clean, not healed, slightly rough J: (55.2'), 10°, open, clean, not healed, moderately rough F: (55.8'), 15°, slightly open, clean, not healed, moderately rough F: (56.4'), 80°, slightly open, clean, not healed, moderately rough F: (57.1'), 50°, slightly open, clean, not healed, moderately rough
350			SEDIMENTARY ROCK (SANDSTONE); thinly bedded with thin interbed remnants of ARGILLITE. SANDSTONE: fine grained; thinly bedded; gray to dark gray; slightly weathered; moderately hard; very intensely fractured; ARGILLITE: thinly bedded, black, decomposed, soft to very soft; very intensely fractured/sheared to: (CLAYEY SAND with Gravel (SC); medium dense; moist; mostly fine to coarse sand, little moderate plasticity fines, little subangular fine gravel); local chaotic quartz and calcite veining. (LANDSLIDE DEPOSIT)		C17			100	0	3.33			
	60				C18			100	0	4.48			
345			SEDIMENTARY ROCK (SANDSTONE); fine to medium grained; massive; gray; moderately weathered; moderately hard; intensely fractured; chaotic quartz and calcite veining to 0.1" thick (LANDSLIDE DEPOSIT)		C19			90	8	4.00			
	65												
340			SEDIMENTARY ROCK (ARGILLITE); very thinly bedded; dark gray to black; decomposed; soft to very soft; very intensely fractured; pervasively sheared to: (Poorly-graded GRAVEL with CLAY and SAND (GP-GC), dense, mostly fine subangular gravel; little fine to coarse sand; few moderate plasticity fines; trace subrounded SANDSTONE bed remnants to 2" diameter; gray; slightly weathered; moderately hard) (LANDSLIDE DEPOSIT)		C20			96	0	7.14			
	70												
335			SEDIMENTARY ROCK (SANDSTONE); fine to medium grained; massive; gray; moderately weathered; moderately hard; intensely fractured; chaotic quartz and calcite veining to 0.1" (LANDSLIDE DEPOSIT) 73.8 feet: 2" ARGILLITE interbed: dips 35°; black; decomposed; very soft; pervasively sheared to: (SANDY fat CLAY (CH); stiff; mostly fines, little fine to coarse sand)		C21			90	45	6.00			
	75		75.8 feet: 2" ARGILLITE interbed: 50°; black; decomposed; very soft; pervasively sheared to: (SANDY fat CLAY (CH); stiff; mostly fines, little fine to coarse sand)		C22			71	0	6.19			
330			SEDIMENTARY ROCK (ARGILLITE); very fine-grained; massive; dark gray; decomposed; very soft; very intensely fractured; pervasively sheared to: (Poorly-graded SAND with Clay and Gravel (SP-SC); medium dense; mostly fine to coarse sand; little subangular fine gravel; few moderate plasticity fines) (LANDSLIDE DEPOSIT)		C23			59	0	5.88			
	80		SEDIMENTARY ROCK (SANDSTONE); fine-grained; dark gray; slightly weathered; moderately hard; very intensely fractured; chaotic quartz and calcite veining to 0.2" thick (LANDSLIDE DEPOSIT) 81.1 feet: 0.5" ARGILLITE interbed: dips 30°; black; decomposed; very soft; pervasively sheared to: (Sandy Fat CLAY (CH); stiff; mostly fines, little fine to coarse sand) 81.5 feet: 2" ARGILLITE interbed: dips 20-30°; black; decomposed; very soft; pervasively sheared to: (SANDY Fat CLAY (CH); stiff; mostly fines, little fine		C24			100	0	8.33			
325					C25			76	0	6.67			
	85				C26			100	0	9.37			

(continued)

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BORING RECORD				**RC-21-001**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**3 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	85		to coarse sand) 82.0 feet: 1" ARGILLITE interbed: 40°; black; decomposed; very soft; pervasively sheared to: (SANDY Fat CLAY (CH); stiff; mostly fines, little fine to coarse sand)		C27			32	0	5.29			
320			SEDIMENTARY ROCK (ARGILLITE) Moderately bedded; dark gray to black; decomposed; soft; very intensely fractured; pervasively sheared to: (CLAYEY SAND with Gravel (SC); medium dense; moist; mostly fine to coarse sand; little moderate plasticity fines; little subangular to subrounded fine to coarse gravel (ARGILLITE and SANDSTONE fragments)); locally larger SANDSTONE bed remnants / clasts as noted; chaotic quartz and calcite veining to 0.1" (LANDSLIDE DEPOSIT) 88.7 feet: 4" thick SANDSTONE bed remnant/clast; gray; slightly weathered; moderately hard		C28			62	7	4.40			
	90												
315													
	95				C29			100	0	3.60			
			96.1 to 97.0 feet: LANDSLIDE FAILURE ZONE: ARGILLITE sheared to: (SANDY lean CLAY (CL); moist; stiff; dark gray to black; mostly fines; some fine to coarse SAND; trace subrounded fine to coarse GRAVEL)		C30			100	0	4.00			
310			SEDIMENTARY ROCK (ARGILLITE) Moderately bedded; dark gray to black; decomposed; soft; very intensely fractured; pervasively sheared to: (CLAYEY SAND with Gravel (SC); medium dense; moist; mostly fine to coarse sand; little moderate plasticity fines; little subangular to subrounded fine to coarse gravel (ARGILLITE and SANDSTONE fragments)); locally larger SANDSTONE bed remnants / clasts as noted; chaotic quartz and calcite veining to 0.1" (FRANCISCAN COMPLEX) 100.1 feet: 7" SANDSTONE bed remnant/clast; gray; slightly weathered; moderately hard; very intensely fractured 100.6 feet: 2" SANDSTONE bed remnant/clast; gray; slightly weathered; moderately hard 103.0 feet: 8" SANDSTONE bed remnant/clast; gray; slightly weathered; moderately hard; very intensely fractured		C31			86	0	5.00			
	100				C32			90	0	4.33			
305					C33			100	19	5.33			
	105												
			106.0 feet: 2" ARGILLITE clast; dark gray slightly weathered; moderately hard 107.3 feet: 4" SANDSTONE clast; gray and dark gray; slightly weathered; moderately hard		C34			100	0	6.92			
300					C35			70	0	8.70			
	110				C36			33	0	7.04			
295					C37			84	0	4.40			
	115												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-21-001**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**4 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	115		SEDIMENTARY ROCK (ARGILLITE)		C37			84	0				
					C38			100	0	4.80			
290			117.4 feet: 3" SANDSTONE clast; gray; slightly weathered; moderately hard										
			SEDIMENTARY ROCK (SANDSTONE); coarse to fine-grained; thickly bedded; gray; slightly weathered; hard; moderately fractured; ARGILLITE clasts up to 0.25" (FRANCISCAN COMPLEX)		C39			100	56	6.19			F: (119.3'), 0°, open, clean, not healed, moderately rough
	120												F: (119.8'), 0°, open, clean, not healed, moderately rough
			SEDIMENTARY ROCK (ARGILLITE); moderately bedded; dark gray to black; decomposed; soft; very intensely fractured; pervasively sheared to: (CLAYEY SAND with Gravel (SC); medium dense; moist; mostly fine to coarse sand; little moderate plasticity fines; little subangular to subrounded fine to coarse gravel (ARGILLITE and SANDSTONE fragments)); locally larger SANDSTONE bed remnants/clasts as noted; chaotic quartz and calcite veining to 0.1" (FRANCISCAN COMPLEX)		C40			100	0	3.79			F: (120.2'), 0°, open, clean, not healed, moderately rough
285													
			123.8 feet: pervasively sheared; 0.3" to 2" rock fragments 124.4 feet: calcite vein to 2"		C41			94	0	6.25			
	125												
			126.0 feet: 5" SANDSTONE clast; gray; slightly weathered; moderately hard		C42			100	13	5.77			F: (126.5'), 50°, moderately open, clean, not healed, moderately rough F: (126.8'), 0°, open, clean, not healed, moderately rough
280													
					C43			100	0	5.00			
	130				C44			100	0	7.78			
			131.8 feet: 8" SANDSTONE clast; moderately weathered; moderately hard; calcite veining		C45			100	0	4.85			
275													
					C46			100	0	5.81			
	135												
					C47			95	0	6.84			
270													
					C48			100	80	4.40			F: (139.2'), 0°, open, clean, not healed, moderately rough F: (140.3'), 0°, open, clean, not healed, moderately rough F: (141.1'), 0°, open, clean, not healed, moderately rough F: (142.3'), 45°, slightly open, clean, not healed, moderately rough
	140		SEDIMENTARY ROCK (SANDSTONE); fine to medium grained; massive; gray; moderately weathered; moderately hard; slightly fractured; trace chaotic quartz and calcite veining										
265													
			SEDIMENTARY ROCK (ARGILLITE) Massive; dark gray to black; decomposed; soft to very soft; intensely fractured; pervasively sheared to:		C49			100	0	3.00			F: (143.8'), 45°, open, clean, not healed, moderately rough
	145												

(continued)

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-21-001**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**5 of 6**

ELEVATION (ft)	DEPTH (ft)	Material Graphics	DESCRIPTION	Sample Location	Sample/Run#	Uncorr. Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Drill Rate (min/ft)	Drilling Method	Casing Depth	Discontinuity Description Fracture Identification: (Depth), Dip, Width, Infilling Composition, Weathering, Hardness, Healing, Roughness
	145		CLAYEY SAND with GRAVEL (SC); medium dense, moist, mostly fine to coarse sand; little medium plasticity fines, little subangular to subrounded fine to coarse gravel (moderately strong ARGILLITE and SANDSTONE clasts)); chaotic quartz and calcite veining to 0.1" thick. (FRANCISCAN COMPLEX) SEDIMENTARY ROCK (ARGILLITE)		C49			100	0				
260			148.6 feet: very intensely fractured		C50			100	0	3.57			
	150		150.0 feet: advance HWT casing to full depth (150.0')										
			Bottom of borehole at 150.0 ft bgs										
255	155												
250	160												
245	165												
240	170												
235	175												

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REPORT TITLE				HOLE ID
BORING RECORD				**RC-21-001**
DIST.	COUNTY	ROUTE	POSTMILE	EA
01	**Del Norte**	**101**	**12-15.5**	**0115000099**
PROJECT OR BRIDGE NAME				
Last Chance Grade Bypass				
BRIDGE NUMBER	PREPARED BY		DATE	SHEET
--	**D. Ross**		**4-22-21**	**6 of 6**

APPENDIX D Drilling Site Photographs

Geoprobe 3230 mud rotary rig on Green Diamond property.
D-20-002 (B-40) Gregg Drilling

Mid-Roto Sonic 50K track rig on Green Diamond property.
D-20-002 (B-40) Gregg Drilling

Burley 6000 helicopter access rig in State park.
RC-20-005 (B-28) Crux Subsurface

CME-850 track rig on Green Diamond property.
RC-20-007 (B-16) Gregg Drilling

Fraste FS250 Sonic 50K rig on northbound shoulder of Highway 101.
D-20-010 (B-24) Gregg Drilling

Geoprobe 3230 air rotary rig on northbound shoulder of Highway 101.
P-20-012 (VWP-2SP) Gregg Drilling

CME-850 track rig adjacent to southbound Highway 101.
RC-20-013 (VWP-6) Gregg Drilling

DMW-45 helicopter access rig in State park.
RC-20-014 (B-29) Crux Subsurface

Burley 55-1 track rig adjacent to northbound shoulder of Highway 101.
RC-20-016 (VWP-3) Crux Subsurface

Burley 55-1 track rig adjacent to southbound Highway 101.
RC-20-017 (B-18) Crux Subsurface