

LOGGED BY T. Carroll	BEGIN DATE 2-11-08	COMPLETION DATE 2-14-08	BOREHOLE LOCATION (Lat/Long or North/East and Datum) N2120835.059 / E5997008.519 (NAD83)	HOLE ID MPTNB-R6
DRILLING CONTRACTOR Gregg Drilling and Testing, Inc.		BOREHOLE LOCATION (Offset, Station, Line) Offset 46ft R Sta 55+34 NB Alignment		SURFACE ELEVATION 11.258 ft (NAVD88)
DRILLING METHOD Mud Rotary		DRILL RIG Fraste Multi-drill (track)		BOREHOLE DIAMETER 5 in. (soil); 4 in. (rock)
SAMPLER TYPE(S) AND SIZE(S) (ID) MC (2.4"), SPT (1.4"), Shelby (2.87"), Pitcher (2.87"), HQ Core		SPT HAMMER TYPE Automatic, 140 lbs., 30-inch drop		HAMMER EFFICIENCY, ERI 72.9%
BOREHOLE BACKFILL AND COMPLETION Neat Cement Grout backfill		GROUNDWATER DURING DRILLING AFTER DRILLING (DATE) READINGS		TOTAL DEPTH OF BORING 261.5 ft

ELEVATION (ft)	DEPTH (ft)	Material Graphics	Description	Sample Location	Sample Number	Blows per 6 In	Blows per Foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
0	0		2.5" ASPHALT CONCRETE.												
	1		Poorly graded GRAVEL with SAND (GP), poorly compacted, dark brown, moist. [BASEROCK]												
9.26	2		Poorly graded SAND with GRAVEL (SP), moderately compacted, greenish gray, moist. [FILL]												
	3		CLAYEY GRAVEL with SAND (GC), poorly compacted, dark brown, moist, SAND is fine.	S1	7	17	39								
	4		CLAYEY SAND (SC), poorly compacted, dark brown and dark gray, moist, fine with carbon nodules.	S2	11	9	100								
7.26	5		2.0', large cobble (> 5" diameter).		3	3	6								
	6		Poorly graded SAND (SP), loose, dark grayish brown, moist, fine.												
5.26	7		3.5', grades wet.												
	8		5.0', grades dark gray.												
	9		6.0', grades dark yellowish brown.												
3.26	10		CLAYEY SAND (SC), loose, light greenish gray to gray, moist to wet, fine. [SANDY BAY MUD]	U3		0	psi	100		55.9	109	UU = 0.21		7.5' of casing installed after drilling to 6'	
	11													Casing extended to 8.5' after sampling to 10'	
1.26	12		10.0', grades with increase in SAND content, with white shell fragments up to 2" diameter.											PI, PA, LL	
	13			U4		0	psi	100		26	117.2			PI, LL, C	
	14														
-2.74	15		Poorly graded SAND (SC), medium dense, gray, wet, fine to medium, trace fines. [MARINE SAND]	S5	4	15	83								
	16				7	8									
	17														
-6.74	18			S6	2	4	83								
	19		SANDY lean CLAY (CL), soft, gray, moist to wet, with lenses of clean, fine SAND and occasional shell fragments. [SANDY BAY MUD]	S7	2	21	100			48.5	109.8				
	20				1	5	16								
-8.74	21		Poorly graded SAND with CLAY (SP-SC), dense, yellowish brown, moist, fine, with iron-oxide mottling. [COLMA SAND]												
	22														
	23		Grades dark yellowish brown with occasional iron-oxide mottling.	S8	15	79	83								
	24		Grades very dense.	S9	30	69	100			22.4	128.9				
-12.74	25														

(continued)

CALTRANS FORMAT DOYLEDRIVE_ARUPLOGS_11-2-08.GPJ ARUP LIBRARY CALTRANS FORMAT.GLB 11/3/08



Department of Transportation
Division of Engineering Services
Geotechnical Services

REPORT TITLE BORING RECORD				HOLE ID MPTNB-R6	
DIST. 4	COUNTY S.F.	ROUTE 101	POSTMILE 8.3/9.4	EA 163701	
PROJECT OR BRIDGE NAME Doyle Drive Replacement Project					
BRIDGE NUMBER 34-0163R		PREPARED BY T. Carroll		DATE 11-3-08	SHEET 1 of 9

Figure

CALTRANS FORMAT DOYLEDRIVE ARUPLOGS 11-2-08.GPJ ARUP LIBRARY CALTRANS FORMAT GLB 11/3/08

ELEVATION (ft)	DEPTH (ft)	Material Graphics	Description	Sample Location	Sample Number	Blows per 6 In	Blows per Foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
-14.74	25		Poorly graded SAND with CLAY (SP-SC), dense, yellowish brown, moist, fine, with iron-oxide mottling. [COLMA SAND]			13 30 39									
-16.74	28		Grades grayish brown.		S10	23 43 48	91	83							
-18.74	30		Grades moist to wet.		S11	10 23 50/ 4.5"	73/ 10.5"	100							
-22.74	34				S12	22 32 43	75	100		21.8	133.8			PA	
-24.74	35				S13	13 43 49	92	100							
-26.74	38				S14	17 22 47	69	83							
-28.74	40		39.6', grades with horizontal iron-oxide laminations, moderately cemented - moist.		S15	13 50/ 5.5"	50/ 5.5"	100							
-30.74	42				S16	36 50/5"	50/5"	64		21.1	133.2			PA	
-32.74	44		Grades moist to wet.		S17	19 39 50/4"	89/10"	100							
-36.74	48				S18	40 50/4"	50/4"	60							
-38.74	49		48.8', 4" iron-oxide layer.		S19	27 33 37	70	100						PA	
-42.74	54				S20	12 14 21	35	100							

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Figure

CALTRANS FORMAT DOYLEDRIVE ARUPLOGS 11-2-08.GPJ ARUP LIBRARY CALTRANS FORMAT GLB 11/3/08

ELEVATION (ft)	DEPTH (ft)	Material Graphics	Description	Sample Location	Sample Number	Blows per 6 in	Blows per Foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
-44.74	56		Poorly graded SAND with CLAY (SP-SC), dense, yellowish brown, moist, fine, with iron-oxide mottling. [COLMA SAND]												
-46.74	58		Grades very dense - moist.	S21	39	53/6"	50			20.6	132.9			PA	
-50.74	62														
-52.74	64		CLAYEY SAND (SC), very dense, dark greenish gray, wet, fine.	S22	23	87/11"	88								
-54.74	66		66.0', grades with SANDY CLAY in cuttings.												
-56.74	68			S23	22	88/11.5"	69			18.2	143			PA	
-58.74	70														
-60.74	72		71.0', grades with SANDY CLAY in cuttings.												
-62.74	74		Grades with frequent black specks and staining.	S24	19	76/11.5"	69			21.3	129.8			PA, CU	74' - 77.5', easier drilling
-64.74	76														
-66.74	78			S25	21	55	100								
-68.74	80		Fat CLAY (CH), very stiff, greenish gray, moist. [OLD BAY CLAY]									PP = 1.13			
-70.74	82		SANDY lean CLAY (CL), hard, olive gray with greenish gray mottling, moist, frequent calcium nodules (up to 1/2" diameter).												
-72.74	84			S26	16	65	67			17.9	133.8			PI, LL	

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PROJECT OR BRIDGE NAME Doyle Drive Replacement Project					
BRIDGE NUMBER 34-0163R		PREPARED BY T. Carroll		DATE 11-3-08	SHEET 3 of 9

Figure

CALTRANS FORMAT DOYLEDRIVE ARUPLOGS 11-2-08.GPJ ARUP LIBRARY CALTRANS FORMAT GLB 11/3/08

ELEVATION (ft)	DEPTH (ft)	Material Graphics	Description	Sample Location	Sample Number	Blows per 6 In	Blows per Foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
-74.74	86		SANDY lean CLAY (CL), hard, olive gray with greenish gray mottling, moist, frequent calcium nodules (up to 1/2" diameter).												
-76.74	88		Fat CLAY (CH), very stiff, olive gray, moist, slight light gray mottling.	S27	10 16 21	37	89					PP = 2.0			
-78.74	90														
-80.74	92														
-82.74	94		Grades stiff.	U28		700 psi	40					PP = 1.13, 1.25, 0.88 TV = 1.0			Hard "spike" in pressure may have caused plug at top of sample PI, LL
-84.74	96														
-86.74	98		Lean CLAY (CL), stiff to very stiff, dark greenish gray, moist, trace fine sand, silt, frequent very light brown shells (crushed) up to 3/4" diameter.	S29	5 8 12	20	89					PP = 1.13 TV = 1.13			
-88.74	100														
-90.74	102														
-92.74	104		CLAYEY SAND (SC), medium dense, greenish gray, wet, SAND is fine to medium, occasional shell fragments, occasional black specks from decayed vegetation. [DEEP MARINE SAND]	U30		500 psi	80								
-94.74	106														
-96.74	108			S31	22 50/5"	50/5"	82			15	139.7				
-98.74	110														
-100.74	112														
-102.74	114		Poorly graded SAND (SP), very dense, yellowish brown and dark reddish brown, wet, mottled, fine, with seams of light yellowish brown SILTY SAND.	S32	19 37 38	75	100								

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REPORT TITLE
BORING RECORD

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PROJECT OR BRIDGE NAME Doyle Drive Replacement Project				EA 163701

PROJECT OR BRIDGE NAME
Doyle Drive Replacement Project

BRIDGE NUMBER 34-0163R	PREPARED BY T. Carroll	DATE 11-3-08	SHEET 4 of 9
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Figure

ELEVATION (ft)	DEPTH (ft)	Material Graphics	Description	Sample Location	Sample Number	Blows per 6 in	Blows per Foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
-104.74	116		CLAYEY SAND (SC), yellowish brown, moist, fine, with iron-oxide mottling, with shell fragments up to ~1/2" diameter.												
-106.74	118		Grades dry to moist. Grades olive gray, very dense, CLAY grades highly plastic, moist.		U33		0 psi 800 psi			16.7	138.2	UU = 5.01			PA Easier drilling
-108.74	120		Poorly graded SAND with CLAY (SP-SC), very dense, dark reddish brown, wet, mottled, fine.												
-112.74	124				S34	41 50/5"	50/5"	100							
-116.74	128				S35	48 50/2"	50/2"	88		21.9 23 20.3	128.6 129.4 127	DS = 5.3095 DS = 5.7415 DS = 6.6655			PA
-122.74	134		Grades dark yellowish brown and dark gray, SAND is very fine, clean.		S36	50/5"	50/5"	100							
-124.74	136		Poorly graded SAND with CLAY (SP-SC), very dense, dark yellowish brown, moist, fine.												
-126.74	138				S37	28 50/6"	50/6"	75							
-132.74	144		Poorly graded SAND (SP), very dense, dark gray, moist, occasional pieces of decayed vegetation, very fine, several clayey seams (up to 1/8" thick), mottled.		S38	25 29 41	70	100							

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Figure

CALTRANS FORMAT DOYLEDRIVE ARUPLOGS_11-2-08.GPJ ARUP LIBRARY CALTRANS FORMAT.GLB 11/3/08

ELEVATION (ft)	DEPTH (ft)	Material Graphics	Description	Sample Location	Sample Number	Blows per 6 in	Blows per Foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
-134.74	146		Poorly graded SAND (SP), very dense, dark gray, moist, occasional pieces of decayed vegetation, very fine, several clayey seams (up to 1/8" thick), mottled.												
-136.74	148		Fat CLAY (CH), hard, greenish gray, moist, with pockets of dark gray, fine, clean SAND (up to 2" in diameter). [OLD BAY CLAY]	S39	11 19 27	46	83			26.1	124.8	PP = >2.0			
-138.74	150		Grades stiff with pieces of decayed vegetation (up to 1/2" diameter), SAND pockets are smaller (up to 1/2" diameter).	S40	22 19 22	41	89					PP = 1.5			
-142.74	154		Grades without SAND pockets, with frequent white shell fragments (up to 1/4" diameter).	S41	7 12 23	40	100			40.8	116.1	UU = 1.28 PP = 1.38 TV = 1.06		159.5', easier drilling	
-150.74	162		Grades without SAND pockets, with frequent white shell fragments (up to 1/4" diameter).												Sampler and slough barrel full, may have lead to increased blow counts
-152.74	164		Grades without SAND pockets, with frequent white shell fragments (up to 1/4" diameter).												
-154.74	166		Grades without SAND pockets, with frequent white shell fragments (up to 1/4" diameter).												
-156.74	168		Grades without SAND pockets, with frequent white shell fragments (up to 1/4" diameter).	S42	4 12 14	26	100					PP = 1.13 TV = 1.25			
-158.74	170		Grades without SAND pockets, with frequent white shell fragments (up to 1/4" diameter).												
-160.74	172		Grades without SAND pockets, with frequent white shell fragments (up to 1/4" diameter).												
-162.74	174		Grades without SAND pockets, with frequent white shell fragments (up to 1/4" diameter).												
	175		Grades without SAND pockets, with frequent white shell fragments (up to 1/4" diameter).												

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Figure

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ELEVATION (ft)	DEPTH (ft)	Material Graphics	Description	Sample Location	Sample Number	Blows per 6 In	Blows per Foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
-164.74	176		Fat CLAY (CH), hard, greenish gray, moist, with pockets of dark gray, fine, clean SAND (up to 2" in diameter). [OLD BAY CLAY] Grades without shell fragments, with decomposed wood, frequent black specks.	M	S43	5	25	100					PP = 1.67 TV = 1.38		
-166.74	177					10									
-168.74	178					15									
-170.74	180		Grades with occasional white shell fragments and occasional pieces of decayed vegetation.									UU = 1.12 PP = 1.5 TV = 1.5		Installed 187.5' of 4" diameter casing after sampling to 184'	
-172.74	181														
-174.74	182		Grades without specks.	M	S44	5	27	100		41.2	114.8				
-176.74	183					13									
-178.74	184					14									
-180.74	186		192.5', cuttings grade dark gray to dark greenish gray with SILT, very fine SAND.	M	S45	3	24	100							
-182.74	187					8									
-184.74	188					16									
-186.74	189		194.0', cuttings are fat clay.											194', slower drilling	
-188.74	190														
-190.74	191														
-192.74	192		195.5', cuttings are dark gray with SILT, very fine SAND.											197.5', sample approximately 30 blows in last 3"	
-194.74	193														
-196.74	194														
-198.74	196		CLAYEY SAND (SC), very dense, green and dark greenish gray, wet, mottled, SAND is fine to medium, with angular GRAVEL pieces (up to 1.5" diameter), occasional decayed vegetation and rootlets, with seams of SANDY CLAY, very faint organic odor. [COLLUVIUM]	M	S46	11	58	100						201' - 202', rig chatter	
-200.74	197					16									
-202.74	198					42									
-204.74	199		200.0', grades moist, with occasional pieces of fractured sandstone (angular, up to 1/2" diameter).		S47	12	76	83						204.5', slower drilling	
-206.74	200					36									
-208.74	201					40									

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Figure

CALTRANS FORMAT DOYLEDRIVE ARUPLOGS_11-2-08.GPJ ARUP LIBRARY CALTRANS FORMAT GLB 11/3/08

ELEVATION (ft)	DEPTH (ft)	Material Graphics	Description	Sample Location	Sample Number	Blows per 6 In	Blows per Foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
205	206														205' - 206', rig chatter heavy
-194.74	206		Lean CLAY (CL), stiff, greenish gray, moist, with SILT, trace fine SAND, frequent decayed vegetation, horizontally fissured (1/16" thick), mottled.	S48	4	14	15	100							Sampler dropped 11" under rod weight then driven a total of 24" - blows given are for final 12"
207															
-196.74	208														
209	210		212.0', cuttings are sandy.												
-198.74	210		Poorly graded SAND with CLAY (SP-SC), dense, greenish gray, SAND is fine to medium, occasional pieces of decayed vegetation, with trace of coarse angular SAND.	S49	13	14	31	89							220' - 220.5', rig chatter
211															
-200.74	212														
213															
-202.74	214														
215	216		218.0', grades fine.												
-204.74	216		SEDIMENTARY ROCK (MELANGE MATRIX), very dark gray, fresh, very soft, very intensely fractured (hard SHALE and META-SANDSTONE fragments in sheared SHALE matrix)(LEAN CLAY (CL), trace fine gravel, gravel is subangular, moist)	S50 C51	50/ 3.5"	50/ 8.5"	100/ 80	100/ 80	N/A						226' - 227', very easy drilling
217															
-206.74	218														
219															
-208.74	220														
221															
-210.74	222														
223															
-212.74	224														
225															
-214.74	226														
227															
-216.74	228														
229															
-218.74	230														
231															
-220.74	232														
233															
-222.74	234														
235															Driller reports bedrock at 232'

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Figure

ELEVATION (ft)	DEPTH (ft)	Material Graphics	Description	Sample Location	Sample Number	Blows per 6 In	Blows per Foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks	
235	236		SEDIMENTARY ROCK (SHALE), very dark gray, fresh, moderately soft, very intensely to intensely fractured, fracture surfaces are commonly polished, fractures predominantly vertical, common white secondary mineral vein infilling. Fractures range from vertical to horizontal.	C52				67	0						Increased down pressure to 600 psi at 236.5' Pressure building at 238.75' Down pressure is 550 psi	
-224.74	237															
-226.74	238				C53				0							
-228.74	239															
-230.74	240				C54				62	0						
-232.74	241		245.5', 0.2' thick sub-vertical mylonized zone.												Straight drilling from 246.5' to 261.5'	
-234.74	242															
-236.74	243															
-238.74	244				C55				97	0						
-240.74	245															
-242.74	246															
-244.74	247															
-246.74	248															
-248.74	249															
-250.74	250															
-252.74	251															
	252															
	253															
	254															
	255															
	256															
	257															
	258															
	259															
	260															
	261															
	262		Borehole terminated at a depth of 261.5 feet on 2/14/2008.													
	263		See Boring Record Legend for soil classification chart and key to test data and sampler type.													
	264		Notes: (1) On 2/15/2008, downhole geophysical (suspension) logging was performed by GEOVision, Inc. Shearwave velocity logging was performed between 18.04 and 246.06 feet. (2) Artesian pressures were encountered after pulling the drill casing to perform shearwave velocity logging. The static water head was approximately 11.5 feet above the ground surface.													



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Figure