



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

PROJECT NO. 34379.1.17	ID. R-2123CE	COUNTY Mecklenburg	GEOLOGIST D. Goodnight
SITE DESCRIPTION I-485 (Charlotte Eastern Outer Loop) at I-85			GROUND WTR (ft)
BORING NO. DB-9	STATION 44+90	OFFSET CL	ALIGNMENT Ramp H
COLLAR ELEV. 657.7 ft	TOTAL DEPTH 80.1 ft	NORTHING 585,650	EASTING 1,483,308
DRILL MACHINE CME 805	DRILL METHOD Wash Rotary/NQ Core	HAMMER TYPE Automatic	
DRILLER R. Toothman	START DATE 06/16/10	COMP. DATE 06/17/10	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
660															657.7	GROUND SURFACE	0.0
655	654.2	3.5	4	5	7	12							M		RESIDUAL Stiff, Medium Plasticity, Tan Brown, Clayey, Fine Sandy SILT		
650	649.2	8.5	3	5	5	10							M		Stiff to Hard, Low Plasticity, White and Gray, Fine Sandy SILT	7.0	
645	644.2	13.5	3	4	6	10							M				
640	639.2	18.5	6	6	10	16							M				
635	634.2	23.5	11	19	25	44							M				
630	629.2	28.5	32	68/0.4					100/0.9						WEATHERED ROCK Gray, Fine Grained, Metamorphosed Quartz Diorite	27.0	
625	624.2	33.5	100/0.3						100/0.3								
620	619.2	38.5	100/0.3						100/0.3								
615									60/0.1						614.2	CRYSTALLINE ROCK Gray and Tan, Moderate to Moderately Severe Weathered, Moderately Hard to Medium Hard, Metamorphosed Quartz Diorite with Very Close to Close Fracture Spacing	43.5
610																	
605																	
600																	
595															594.6	Gray and White, Moderate to Slightly Weathered, Moderately Hard, Metamorphosed Quartz Diorite with Close Fracture Spacing	63.1
590																	
585															585.4	Dark Gray and White, Very Slightly Weathered to Fresh, Hard, Metamorphosed Quartz Diorite with Close to Moderately Close Fracture Spacing	72.3
580																	

NCDOT BORE SINGLE 111643.GPJ NC_DOT.GDT 6/22/10



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BORING NO. DB-9		STATION 44+90		OFFSET CL		ALIGNMENT Ramp H										
COLLAR ELEV. 657.7 ft		TOTAL DEPTH 80.1 ft		NORTHING 585,650		EASTING 1,483,308										
DRILL MACHINE CME 805		DRILL METHOD Wash Rotary/NQ Core				HAMMER TYPE Automatic										
DRILLER R. Toothman		START DATE 06/16/10		COMP. DATE 06/17/10		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
580						Match Line										
										577.6	80.1	
575																Boring Terminated at Elevation 577.6 ft in Crystalline Rock: Metamorphosed Quartz Diorite
570																Bentonite and Tap Water Used as Drilling Fluid Mud Wt. = 64 lbs./cubic ft. initially
565																
560																
555																
550																
545																
540																
535																
530																
525																
520																
515																
510																
505																
500																

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NCDOT GEOTECHNICAL ENGINEERING UNIT

CORE BORING REPORT

PROJECT NO. 34379.1.17	ID. R-2123CE	COUNTY Mecklenburg	GEOLOGIST D. Goodnight
SITE DESCRIPTION I-485 (Charlotte Eastern Outer Loop) at I-85			GROUND WTR (ft)
BORING NO. DB-9	STATION 44+90	OFFSET CL	ALIGNMENT Ramp H
COLLAR ELEV. 657.7 ft	TOTAL DEPTH 80.1 ft	NORTHING 585,650	EASTING 1,483,308
DRILL MACHINE CME 805	DRILL METHOD Wash Rotary/NQ Core	HAMMER TYPE Automatic	
DRILLER R. Toothman	START DATE 06/16/10	COMP. DATE 06/17/10	SURFACE WATER DEPTH N/A

CORE SIZE NQ	TOTAL RUN 36.6 ft		
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ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %			
614.2											Begin Coring @ 43.5 ft	
	614.2	43.5	4.6	3:01 3:54 3:24	(2.4) 52%	(0.0) 0%		(9.4) 48%	(0.0) 0%	CRYSTALLINE ROCK	Gray and Tan, Moderate to Moderately Severe Weathered, Moderately Hard to Medium Hard, Metamorphosed Quartz Diorite with Very Close to Close Fracture Spacing	43.5
	609.6	48.1	5.0	2:27 2:57						Iron Staining on Majority of Joint Faces		
	604.6	53.1	5.0	4:02 2:26 2:12 1:44 1:30	(2.8) 56%	(0.0) 0%				Very Broken Throughout from 43.5 ft. to 63.1 ft. with the Exception of a Hard, Moderately Weathered Zone from 48.1 ft. to 49.4 ft. with 3 joints at 50° to 60°, 2 joints at 20° to 30°, and 1 joint at 10°.		
	599.6	58.1	5.0	1:49 2:54 2:57 1:07 2:51	(2.0) 40%	(0.0) 0%				Moderately Weathered, Moderately Hard Zone from 44.5 ft. to 45.4 ft. with 6 joints at 5° to 10°		
	594.6	63.1	5.0	3:30 3:25 3:44 3:20 3:02	(2.2) 44%	(0.0) 0%				Core Loss was Intermittent and Throughout the Runs from 43.5 ft. to 63.1 ft.		
	589.6	68.1	5.0	3:15 2:42 2:13 2:10 2:56	(4.8) 96%	(2.3) 46%		(7.8) 85%	(3.1) 34%	Gray and White, Moderate to Slightly Weathered, Moderately Hard, Metamorphosed Quartz Diorite with Close Fracture Spacing		
	584.6	73.1	5.0	2:45 1:57 1:57 2:18 2:12	(3.8) 76%	(1.6) 32%				Iron Staining on Joint Faces		
	579.6	78.1	5.0	2:43 2:34 2:10 1:59	(5.0) 100%	(4.6) 92%		(7.8) 100%	(7.4) 95%	8 joints at 0° to 10° 5 joint at 80° to near vertical 5 joints at 50° to 60°		72.3
	577.6	80.1	2.0	3:06 2:19	(2.0) 100%	(2.0) 100%				Very Broken at 64.6 ft. to 65.0 ft.; 67.4 ft. to 67.6 ft.; 70.9 ft. to 72.3 ft.		
										Core Loss at 64.8 ft. to 65.0 ft.; 71.1 ft. to 72.3 ft.		
										Dark Gray and White, Very Slightly Weathered to Fresh, Hard, Metamorphosed Quartz Diorite with Close to Moderately Close Fracture Spacing		
										3 joints at 60° to 70° 3 joints at 20° to 30°		80.1
										Boring Terminated at Elevation 577.6 ft in Crystalline Rock: Metamorphosed Quartz Diorite		
										Bentonite and Tap Water Used as Drilling Fluid Mud Wt. = 64 lbs./cubic ft. initially		

NCDOT CORE SINGLE 111643.GPJ NC_DOT.GDT 6/22/10

CORE PHOTOGRAPHS

DB-9

BOXES 1 & 2: 43.5 - 73.1 FEET



CORE PHOTOGRAPHS

DB-9

BOX 3: 73.1 - 80.1 FEET



FEET



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

PROJECT NO. 34379.1.17	ID. R-2123CE	COUNTY Mecklenburg	GEOLOGIST Smith, B.
SITE DESCRIPTION I-485 (Charlotte Eastern Outer Loop) at I-85			GROUND WTR (ft)
BORING NO. DB-19	STATION 34+15	OFFSET CL	ALIGNMENT -RAMP H- 0 HR. N/A
COLLAR ELEV. 688.9 ft	TOTAL DEPTH 80.5 ft	NORTHING 586,712	EASTING 1,483,352 24 HR. 12.0 Caved
DRILL MACHINE CME-45C	DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic	
DRILLER Gower, S.	START DATE 06/15/10	COMP. DATE 06/16/10	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
690															688.9	GROUND SURFACE 0.0
685	685.1	3.8	8	40	44											RESIDUAL Gray & orange-brown, v. dense, f. grain sand w/trace rock frags. (A-3).
680	680.1	8.8	9	91/0.4											679.6	9.3
675	675.1	13.8	37	63/0.2												WEATHERED ROCK Gray to orange-brown, f. grain sand, interpreted as WR (Quartz Diorite). Auger & SPT refusal @ 22.1'
670	670.1	18.8														
	666.8	22.1													666.8	22.1
665																CRYSTALLINE ROCK Gray, black, mod. to mod. sev. weathering, mod. hard to hard, close to v. close frac. spacing, highly fractured, quartz diorite, iron oxide staining, f. crystalline w/intervals cse. crystalline.
660																
655																
650																
645																
640																
635															638.4	50.5
630																CRYSTALLINE ROCK Gray, black, salmon pink, light to dark gray, sli. weathered, hard to v. hard, close to v. close frac. spacing, quartz diorite, sli. metamorphosed w/weak foliation, iron-oxide staining, numerous healed frags., f. to med. crystalline w/intervals coarsly crystalline.
625																
620																
615																
610																

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NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

PROJECT NO. 34379.1.17	ID. R-2123CE	COUNTY Mecklenburg	GEOLOGIST Smith, B.
SITE DESCRIPTION I-485 (Charlotte Eastern Outer Loop) at I-85			GROUND WTR (ft)
BORING NO. DB-19	STATION 34+15	OFFSET CL	ALIGNMENT -RAMP H- 0 HR. N/A
COLLAR ELEV. 688.9 ft	TOTAL DEPTH 80.5 ft	NORTHING 586,712	EASTING 1,483,352 24 HR. 12.0 Caved
DRILL MACHINE CME-45C	DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic	
DRILLER Gower, S.	START DATE 06/15/10	COMP. DATE 06/16/10	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						ELEV. (ft)
610																
Match Line																
															608.4	80.5
Boring Terminated at Elevation 608.4 ft in Crystalline Rock (Quartz Diorite).																
605																
600																
595																
590																
585																
580																
575																
570																
565																
560																
555																
550																
545																
540																
535																
530																

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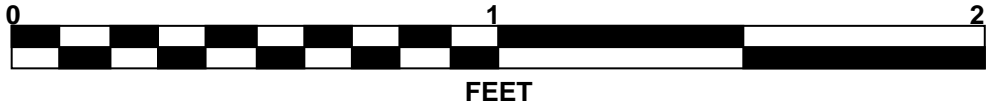
NCDOT GEOTECHNICAL ENGINEERING UNIT

CORE BORING REPORT

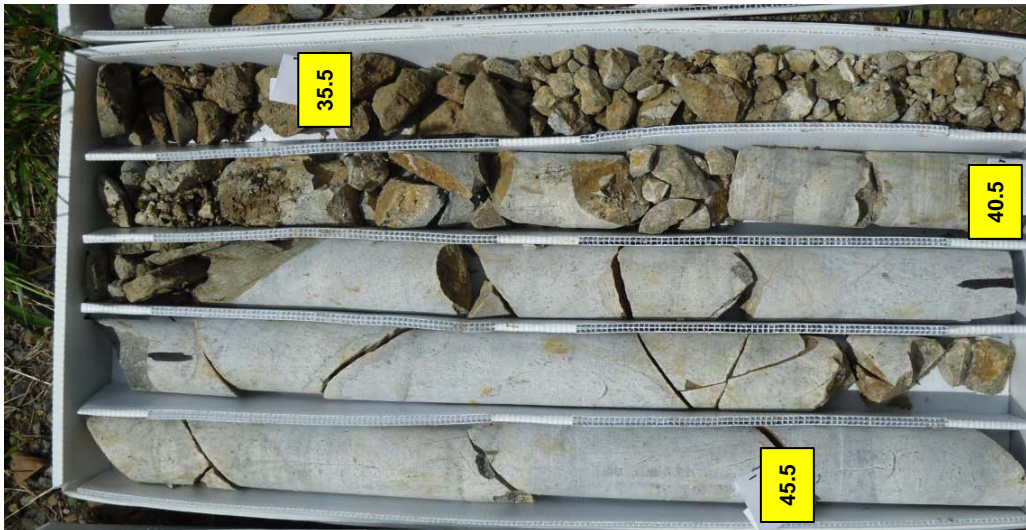
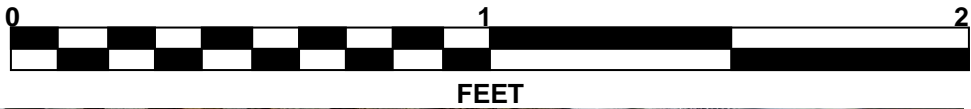
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SITE DESCRIPTION I-485 (Charlotte Eastern Outer Loop) at I-85							GROUND WTR (ft)				
BORING NO. DB-19		STATION 34+15		OFFSET CL		ALIGNMENT -RAMP H-					
COLLAR ELEV. 688.9 ft		TOTAL DEPTH 80.5 ft		NORTHING 586,712		EASTING 1,483,352					
DRILL MACHINE CME-45C		DRILL METHOD SPT Core Boring				HAMMER TYPE Automatic					
DRILLER Gower, S.		START DATE 06/15/10		COMP. DATE 06/16/10		SURFACE WATER DEPTH N/A					
CORE SIZE NQ2		TOTAL RUN 58.4 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %	REC. (ft) %	RQD (ft) %			
666.8										Begin Coring @ 22.1 ft	
665	666.8	22.1	3.4	1:49 1:30 2:03/1.4	(3.0) 88%	(2.0) 59%	(25.6) 90%	(12.1) 43%		CRYSTALLINE ROCK Gray, black, mod. to mod. sev. weathering, mod. hard to hard, close to v. close frac. spacing, highly fractured, quartz diorite, iron oxide staining, f. crystalline w/intervals cse. crystalline.	22.1
	663.4	25.5	5.0	1:43 1:15 2:00	(2.5) 50%	(0.0) 0%					
660				2:31 2:18							
	658.4	30.5	5.0	2:05 1:45 2:32	(4.1) 82%	(0.0) 0%					
655				2:39 2:43							
	653.4	35.5	5.0	2:12 1:29 1:27	(3.4) 68%	(0.0) 0%					
650				3:11 2:18							
	648.4	40.5	5.0	1:50 1:21 1:31	(4.9) 98%	(2.6) 52%					
645				2:27 3:03							
	643.4	45.5	5.0	2:00 1:32 1:28	(4.6) 92%	(2.4) 48%					
640				1:32 1:35							
	638.4	50.5	5.0	2:25 1:40 3:18	(4.4) 88%	(1.2) 24%	(23.6) 79%	(0.0) 0%		CRYSTALLINE ROCK Gray, black, salmon pink, light to dark gray, sli. weathered, hard to v. hard, close to v. close frac. spacing, quartz diorite, sli. metamorphosed w/weak foliation, iron-oxide staining, numerous healed frags., f. to med. crystalline w/intervals coarsly crystalline.	50.5
635				3:45 5:54							
	633.4	55.5	5.0	1:51 1:59 2:22	(4.0) 80%	(1.5) 30%					
630				2:15 1:57							
	628.4	60.5	5.0	1:59 5:06 1:26	(4.7) 94%	(0.0) 0%					
625				1:31 3:33							
	623.4	65.5	5.0	1:20 1:38 1:35	(4.0) 80%	(0.0) 0%					
620				2:15 3:36							
	618.4	70.5	5.0	2:12 2:22 5:47	(4.9) 98%	(0.0) 0%					
615				3:02 4:30							
	613.4	75.5	5.0	3:17 2:07 2:00	(4.7) 94%	(2.4) 48%					
610				2:04 2:20							
	608.4	80.5								Boring Terminated at Elevation 608.4 ft in Crystalline Rock (Quartz Diorite).	80.5
605											
600											
595											
590											

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CORE PHOTOGRAPHIC RECORD
I-485 (Charlotte Eastern Outer Loop) at I-85

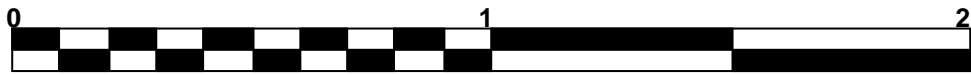


Boring DB-19 – Station 34+15 @ CL Box 1 of 6



Boring DB-19 – Station 34+15 @ CL Box 2 of 6

CORE PHOTOGRAPHIC RECORD
I-485 (Charlotte Eastern Outer Loop) at I-85



FEET



Boring DB-19 – Station 34+15 @ CL Box 3 of 6



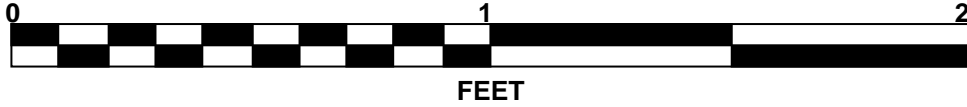
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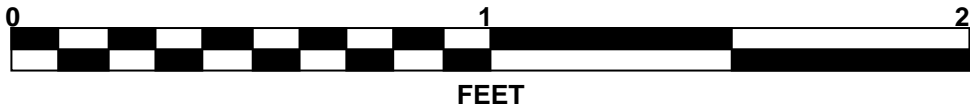
Boring DB-19 – Station 34+15 @ CL Box 4 of 6

CORE PHOTOGRAPHIC RECORD

I-485 (Charlotte Eastern Outer Loop) at I-85



Boring DB-19 – Station 34+15 @ CL Box 5 of 6



Boring DB-19 – Station 34+15 @ CL Box 6 of 6