


REV 1 Final Boring B-401

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)		SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 340123.51 ft E. 2405131.34 ft											
								GROUND SURFACE ELEVATION: 747.68 ft			
								DESCRIPTION			
747.0	1.0	S-1	1-2-1 (3) 73%		0.0-1.5 ft Silty sand, (sm), 60% sand, fine; 40% fines, low plasticity, low toughness; maximum grain size = 1 inches, moderate yellowish brown (10YR 5/4), moist, very loose, trace gravel				sm	9.0-10.0 ft., ST-1, down pressure of 750 psi	
746.0	2.0	S-2	5-8-15 (23) 87%		1.5-3.0 ft Silty sand, (sm), 60% sand, fine to medium; 30% fines, low plasticity, low toughness; 10% gravel, fine, angular, flat, soft hardness; maximum grain size = 0.2 inches, grayish orange (10YR 7/4) and dark gray (N3), moist, medium dense, intermixed pieces of shale.				sm		
745.0	3.0	S-3	15-16-22 (38) 100%		3.0-4.5 ft Silty sand, (sm), 60% sand, fine; 30% fines, low plasticity, low toughness; 10% gravel, fine, angular, flat, soft hardness; maximum grain size = 0.1 inches, moderate brown (5YR 4/4), moist, dense, intermixed pieces of shale, easily broken.				sm		
744.0	4.0										
743.0	5.0	S-4	10-8-10 (18) 100%		4.5-7.5 ft SILTY, CLAYEY GRAVEL WITH SAND, (GC-GM), 49.35% gravel, fine to medium, subrounded to subangular, soft hardness; 34.69% sand, fine to medium; 15.96% fines, low plasticity, medium toughness; maximum grain size = 1.0 inches, light brown (5YR 5/6) to grayish orange (10YR 7/4), moist, medium dense				GC-GM		
742.0	6.0	S-5	11-10-8 (18) 100%								
741.0	7.0										
740.0	8.0	S-6	7-9-10 (19) 100%		7.5-9.0 ft Grayish yellow (5Y 8/4) and dark gray (N3), dry, medium dense, moderately to intensely weathered shale, solid pieces, soft to medium hardness.						
739.0	9.0	ST-1	100%		9.0-10.0 ft Silty sand with gravel, (sm), 60% sand, fine; 20% gravel, fine to medium, subangular, medium hardness; 20% fines, medium plasticity, low toughness; maximum grain size = 0.2 inches, dark yellowish orange (10YR 6/6), moist				sm		
738.0	10.0										
737.0	11.0	S-7	11-21-26 (47) 93%		10.0-11.5 ft Silty sand, (sm), 60% sand, fine; 30% fines, medium plasticity, low toughness; 10% gravel, fine to medium, subangular, medium hardness; maximum grain size = 0.5 inches, moderate yellowish brown (10YR 5/4), moist, dense, pieces of moderately weathered shale, iron oxide staining.				sm		
736.0	12.0	S-8	6-6-8 (14) 87%		11.5-13.0 ft Silty sand with gravel, (sm), 50% sand, fine to medium; 30% gravel, fine to medium, subangular, medium hardness; 20% fines, medium plasticity, low toughness; maximum grain size = 0.25 inches, grayish orange (10YR 7/4) and light greenish gray (5GY 8/1), moist, medium dense, pieces of moderately to intensely weathered shale.				sm		
735.0	13.0	S-9	5-12-15 (27) 93%		13.0-14.5 ft Silty sand, (sm), 60% sand, fine to medium; 30% fines, medium plasticity, low toughness; 10% gravel, fine to medium, subangular, medium hardness; maximum grain size = 0.3 inches, dark yellowish orange (10YR 6/6) and yellowish gray (5Y 7/2), moist, medium dense, small, fissle pieces of moderately to intensely weathered shale dark gray (N3) and yellowish gray (5Y 7/2).				sm		
734.0	14.0										
733.0	15.0	S-10	10-14-16 (30) 87%	14.5-16.0 ft Silty sand with gravel, (sm), 40% sand, fine; 40% fines, low plasticity, no dry strength, low toughness; 20% gravel, fine, subrounded; maximum grain size = 0.3 inches, light brown (5YR 5/6) and yellowish gray (5Y 7/2), moist, medium dense, more small pieces of moderately to intensely weathered shale, some dark gray (N3), iron oxide staining.				sm			
732.0	16.0	S-11	7-16-17 (33) 97%	16.0-17.0 ft Silty sand, (sm), grayish orange (10YR 7/4) and very light gray (N8), dry, dense				sm			
731.0	17.0										
730.0	18.0	S-12	14-34-50/5 100%	17.0-18.9 ft Silty sand, (sm), yellowish gray (5Y 7/2) and grayish orange (10YR 7/4), dry, very dense				sm			
729.0	19.0	S-13	50/5								
728.0		R-1	100%	FD7	18.9-19.0 ft Interval not sampled				sm		
DATE STARTED: 4/12/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky								DRILLING METHOD: 6" Solid Flight Auger, HQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez								DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

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COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 747.68 ft						DESCRIPTION	
DESCRIPTION							
727.0	21.0	R-1	90% (0%)	FD7		19.0-19.42 ft Silty sand, (sm), yellowish gray (5Y 7/2) and dark gray (N3), dry, very loose	SC-1 35.4-36.2 at 15:32 on 4/12/10.
726.0	22.0					19.42-29.5 ft SHALE, moderately hard, very intensely weathered, yellowish gray (5Y 7/2) and dark gray (N3), very closely to closely fractured, no reaction to HCl, iron oxide staining	
725.0	23.0						
724.0	24.0						
723.0	25.0						
722.0	26.0	R-2	100% (8%)	FD7			
721.0	27.0						
720.0	28.0					27.8-29.5 ft Joint, R.D. = 90°, 70°; filling: clay; surface: rough, undulating; iron oxidation on fracture faces. Fracture set #F-1.	
719.0	29.0						
718.0	30.0					29.5-34.5 ft SHALE, moderately hard, fresh, dark gray (N3), very closely to moderately fractured, no reaction to HCl, iron oxide staining, intensely weathered section from 29.8 to 31.3 ft., yellowish gray (5Y 7/2).	
717.0	31.0	R-3	88% (26%)	FD7			
716.0	32.0					31.3-33.4 ft Joint, R.D. = 0°, closely spaced; filling: slightly weathered; surface: slightly rough, planar, slightly weathered. Fracture set #F-2.	
715.0	33.0						
714.0	34.0						
713.0	35.0					34.5-39.5 ft SHALE, interbedded, moderately hard, fresh, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining	
712.0	36.0	R-4	100% (46%)	FD5		34.5-38.7 ft Joint, R.D. = 50°, 75°, closely spaced; filling: slightly weathered; surface: moderately rough, slightly weathered. Fracture set #F-3.	
711.0	37.0						
710.0	38.0						
709.0	39.0						
708.0	40.0	R-5		FD5		39.5-40.1 ft Joint, R.D. = 0 to 20°; surface: slightly rough. Fracture set #F-4.	
DATE STARTED: 4/12/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						NOTES:	
APPROVED BY: Rolando Benitez						DRILL RIG: CME-55 (Truck) HAMMER ID: 955	






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PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 340123.51 ft E. 2405131.34 ft GROUND SURFACE ELEVATION: 747.68 ft										
							DESCRIPTION			
707.0	41.0	R-5	100% (44%)	FD5		39.5-64.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), moderately fractured, no reaction to HCl, iron oxide staining 40.1-40.8 ft Joint, R.D. = 75°; filling: slightly weathered; surface: slightly rough, slightly weathered; iron oxide on fracture surfaces. Fracture set #F-5. 40.8-41 ft Joint, R.D. = 0° to 20°; Fracture set #F-6. 41.6-41.8 ft Joint, R.D. = 60°; Fracture set #F-7. 41.9-44.2 ft Joint, R.D. = 10°; Fracture set #F-8.				
706.0	42.0									
705.0	43.0									
704.0	44.0									
703.0	45.0									
702.0	46.0	R-6	100% (53%)	FD3		45.2-46.5 ft Joint, R.D. = 45° to 90°; filling: slightly weathered; surface: moderately rough, undulating, slightly weathered; fracture begins at 45°, progresses to 90° and returns to 45°, iron oxide staining on fracture surfaces. Fracture set #F-9. 47.5-49.5 ft Joint, R.D. = 30°, closely spaced; surface: smooth, planar. Fracture set #F-10.				
701.0	47.0									
700.0	48.0									
699.0	49.0									
698.0	50.0									
697.0	51.0	R-7	100% (34%)	FD6		49.6-49.8 ft Joint, R.D. = 65°; surface: moderately rough, planar. Fracture set #F-11. 50.4-50.5 ft Joint, R.D. = 25°; surface: rough. Fracture set #F-12. 51.7-52.2 ft Joint, R.D. = 70°; surface: moderately rough, undulating. Fracture set #F-13. 52.3-52.7 ft R.D. = 20°; surface: smooth, planar. Fracture set #F-14. 52.9-53.1 ft R.D. = 60°; surface: moderately rough, undulating. Fracture set #F-15. 53.6-53.7 ft Joint, R.D. = 0°; surface: rough. Fracture set #F-16. 53.8-54.2 ft Joint, R.D. = 75°; filling: moderately healed. Fracture set #F-17.				
696.0	52.0									
695.0	53.0									
694.0	54.0									
693.0	55.0									
692.0	56.0	R-8	100% (46%)	FD7		54.5-54.9 ft Joint, R.D. = 100°; surface: slightly rough, undulating. Fracture set #F-18. 54.9-59 ft Joint, R.D. = 0° to 40°, closely spaced; surface: slightly rough, planar. Fracture set #F-19.				
691.0	57.0									
690.0	58.0									
689.0	59.0									
688.0		R-9		FD6		59.5-64.5 ft Joint, R.D. = 0° to 20°, closely spaced; surface: slightly rough.				
DATE STARTED: 4/12/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky							DRILLING METHOD: 6" Solid Flight Auger, HQ DRILLING CO. Terracon	NOTES:		
APPROVED BY: Rolando Benitez							DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955		

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ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						<p>N. 340123.51 ft E. 2405131.34 ft</p> <p>GROUND SURFACE ELEVATION: 747.68 ft</p>		
687.0	61.0	R-9	100% (44%)	FD6		Fracture set #F-20.		SC-2 63.85-64.5 ft. at 10:24 on 4/13/10.
686.0	62.0					39.5-64.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), moderately fractured, no reaction to HCl, iron oxide staining		
685.0	63.0					60.4-63.6 ft Joint, R.D. = 50°-55°, widely spaced; filling: totally healed.		
684.0	64.0							
683.0	65.0	R-10	100% (22%)	FD8		64.5-69.5 ft SHALE, moderately hard, fresh to moderately weathered, dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining, becomes moderately weathered from 65.9 ft., shale beginning to weather into clay yellowish gray (5Y 7/2) but still intact, all broken/fractured surfaces with iron oxide staining.		
682.0	66.0					64.5-69.5 ft Joint, R.D. = 0° to 20°, closely spaced; filling: slightly weathered; surface: slightly rough, planar, slightly weathered. Fracture set #F-21.		
681.0	67.0							
680.0	68.0							
679.0	69.0	R-11	100% (0%)	FD8		69.5-74.5 ft SHALE, moderately hard, moderately weathered, dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining, moderately to intensely weathered, shale beginning to weather into clay, yellowish gray (5Y 7/2), breaking apart in places, becomes intensely weathered at 72.7 ft., quartz filled fracture 72.7-74.5 ft.		
678.0	70.0							
677.0	71.0							
676.0	72.0							
675.0	73.0	R-12	100% (24%)	FD6		72.7-76.1 ft Joint, R.D. = 70°, closely spaced, moderately open; filling: moderately healed, thin quartz, moderately weathered; surface: rough, moderately weathered. Fracture set #F-22.		
674.0	74.0							
673.0	75.0					74.5-79.0 ft SHALE, interbedded, moderately hard, moderately weathered, dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining, moderately to intensely weathered, shale beginning to weather into yellowish gray (5Y 7/2) clay, quartz filled fracture 75.2-76.1 ft., shale becomes fresh to slightly weathered from 76.1 - 79.0 ft.		
672.0	76.0					76.1-79 ft Joint, R.D. = 20° to 45°, closely spaced, slightly open; iron oxide staining on fracture surfaces. Fracture set #F-23.		
671.0	77.0	R-13	100% (24%)	FD6				
670.0	78.0							
669.0	79.0							
668.0						79.0-84.5 ft SHALE, moderately hard, fresh, dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining		
DATE STARTED: 4/12/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, HQ DRILLING CO. Terracon	NOTES:	
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						COORDINATES		USCS SYMBOL	REMARKS
						N. 340123.51 ft E. 2405131.34 ft			
						GROUND SURFACE ELEVATION: 747.68 ft			
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION			
667.0	81.0	R-13	100% (24%)	FD6		79.1-80.15 ft Joint, R.D. = 10°; surface: slightly rough, planar. Fracture set #F-25. 79.6-80.1 ft Joint, R.D. = 60°; surface: moderately rough, undulating. Fracture set #F-24. 79.0-84.5 ft SHALE, moderately hard, fresh, dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining 80.3-81.7 ft Joint, R.D. = 70°; filling: slightly weathered; surface: moderately rough, planar, slightly weathered. Fracture set #F-26. 82.9-83.2 ft Joint, R.D. = 0°; Fracture set #F-27. 83.2-84.3 ft Joint, R.D. = 85°; filling: moderately healed, very thin calcite, slightly weathered; surface: slightly weathered. Fracture set #F-28.		SC-3 90.8 - 92.10 at 11:20 on 4/14/10.	
666.0	82.0								
665.0	83.0								
664.0	84.0								
663.0	85.0	R-14	100% (0%)	FD7		84.5-89.5 ft SHALE, moderately hard, fresh, dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining, moderately weathered from 86.8-87.85 ft., shale beginning to weather into yellowish gray (5Y 7/2) clay, breaking apart in places, quartz filled fracture 85.7-86.5 ft., 75°. 84.5-85.6 ft R.D. = 10° to 20°; surface: slightly rough, planar. Fracture set #F-29. 85.7-86.5 ft Joint, R.D. = 70°, slightly open; filling: partly healed, very thin quartz, slightly weathered, moderately hard; surface: rough, slightly weathered; fracture healed 85.7-86.0 ft., broken open/unhealed 86.0-86.6 ft., iron oxide staining. Fracture set #F-30. 87.85-88.3 ft Joint, R.D. = 70°; filling: moderately healed, very thin; iron staining within fracture. Fracture set #F-31. 88.5-88.8 ft Joint, R.D. = 10°; surface: smooth, planar. Fracture set #F-32. 88.9-89.4 ft Joint, R.D. = 65°; surface: slightly rough, planar. Fracture set #F-33.			
662.0	86.0								
661.0	87.0								
660.0	88.0								
659.0	89.0	R-15	100% (92%)	FD3		89.5-94.5 ft SHALE, moderately hard, fresh, dark gray (N3), widely fractured, no reaction to HCl, iron oxide staining, moderately weathered shale 89.5-89.7 ft., calcite healed fracture 93.8-94.1 ft., trace pyrite on healed fracture. 89.5-90.8 ft Joint, R.D. = 10°; surface: smooth, planar. Fracture set #F-34.			
658.0	90.0								
657.0	91.0								
656.0	92.0								
655.0	93.0	R-16	100% (100%)	FD1		93.8-94.1 ft Joint, R.D. = 60°, moderately open; filling: totally healed, very thin calcite, fresh, moderately soft; surface: fresh. Fracture set #F-35. 94.5-99.5 ft SHALE, moderately hard, fresh, dark gray (N3), very widely to extremely widely fractured, no reaction to HCl, trace fossils and pyrite throughout sample. 95.3-95.4 ft Joint, R.D. = 0°; surface: smooth. Fracture set #F-36.			
654.0	94.0								
653.0	95.0								
652.0	96.0								
651.0	97.0	R-17		FD1					
650.0	98.0								
649.0	99.0								
648.0									
DATE STARTED: 4/12/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, HQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 955	


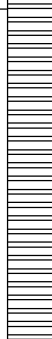

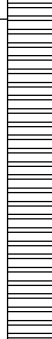

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ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE				
GROUND SURFACE ELEVATION: 747.68 ft						DESCRIPTION			
647.0	101.0	R-17	100% (100%)	FD1		99.5-241.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, trace fossils and pyrite throughout sample.		mechanically broken while being removed from core catcher.	
646.0	102.0					101.3-101.6 ft Joint, R.D. = 55°; surface: slightly rough, planar. Fracture set #F-37.			
645.0	103.0								
644.0	104.0								
643.0	105.0								
642.0	106.0	R-18	100% (100%)	FD0					
641.0	107.0								
640.0	108.0					107.5-108.4 ft Joint, R.D. = 80°; filling: totally healed, moderately thin calcite, fresh, soft; surface: fresh; u-shaped fracture. Fracture set #F-38.			
639.0	109.0								
638.0	110.0								
637.0	111.0	R-19	100% (100%)	FD0					
636.0	112.0								
635.0	113.0								
634.0	114.0								
633.0	115.0								
632.0	116.0	R-20	100% (100%)	FD0					
631.0	117.0								
630.0	118.0								
629.0	119.0								
628.0	120.0								
628.0		R-21		FD0		119-120 ft Joint, R.D. = 75°, closely spaced, slightly open; filling: totally healed, moderately thin calcite, fresh, moderately soft; surface: fresh; two			
DATE STARTED: 4/12/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, HQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 955	


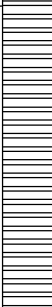

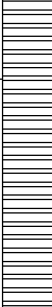

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ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 747.68 ft						DESCRIPTION		
DESCRIPTION								
627.0	121.0	R-21	100% (100%)	FD0		relatively parallel, u-shaped vertically, totally healed with calcite fractures. Fracture set #F-39. 99.5-241.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, trace fossils and pyrite throughout sample.		
626.0	122.0							
625.0	123.0							
624.0	124.0							
623.0	125.0							
622.0	126.0	R-22	96% (96%)	FD0		124.25-124.3 ft Joint, R.D. = 5°; filling: totally healed, very thin calcite, moderately soft. Fracture set #F-40. 125.8-126.55 ft Joint, R.D. = 70°; filling: totally healed, very thin calcite, fresh, moderately soft; surface: fresh; u-shaped vertical fracture, discontinuous in places. Fracture set #F-41.		
621.0	127.0							
620.0	128.0							
619.0	129.0							
618.0	130.0							
617.0	131.0	R-23	100% (87%)	FD2		130.9-131.4 ft Joint, R.D. = 45°; surface: slightly rough, planar. Fracture set #F-42. 131.6-133.1 ft Joint, R.D. = 70°; filling: totally healed, very thin calcite, fresh, moderately soft; surface: fresh; fracture/healing distorted, not continuous/interrupted, u-shaped vertical. Fracture set #F-43.		
616.0	132.0							
615.0	133.0							
614.0	134.0							
613.0	135.0							
612.0	136.0	R-24	100% (100%)	FD1		135.3-135.4 ft Joint, R.D. = 10°, very closely spaced; surface: slightly rough, planar. Fracture set #F-44.		
611.0	137.0							
610.0	138.0							
609.0	139.0							
608.0	140.0							
608.0		R-25		FD1				
DATE STARTED: 4/12/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, HQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick		

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ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE							
GROUND SURFACE ELEVATION: 747.68 ft						DESCRIPTION						
DESCRIPTION												
607.0	141.0	R-25	100% (86%)	FD1		99.5-241.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, trace fossils and pyrite throughout sample.		SC-4 140.9 - 141.9 ft at 11:00 on 4/20/10.				
606.0	142.0											
605.0	143.0											
604.0	144.0											
603.0	145.0	R-26	96% (96%)	FD0								
602.0	146.0											
601.0	147.0											
600.0	148.0											
599.0	149.0	R-27	100% (100%)	FD0								
598.0	150.0											
597.0	151.0											
596.0	152.0											
595.0	153.0	R-28	100% (100%)	FD0								
594.0	154.0											
593.0	155.0											
592.0	156.0											
591.0	157.0	R-29		FD0								
590.0	158.0											
589.0	159.0											
588.0												
DATE STARTED: 4/12/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, HQ DRILLING CO. Terracon			NOTES:			
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick			DRILL RIG: CME-55 (Truck) HAMMER ID: 955			


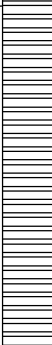
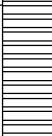
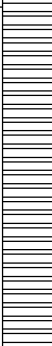
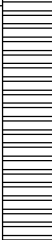
REV 1 Final Boring B-401

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS		
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE				
GROUND SURFACE ELEVATION: 747.68 ft						DESCRIPTION			
587.0	161.0	R-29	98% (96%)	FD0		99.5-241.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, trace fossils and pyrite throughout sample.			
586.0	162.0					162-162.1 ft Joint, R.D. = 20°; filling: totally healed, moderately thin calcite, fresh, moderately soft; surface: fresh. Fracture set #F-46.			
585.0	163.0								
584.0	164.0								
583.0	165.0								
582.0	166.0								
581.0	167.0								
580.0	168.0								
579.0	169.0								
578.0	170.0								
577.0	171.0								
576.0	172.0								
575.0	173.0								
574.0	174.0								
573.0	175.0								
572.0	176.0								
571.0	177.0								
570.0	178.0								
569.0	179.0								
568.0	179.0								
		R-30	100% (100%)	FD0					
		R-31	100% (100%)	FD0					
		R-32	100% (100%)	FD0					
		R-33		FD0					
DATE STARTED: 4/12/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, HQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick			
						DRILL RIG: CME-55 (Truck) HAMMER ID: 955			

REV 1 Final Boring B-401

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 340123.51 ft E. 2405131.34 ft GROUND SURFACE ELEVATION: 747.68 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
567.0 181.0		R-33	100% (100%)	FD0		99.5-241.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, trace fossils and pyrite throughout sample.		
566.0 182.0								
565.0 183.0								
564.0 184.0								
563.0 185.0		R-34	100% (100%)	FD0				
562.0 186.0								
561.0 187.0								
560.0 188.0								
559.0 189.0		R-35	75% (75%)	FD0			Short, 2.0 ft run, due to drillers removing casing advancer	
558.0 190.0								
557.0 191.0								
556.0 192.0								
555.0 193.0		R-36	100% (83%)	FD1		192.7-193.2 ft Joint, R.D. = 75°, very closely spaced; surface: slightly rough, planar. Fracture set #F-47.		
554.0 194.0								
553.0 195.0								
552.0 196.0								
551.0 197.0		R-37	100% (94%)	FD1			SC-5 195.0- 196.5 ft at 10:30 on 4/21/10.	
550.0 198.0								
549.0 199.0								
548.0								
DATE STARTED: 4/12/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, HQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-401

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340123.51 ft E. 2405131.34 ft GROUND SURFACE ELEVATION: 747.68 ft		
						DESCRIPTION		
547.0	201.0	R-37	100% (94%)	FD1		99.5-241.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, trace fossils and pyrite throughout sample. 200.6-200.9 ft Joint, R.D. = 60°; surface: slightly rough, planar. Fracture set #F-48.		
546.0	202.0							
545.0	203.0							
544.0	204.0	R-38	100% (100%)	FD0				
543.0	205.0							
542.0	206.0							
541.0	207.0							
540.0	208.0							
539.0	209.0	R-39	100% (98%)	FD0				
538.0	210.0							
537.0	211.0							
536.0	212.0					217.3-218 ft Joint, R.D. = 80°, tight; surface: slightly rough, planar. Fracture set #F-49.		
535.0	213.0							
534.0	214.0	R-40	100% (100%)	FD0				
533.0	215.0							
532.0	216.0							
531.0	217.0							
530.0	218.0	R-41	98% (98%)	FD1				
529.0	219.0							
528.0								
DATE STARTED: 4/12/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, HQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-401

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340123.51 ft E. 2405131.34 ft GROUND SURFACE ELEVATION: 747.68 ft		
						DESCRIPTION		
527.0	221.0	R-41	98% (98%)	FD1		99.5-241.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, trace fossils and pyrite throughout sample.		
526.0	222.0							
525.0	223.0							
524.0	224.0	R-42	100% (100%)	FD0				
523.0	225.0							
522.0	226.0							
521.0	227.0							
520.0	228.0							
519.0	229.0	R-43	98% (98%)	FD0				
518.0	230.0							
517.0	231.0							
516.0	232.0							
515.0	233.0							
514.0	234.0	R-44	100% (100%)	FD0				
513.0	235.0							
512.0	236.0							
511.0	237.0							
510.0	238.0	R-45	100% (100%)	FD0				
509.0	239.0							
508.0								
DATE STARTED: 4/12/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, HQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-401

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 747.68 ft						DESCRIPTION		
507.0	241.0	R-45	100% (100%)	FD0		99.5-241.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, trace fossils and pyrite throughout sample.	SC-6 247.35 - 248.9 ft. at 08:15 on 4/22/10.	
506.0	242.0					241.5-246.5 ft SHALE, interbedded, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, trace fossils and pyrite, slightly more fossils than above concentrated into several layers (242.5-242.7 ft., 244.0 ft., 245.1-245.2 ft., 246.2 ft.).		
505.0	243.0							
504.0	244.0	R-46	100% (100%)	FD0				
503.0	245.0							
502.0	246.0							
501.0	247.0					246.5-251.5 ft SHALE, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, distinct fossil bands at 246.9-247.7 ft. and 249.8-250.2 ft., trace fossils and pyrite throughout sample.		
500.0	248.0							
499.0	249.0	R-47	100% (100%)	FD0				
498.0	250.0							
497.0	251.0							
496.0	252.0					251.5-266.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, fossil layers and trace pyrite throughout sample.		
495.0	253.0							
494.0	254.0	R-48	100% (100%)	FD0				
493.0	255.0							
492.0	256.0							
491.0	257.0							
490.0	258.0	R-49	100% (100%)	FD0				
489.0	259.0							
488.0								
DATE STARTED: 4/12/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, HQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-401

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 747.68 ft						DESCRIPTION	
DESCRIPTION							
487.0	261.0	R-49	100% (100%)	FD0		251.5-266.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, fossil layers and trace pyrite throughout sample.	
486.0	262.0	R-50	100% (100%)	FD0			
485.0	263.0						
484.0	264.0						
483.0	265.0						
482.0	266.0	R-51	98% (98%)	FD0			
481.0	267.0						
480.0	268.0						
479.0	269.0						
478.0	270.0	R-52	100% (100%)	FD0			
477.0	271.0						
476.0	272.0						
475.0	273.0						
474.0	274.0	R-53	100% (100%)	FD0			
473.0	275.0						
472.0	276.0						
471.0	277.0						
470.0	278.0						
469.0	279.0						
468.0							
DATE STARTED: 4/12/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, HQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-401

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 340123.51 ft E. 2405131.34 ft GROUND SURFACE ELEVATION: 747.68 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
467.0	281.0	R-53	100% (100%)	FD0		276.5-281.5 ft SHALE, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, trace fossils and pyrite, 0.05 ft. thick totally healed with calcite fracture at 277.3 ft.	SC-7 293.2-294.3 ft. at 15:00 on 4/22/10.	
466.0	282.0	R-54	100% (100%)	FD0		281.5-286.5 ft SHALE, moderately hard, fresh, dark gray (N3), widely to very widely fractured, no reaction to HCl, trace fossils and pyrite, fractures totally healed with calcite 282.2 ft., 283.5 ft., 285.8-286.5 ft. 282.2-283.6 ft Joint, R.D. = 15°, widely spaced; filling: totally healed, moderately thin calcite, fresh, moderately soft; surface: planar, fresh. Fracture set #F-52.		
465.0	283.0							
464.0	284.0							
463.0	285.0							
462.0	286.0	R-55	92% (92%)	FD0		285.8-286.5 ft Joint, R.D. = 60°; filling: totally healed, very thin calcite, fresh, moderately soft; surface: fresh. Fracture set #F-53. 286.5-291.5 ft SHALE, moderately hard, fresh, dark gray (N3), widely to very widely fractured, no reaction to HCl, trace pyrite, wavy calcite-healed fracture, very thin, at 288.55 ft.		
461.0	287.0							
460.0	288.0							
459.0	289.0							
458.0	290.0	R-56	100% (100%)	FD0		288.55-288.6 ft Joint, R.D. = 25°; filling: totally healed, very thin calcite, fresh, moderately soft; surface: fresh; wavy. Fracture set #F-54. 291-291.1 ft Joint, R.D. = 25°; filling: totally healed, moderately thin calcite, fresh, moderately soft; surface: fresh. Fracture set #F-55. 291.5-296.5 ft SHALE, moderately hard, fresh, dark gray (N3), closely to widely fractured, no reaction to HCl, totally healed with calcite fracture-zone, several irregular pieces of shale within healing, 294.3-296.5 ft.		
457.0	291.0							
456.0	292.0							
455.0	293.0							
454.0	294.0	R-57	100% (100%)	FD0		294.3-296.5 ft Joint, R.D. = 10°, 55°, moderately spaced; filling: totally healed, moderately thick calcite, fresh, moderately soft; surface: fresh. Fracture set #F-56. 296.5-301.5 ft SHALE, moderately hard, fresh, dark gray (N3), moderately to very widely fractured, no reaction to HCl, trace fossils and pyrite, totally healed with calcite set of fractures 297.0-298.7 ft., at 75°. 297-298.7 ft Joint, R.D. = 75°; filling: totally healed, moderately thin calcite, fresh, moderately soft; surface: fresh. Fracture set #F-57.		
453.0	295.0							
452.0	296.0							
451.0	297.0							
450.0	298.0							
449.0	299.0							
448.0								
DATE STARTED: 4/12/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, HQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-401

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 340123.51 ft E. 2405131.34 ft GROUND SURFACE ELEVATION: 747.68 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
447.0	301.0	R-57	100% (100%)	FD0		296.5-301.5 ft SHALE, moderately hard, fresh, dark gray (N3), moderately to very widely fractured, no reaction to HCl, trace fossils and pyrite, totally healed with calcite set of fractures 297.0-298.7 ft., at 75°.	
446.0	302.0					301.5-306.5 ft SHALE, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, trace pyrite throughout sample.	
445.0	303.0					301.93-301.95 ft Joint, R.D. = 0°; filling: totally healed, very thin calcite, fresh, moderately soft; surface: planar, fresh. Fracture set #F-58.	
444.0	304.0	R-58	96% (96%)	FD0			
443.0	305.0						
442.0	306.0						
441.0	307.0					306.5-356.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), closely to extremely widely fractured, no reaction to HCl, trace pyrite.	
440.0	308.0						
439.0	309.0	R-59	100% (100%)	FD0			
438.0	310.0					309.55-309.6 ft Joint, R.D. = 10°; filling: totally healed, very thin calcite, fresh, moderately soft; surface: fresh. Fracture set #F-59.	
437.0	311.0						
436.0	312.0						
435.0	313.0						
434.0	314.0	R-60	100% (100%)	FD0			
433.0	315.0						
432.0	316.0						
431.0	317.0						
430.0	318.0	R-61	94% (94%)	FD0			
429.0	319.0						
428.0							
DATE STARTED: 4/12/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, HQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-401

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340123.51 ft E. 2405131.34 ft GROUND SURFACE ELEVATION: 747.68 ft DESCRIPTION		
427.0	321.0	R-61	94% (94%)	FD0		306.5-356.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), closely to extremely widely fractured, no reaction to HCl, trace pyrite.		
426.0	322.0					321.5-324 ft R.D. = 70°-80°, closely spaced; filling: totally healed, moderately thin calcite, fresh, moderately soft; surface: fresh; healed fractures discontinuous in places. Fracture set #F-60.		
425.0	323.0							
424.0	324.0	R-62	100% (100%)	FD0		324-324.1 ft Joint, R.D. = 15°; filling: totally healed, moderately thick calcite, fresh, moderately soft; surface: planar, fresh. Fracture set #F-61.		
423.0	325.0							
422.0	326.0							
421.0	327.0							
420.0	328.0							
419.0	329.0	R-63	100% (100%)	FD0		329.35-329.85 ft Joint, R.D. = 0°, closely spaced; filling: totally healed, very thin calcite, fresh, moderately soft; surface: fresh. Fracture set #F-62. 329.85-330.3 ft Joint, R.D. = 70°; filling: totally healed, very thin calcite and pyrite, fresh, moderately soft; surface: fresh. Fracture set #F-63.		
418.0	330.0							
417.0	331.0							
416.0	332.0					331.9-334.2 ft Joint, R.D. = 56°; filling: totally healed, very thin calcite, fresh, moderately soft; surface: fresh; discontinuous. Fracture set #F-64.		
415.0	333.0					332.9-335.7 ft Joint, R.D. = 10°, widely spaced; filling: totally healed, very thin calcite, fresh, moderately soft; surface: fresh. Fracture set #F-65.		
414.0	334.0	R-64	100% (100%)	FD0				
413.0	335.0							
412.0	336.0							
411.0	337.0					336.5-337.2 ft Joint, R.D. = 85°; filling: totally healed, moderately thin calcite, fresh, moderately soft; surface: fresh. Fracture set #F-66.		
410.0	338.0	R-65	98% (90%)	FD2		337.2-337.33 ft Joint, R.D. = 15°, very closely spaced; filling: totally healed, moderately thick calcite, fresh, moderately soft; surface: fresh; multiple tightly packed bands. Fracture set #F-67. 337.33-338.2 ft Joint, R.D. = 70°, very closely spaced; filling: totally healed, thin calcite, fresh, moderately soft; surface: fresh; zone of many healed fractures, generally dipping 70°, with irregular broken pieces of shale within calcite healing.. Fracture set #F-68.		
409.0	339.0					338.2-338.25 ft Joint, R.D. = 15°, very closely spaced; filling: totally healed,		
408.0								
DATE STARTED: 4/12/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, HQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-401

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						<p>N. 340123.51 ft E. 2405131.34 ft</p> <p>GROUND SURFACE ELEVATION: 747.68 ft</p>		
407.0	341.0	R-65	98% (90%)	FD2		thin calcite. Fracture set #F-69.		
406.0	342.0							
405.0	343.0							
404.0	344.0	R-66	100% (100%)	FD0		<p>338.3-338.7 ft Joint, R.D. = 75°, tight; surface: slightly rough, planar; probably mechanically broken during retrieval. Fracture set #F-70.</p> <p>339.2-340.8 ft Joint, R.D. = 25°, moderately spaced; filling: totally healed, very thin calcite, fresh, moderately soft; surface: smooth, planar, fresh. Fracture set #F-71.</p> <p>306.5-356.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), closely to extremely widely fractured, no reaction to HCl, trace pyrite.</p> <p>341.5-342.2 ft Joint, R.D. = 75°; filling: totally healed, very thin calcite, fresh, moderately soft; surface: fresh. Fracture set #F-72.</p> <p>342.2-342.25 ft Joint, R.D. = 15°; filling: totally healed, thin calcite, fresh, moderately soft; surface: smooth, planar, fresh. Fracture set #F-73.</p> <p>343.3-346.5 ft Joint, R.D. = 20°, closely spaced; filling: totally healed, very thin calcite, fresh, moderately soft; surface: smooth, planar, fresh; very thin to clean, totally healed/calcite fractures dipping generally at 70° within this zone. Fracture set #F-74.</p> <p>346.5-346.65 ft Joint, R.D. = 90°, very closely spaced; filling: totally healed, moderately thick calcite, fresh, moderately soft; surface: smooth, planar, fresh; three vertical bands with broken, irregular, shale fragments within healing. Fracture set #F-75.</p>		SC-8 342.8-344.0 ft. at 14:20 4/23/10.
403.0	345.0							
402.0	346.0							
401.0	347.0							
400.0	348.0							
399.0	349.0	R-67	98% (90%)	FD0				
398.0	350.0							
397.0	351.0							
396.0	352.0							
395.0	353.0							
394.0	354.0	R-68	100% (100%)	FD0				
393.0	355.0							
392.0	356.0							
						---		<p>Snapped wireline pulling R-69</p> <p>Changed drilling rig to CME-550 (Buggy). description continues on next page</p>
<p>DATE STARTED: 4/12/10</p> <p>DATE FINISHED: 4/28/10</p> <p>FIELD GEOLOGIST: Jesse Merkel</p> <p>CHECKED BY: Jennifer Ostrowsky</p>						<p>DRILLING METHOD: 6" Solid Flight Auger, HQ</p> <p>DRILLING CO. Terracon</p>	NOTES:	
<p>APPROVED BY: Rolando Benitez</p>						<p>DRILLER: C. VanVactor</p> <p>HELPER(S): E. Zetwick</p>	<p>DRILL RIG: CME-55 (Truck)</p> <p>HAMMER ID: 955</p>	

REV 1 Final Boring B-401

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
						N. 340123.51 ft	E. 2405131.34 ft		
						GROUND SURFACE ELEVATION: 747.68 ft			
						DESCRIPTION			
407.0	341.0								This description is for the continuation of B-401 core sample collection with CME-550 (Buggy)
406.0	342.0								
405.0	343.0								
404.0	344.0								
403.0	345.0								
402.0	346.0								
401.0	347.0								
400.0	348.0								
399.0	349.0								
398.0	350.0								
397.0	351.0								
396.0	352.0								
395.0	353.0								
394.0	354.0								
393.0	355.0								
392.0	356.0								
391.0	357.0								
390.0	358.0	R -69	98% (98%)	FD0		356.5-361.5 ft SHALE, moderately hard to hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace pyrite and calcite, in some areas calcite showing secondary replacement by pyrite			CME 550 (Buggy) rig starts drilling at 356.5 ft on 4/28/10, switch from HQ wireline to NQ wireline at 361.5 ft.
389.0	359.0								
388.0									
DATE STARTED: 4/28/10						NOTES:			
DATE FINISHED: 4/28/10									
FIELD GEOLOGIST: Adrianna Semione						DRILLING METHOD: NQ			
CHECKED BY: Jennifer Ostrowsky						DRILLING CO. Terracon			
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook			DRILL RIG: CME-550 (Buggy)
						HELPER(S): J. Parlett			HAMMER ID: 925

REV 1 Final Boring B-401

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340123.51 ft E. 2405131.34 ft GROUND SURFACE ELEVATION: 747.68 ft DESCRIPTION		
387.0	361.0	R -69	98% (98%)	FD0		356.5-361.5 ft SHALE, moderately hard to hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace pyrite and calcite, in some areas calcite showing secondary replacement by pyrite		
386.0	362.0					361.5-381.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely to extremely widely fractured, no reaction to HCl, trace pyrite to zones with trace to moderate amounts of pyrite (366.9-367.8 ft.), trace calcite showing secondary replacement by pyrite, oily sheen on surface		
385.0	363.0							
384.0	364.0	R -70	100% (94%)			363.6-363.61 ft Bedding plane separation, R.D. = 10°; filling: totally healed, very thin calcite, fresh; surface: fresh.		
383.0	365.0							
382.0	366.0							
381.0	367.0			FD1				
380.0	368.0							
379.0	369.0	R -71	99% (99%)					
378.0	370.0							
377.0	371.0							
376.0	372.0							
375.0	373.0							
374.0	374.0	R -72	100% (100%)					
373.0	375.0							
372.0	376.0			FD0				
371.0	377.0							
370.0	378.0	R -73	100% (100%)					
369.0	379.0							
368.0								
DATE STARTED: 4/28/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-401

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 340123.51 ft E. 2405131.34 ft GROUND SURFACE ELEVATION: 747.68 ft		
367.0		R -73	100% (100%)	FD0				
366.0						381.0-396.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), extremely widely to widely fractured, no reaction to HCl, trace pyrite, oily sheen on rock surface, trace calcite replaced shells		
365.0								
364.0		R -74	100% (100%)	FD1				
363.0								
362.0						384.6-384.65 ft Bedding plane separation, R.D. = 10°; filling: not healed; surface: smooth, planar; slickensides on bedding plane surface.		
361.0								
360.0								
359.0		R -75	100% (100%)					
358.0								
357.0								
356.0								
355.0								
354.0		R -76	100% (100%)	FD0				
353.0								
352.0								
351.0						396.0-411.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace pyrite and calcite		
350.0								
349.0		R -77	100% (100%)					
348.0								
DATE STARTED: 4/28/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-401

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 340123.51 ft E. 2405131.34 ft GROUND SURFACE ELEVATION: 747.68 ft		
347.0	401.0	R -77	100% (100%)	FD0		396.0-411.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace pyrite and calcite		SC-9, 399.9-401.0 ft, 4/28/10, 1450
346.0	402.0							
345.0	403.0							
344.0	404.0	R -78	100% (100%)					
343.0	405.0							
342.0	406.0			FD0				
341.0	407.0							
340.0	408.0							
339.0	409.0	R -79	100% (100%)					
338.0	410.0							
337.0	411.0					411.0-420.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely fractured, no reaction to HCl, trace calcite		
336.0	412.0					411.3-411.4 ft R.D. = 36°; filling: not healed; surface: smooth, planar.		
335.0	413.0							
334.0	414.0	R -80	100% (94%)	FD1				
333.0	415.0							
332.0	416.0							
331.0	417.0							
330.0	418.0	R -81	100% (100%)	FD0				
329.0	419.0							
328.0						419.6-419.61 ft Bedding plane separation, R.D. = 10°; filling: totally healed,		
DATE STARTED: 4/28/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	


REV 1 Final Boring B-401

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340123.51 ft E. 2405131.34 ft GROUND SURFACE ELEVATION: 747.68 ft		
						DESCRIPTION		
						<div>calcite, fresh; surface: fresh.</div> <div>---- Bottom of Boring at 420.00 ft.----</div>		
DATE STARTED: 4/28/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-402

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 340214.84 ft E. 2405121.84 ft GROUND SURFACE ELEVATION: 761.79 ft		
761.0	1.0	S-1	2-3-5 (8) 40%			0.0-1.5 ft Organic soil, (ol/oh), 95% fines, no dry strength; 5% gravel; maximum grain size = 0.1 inches, dark yellowish brown (10YR 4/2), organic odor, moist, no HCl reaction, spongy, with roots, little shale fragments	ol/oh	
760.0	2.0	S-2	9-11-15 (26) 27%			1.5-15.0 ft SHALE, soft, decomposed to very intensely weathered, medium light gray (N6) and medium dark gray (N4), no reaction to HCl, iron oxide staining, changes to dusky yellow (5Y 6/4) at 7.9 to 8.8 ft		
759.0	3.0							
758.0	4.0	S-3	9-12-14 (26) 100%					
757.0	5.0	S-4	8-12-12 (24) 100%					
756.0	6.0							
755.0	7.0	S-5	7-8-9 (17) 100%					
754.0	8.0	S-6	9-9-11 (20) 100%					
753.0	9.0							
752.0	10.0	S-7	11-12-16 (28) 100%					
751.0	11.0	S-8	18-19-22 (41) 100%					
750.0	12.0							
749.0	13.0	S-9	22-23-27 (50) 100%			15.0-27.7 ft SHALE, soft, decomposed to very intensely weathered, medium light gray (N6) and medium dark gray (N4), very closely to closely fractured, no reaction to HCl, iron oxide staining, dusky yellow (5Y 6/4)		
748.0	14.0	S-10	22-27-32 (59) 93%					
747.0	15.0							
746.0	16.0							
745.0	17.0							
744.0	18.0	R-1	68% (0%)	FD9				
743.0	19.0							
742.0								
DATE STARTED: 5/5/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett	DRILL RIG: CME-550 (Buggy) CME-550 (Buggy) HAMMER ID: 925	

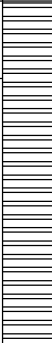

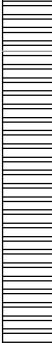
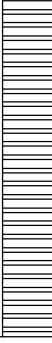

REV 1 Final Boring B-402

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS				
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE						
GROUND SURFACE ELEVATION: 761.79 ft						DESCRIPTION					
741.0	21.0	R-2	58% (0%)	FD9		15.0-27.7 ft SHALE, soft, decomposed to very intensely weathered, medium light gray (N6) and medium dark gray (N4), very closely to closely fractured, no reaction to HCl, iron oxide staining, dusky yellow (5Y 6/4)	cl	SC-1, 26.65-27.5ft., 13:00, 5/5/10			
740.0	22.0					<div>27.7-28.0 ft Sandy lean clay, (cl), 100% fines; light olive gray (5Y 6/1), no HCl reaction</div> <div>28.0-28.4 ft SHALE, soft, intensely weathered, dark gray (N3) with grayish orange (10YR 7/4), very closely to closely fractured, no reaction to HCl, iron oxide staining</div> <div>28.4-28.7 ft Organic soil, (ol/oh), 95% fines, no dry strength; 5% gravel; dark yellowish brown (10YR 4/2), organic odor, moist, no HCl reaction, spongy, with roots, little rock fragments</div> <div>28.7-34.6 ft SHALE, soft, intensely to very intensely weathered, dark gray (N3) with moderate yellow (5Y 7/6), very closely fractured, no reaction to HCl, iron oxide staining</div> <div>28.7-45 ft R.D. = 0°-78°, very closely to moderately spaced; filling: not healed to partly healed, thin clay, iron oxide staining; surface: rough to slightly rough; moderately to intensely weathered.</div> <div>34.6-47.5 ft SHALE, moderately soft to moderately hard, moderately to very intensely weathered, medium dark gray (N4) with pale yellowish orange (10YR 8/6), thinly to thickly bedded, very closely to moderately fractured, no reaction to HCl, iron oxide staining</div>			ol/oh		
739.0	23.0										
738.0	24.0										
737.0	25.0										
736.0	26.0	R-3	100% (17%)	FD8							
735.0	27.0										
734.0	28.0										
733.0	29.0										
732.0	30.0										
731.0	31.0	R-4	90% (25%)	FD7			31.0 ft., Complete loss of circulation.				
730.0	32.0										
729.0	33.0										
728.0	34.0										
727.0	35.0										
726.0	36.0	R-5	99% (12%)								
725.0	37.0										
724.0	38.0										
723.0	39.0										
722.0											
DATE STARTED: 5/5/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:			
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett					
								DRILL RIG: CME-550 (Buggy) CME-550 (Buggy) HAMMER ID: 925			

REV 1 Final Boring B-402

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW(SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS	
							N. 340214.84 ft E. 2405121.84 ft	GROUND SURFACE ELEVATION: 761.79 ft			
							DESCRIPTION				
721.0	41.0	R-6	96% (30%)	FD7		34.6-47.5 ft SHALE, moderately soft to moderately hard, moderately to very intensely weathered, medium dark gray (N4) with pale yellowish orange (10YR 8/6), thinly to thickly bedded, very closely to moderately fractured, no reaction to HCl, iron oxide staining					
720.0	42.0										
719.0	43.0										
718.0	44.0										
717.0	45.0	R-7	100% (35%)	FD5		45-80 ft Fracture, R.D. = 0°-71°, very closely to moderately spaced; filling: not healed to totally healed, very intensely to slightly weathered; surface: rough to smooth, very intensely to slightly weathered.					
716.0	46.0										
715.0	47.0										
714.0	48.0					47.5-49.3 ft SHALE, clayey, soft, very intensely weathered, grayish orange (10YR 7/4), very closely to closely fractured, no reaction to HCl					
713.0	49.0	R-8	84% (22%)	FD7		49.3-50.8 ft SHALE, moderately soft, moderately weathered, dark gray (N3), very closely to closely fractured, no reaction to HCl					
712.0	50.0										
711.0	51.0										
710.0	52.0					50.8-60.2 ft SHALE, clayey, very soft to moderately soft, intensely weathered to decomposed, grayish orange (10YR 7/4) to dark greenish gray (5G 4/1), very closely to closely fractured, no reaction to HCl, iron oxide staining					
709.0	53.0	R-9	82% (24%)	FD7							
708.0	54.0										
707.0	55.0										
706.0	56.0										
705.0	57.0	R-9	82% (24%)	FD7							
704.0	58.0										
703.0	59.0										
702.0	60.0										
DATE STARTED: 5/5/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon				NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett				DRILL RIG: CME-550 (Buggy) CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-402

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 761.79 ft							
DESCRIPTION							
701.0	61.0	R-10	99% (60%)			cl	SC-2, 69.1-70.0 ft., 08:07, 5/6/10.
700.0	62.0						
699.0	63.0						
698.0	64.0						
697.0	65.0	R-11	96% (53%)	FD5			
696.0	66.0						
695.0	67.0						
694.0	68.0						
693.0	69.0	R-12	93% (35%)				
692.0	70.0						
691.0	71.0						
690.0	72.0						
689.0	73.0	R-13	90% (35%)	FD6			
688.0	74.0						
687.0	75.0						
686.0	76.0						
685.0	77.0						
684.0	78.0						
683.0	79.0						
682.0							
DATE STARTED: 5/5/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	
APPROVED BY: Rolando Benítez						DRILLER: D. Westbrook HELPER(S): J. Parlett	
						NOTES: DRILL RIG: CME-550 (Buggy) CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-402

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 340214.84 ft E. 2405121.84 ft GROUND SURFACE ELEVATION: 761.79 ft										
							DESCRIPTION			
681.0	81.0	R-14	98% (30%)	FD5		74.3-87.8 ft SHALE, soft to moderately hard, moderately to intensely weathered, medium gray (N5) with moderate greenish yellow (10Y 7/4), thinly to moderately, no odor, very closely to moderately fractured, no reaction to HCl, iron oxide staining 80-98.8 ft R.D. = 0°-68°, closely to widely spaced; filling: not healed to moderately healed, clean, very thin pyrite, very thin clay, thin to moderately thin quartz, fresh to intensely weathered; surface: smooth to rough, fresh to intensely weathered.				
680.0	82.0									
679.0	83.0									
678.0	84.0									
677.0	85.0	R-15	98% (32%)							
676.0	86.0									
675.0	87.0									
674.0	88.0									
673.0	89.0	R-16	98% (58%)							
672.0	90.0									
671.0	91.0									
670.0	92.0									
669.0	93.0	R-17	100% (70%)							
668.0	94.0									
667.0	95.0									
666.0	96.0									
665.0	97.0									
664.0	98.0									
663.0	99.0									
662.0										
DATE STARTED: 5/5/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon			NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett			DRILL RIG: CME-550 (Buggy) CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-402

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 761.79 ft						DESCRIPTION		
661.0	101.0	R-18	100% (80%)	FD4		87.8-113.05 ft SHALE, moderately soft to moderately hard, slightly weathered to fresh, dark gray (N3), thinly to moderately bedded, no odor, closely to widely fractured, no reaction to HCl, iron oxide staining, with fossiliferous zones, 112.6 ft strong reaction to HCl on only on calcite laminae 100.7-141 ft R.D. = 0°-72°, very closely to widely spaced; filling: not healed to moderately healed, clean, very thin clay, thin calcite, very thin pyrite, fresh to slightly weathered; surface: smooth to rough, fresh to slightly weathered.		
660.0	102.0							
659.0	103.0							
658.0	104.0							
657.0	105.0							
656.0	106.0	R-19	100% (88%)	FD4				
655.0	107.0							
654.0	108.0							
653.0	109.0							
652.0	110.0							
651.0	111.0	R-20	100% (88%)	FD3		113.05-113.35 ft Fat clay, (ch), 100% fines; dark gray (N3), no HCl reaction 113.05-113.35 ft No reaction to HCl 113.35-115.0 ft SHALE, moderately hard, slightly weathered to fresh, dark gray (N3) to grayish black (N2), widely fractured, no reaction to HCl	ch	
650.0	112.0							
649.0	113.0							
648.0	114.0							
647.0	115.0							
646.0	116.0	R-21	100% (93%)	FD3		115.0-115.2 ft Lean clay, (cl), 100% fines; dark gray (N3), no HCl reaction 115.0-115.2 ft No reaction to HCl 115.2-140.0 ft SHALE, moderately hard, fresh, dark gray (N3) to grayish black (N2), widely fractured, no reaction to HCl, with fossiliferous zones	cl	
645.0	117.0							
644.0	118.0							
643.0	119.0							
642.0								
DATE STARTED: 5/5/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett		
						DRILL RIG: CME-550 (Buggy) CME-550 (Buggy) HAMMER ID: 925		


REV 1 Final Boring B-402

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS				
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE						
GROUND SURFACE ELEVATION: 761.79 ft						DESCRIPTION					
641.0	121.0	R-22	98% (79%)	FD3		115.2-140.0 ft SHALE, moderately hard, fresh, dark gray (N3) to grayish black (N2), widely fractured, no reaction to HCl, with fossiliferous zones					
640.0	122.0										
639.0	123.0										
638.0	124.0										
637.0	125.0	R-23	100% (78%)								
636.0	126.0										
635.0	127.0										
634.0	128.0										
633.0	129.0	R-24	100% (100%)								
632.0	130.0										
631.0	131.0										
630.0	132.0										
629.0	133.0	R-25	100% (70%)								
628.0	134.0										
627.0	135.0										
626.0	136.0										
625.0	137.0										
624.0	138.0										
623.0	139.0										
622.0											
DATE STARTED: 5/5/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky								DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez								DRILLER: D. Westbrook HELPER(S): J. Parlett			
					DRILL RIG: CME-550 (Buggy) CME-550 (Buggy) HAMMER ID: 925						

REV 1 Final Boring B-402

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW(Sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES N. 340214.84 ft E. 2405121.84 ft GROUND SURFACE ELEVATION: 761.79 ft		USCS SYMBOL	REMARKS					
		DESCRIPTION													
621.0	141.0		R-26	100% (85%)	FD3		140.0-165.0 ft SHALE, moderately hard, fresh, dark gray (N3) to grayish black (N2), widely fractured, weak reaction to HCl, trace fossils reaped with calcite, trace pyrite, approximately 140.0-145.0 ft., weak reaction to HCl								
620.0	142.0														
619.0	143.0														
618.0	144.0														
617.0	145.0		R-27	100% (95%)											
616.0	146.0														
615.0	147.0														
614.0	148.0														
613.0	149.0		R-28	100% (97%)											
612.0	150.0														
611.0	151.0														
610.0	152.0														
609.0	153.0		R-29	95% (91%)			155.2-195.33 ft R.D. = 10°-58°, very closely to very widely spaced; filling: not healed to moderately healed, clean, vey thin and moderately thick clay, very thin calcite, fresh to slightly weathered, moderately soft to moderately hard; surface: smooth to stepped, fresh to slightly weathered.								
608.0	154.0														
607.0	155.0														
606.0	156.0														
605.0	157.0														
604.0	158.0														
603.0	159.0														
602.0															
DATE STARTED: 5/5/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky							DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon				NOTES:				
APPROVED BY: Rolando Benitez							DRILLER: D. Westbrook HELPER(S): J. Parlett				DRILL RIG: CME-550 (Buggy) CME-550 (Buggy) HAMMER ID: 925				


REV 1 Final Boring B-402

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS			
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE					
GROUND SURFACE ELEVATION: 761.79 ft						DESCRIPTION				
601.0	161.0	R-30	100% (92%)	FD3		140.0-165.0 ft SHALE, moderately hard, fresh, dark gray (N3) to grayish black (N2), widely fractured, weak reaction to HCl, trace fossils replaced with calcite, trace pyrite, approximately 140.0-145.0 ft., weak reaction to HCl				
600.0	162.0									
599.0	163.0									
598.0	164.0									
597.0	165.0	R-31	100% (97%)			165.0-190.15 ft SHALE, moderately hard, fresh, dark gray (N3) to grayish black (N2), moderately to widely fractured, no reaction to HCl, trace fossils replaced with calcite, trace pyrite				
596.0	166.0									
595.0	167.0									
594.0	168.0									
593.0	169.0									
592.0	170.0									
591.0	171.0									
590.0	172.0									
589.0	173.0	R-32	100% (96%)							
588.0	174.0									
587.0	175.0									
586.0	176.0									
585.0	177.0	R-33	97% (94%)							
584.0	178.0									
583.0	179.0									
582.0										
DATE STARTED: 5/5/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon				
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett				
						NOTES:				
						DRILL RIG: CME-550 (Buggy) CME-550 (Buggy) HAMMER ID: 925				

REV 1 Final Boring B-402

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 761.79 ft						DESCRIPTION	
581.0	181.0	R-34	100% (86%)			165.0-190.15 ft SHALE, moderately hard, fresh, dark gray (N3) to grayish black (N2), moderately to widely fractured, no reaction to HCl, trace fossils replaced with calcite, trace pyrite	
580.0	182.0						
579.0	183.0						
578.0	184.0						
577.0	185.0	R-35	99% (96%)				
576.0	186.0						
575.0	187.0						
574.0	188.0						
573.0	189.0	R-36	99% (91%)	FD3		190.15-190.4 ft Fat clay, (ch), 100% fines; dark gray (N3)	ch
572.0	190.0						
571.0	191.0						
570.0	192.0						
569.0	193.0	R-37	100% (94%)			190.4-225.0 ft SHALE, moderately hard, fresh, dark gray (N3) to grayish black (N2), thickly to massive bedded, moderately to very widely fractured, no reaction to HCl, no staining, trace calcite and pyrite replaced fossils	
568.0	194.0						
567.0	195.0						
566.0	196.0						
565.0	197.0						
564.0	198.0						
563.0	199.0						
562.0							
DATE STARTED: 5/5/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky				DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez				DRILLER: D. Westbrook HELPER(S): J. Parlett		DRILL RIG: CME-550 (Buggy) CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-402

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS			
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE					
GROUND SURFACE ELEVATION: 761.79 ft						DESCRIPTION				
561.0	201.0	R-38	97% (91%)			190.4-225.0 ft SHALE, moderately hard, fresh, dark gray (N3) to grayish black (N2), thickly to massive bedded, moderately to very widely fractured, no reaction to HCl, no staining, trace calcite and pyrite replaced fossils 200.1-237.3 ft R.D. = 29°-56°, closely to extremely widely spaced; filling: not healed, clean, moderately thin clay, very soft; surface: rough to moderately rough, fresh to slightly weathered.				
560.0	202.0									
559.0	203.0									
558.0	204.0									
557.0	205.0	R-39	100% (93%)							
556.0	206.0									
555.0	207.0									
554.0	208.0									
553.0	209.0	R-40	100% (88%)	FD3						
552.0	210.0									
551.0	211.0									
550.0	212.0									
549.0	213.0	R-41	99% (88%)							
548.0	214.0									
547.0	215.0									
546.0	216.0									
545.0	217.0									
544.0	218.0									
543.0	219.0									
542.0										
DATE STARTED: 5/5/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky								DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez								DRILLER: D. Westbrook HELPER(S): J. Parlett		
								DRILL RIG: CME-550 (Buggy) CME-550 (Buggy) HAMMER ID: 925		

REV 1 Final Boring B-402

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 761.79 ft						DESCRIPTION	
541.0	221.0	R-42	97% (92%)			190.4-225.0 ft SHALE, moderately hard, fresh, dark gray (N3) to grayish black (N2), thickly to massive bedded, moderately to very widely fractured, no reaction to HCl, no staining, trace calcite and pyrite replaced fossils	
540.0	222.0						
539.0	223.0						
538.0	224.0						
537.0	225.0						
536.0	226.0	R-43	100% (100%)	FD3		225.0-260.0 ft SHALE, moderately hard, fresh, dark gray (N3) to grayish black (N2), thickly to massive bedded, widely to extremely widely fractured, no reaction to HCl, no staining, trace calcite replaced shells, trace pyrite	
535.0	227.0						
534.0	228.0						
533.0	229.0						
532.0	230.0						
531.0	231.0	R-44	100% (95%)				
530.0	232.0						
529.0	233.0						
528.0	234.0						
527.0	235.0						
526.0	236.0	R-45	100% (100%)	FD1			
525.0	237.0						
524.0	238.0						
523.0	239.0						
522.0							
DATE STARTED: 5/5/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez						DRILL RIG: CME-550 (Buggy) CME-550 (Buggy) HAMMER ID: 925	
DRILLER: D. Westbrook HELPER(S): J. Parlett							

REV 1 Final Boring B-402

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 761.79 ft						DESCRIPTION	
521.0	241.0	R-46	97% (97%)			225.0-260.0 ft SHALE, moderately hard, fresh, dark gray (N3) to grayish black (N2), thickly to massive bedded, widely to extremely widely fractured, no reaction to HCl, no staining, trace calcite replaced shells, trace pyrite	
520.0	242.0						
519.0	243.0						
518.0	244.0						
517.0	245.0	R-47	100% (100%)				
516.0	246.0						
515.0	247.0						
514.0	248.0						
513.0	249.0	R-48	100% (100%)	FD1			
512.0	250.0						
511.0	251.0						
510.0	252.0						
509.0	253.0	R-49	100% (100%)				
508.0	254.0						
507.0	255.0						
506.0	256.0						
505.0	257.0						
504.0	258.0						
503.0	259.0						
502.0							
DATE STARTED: 5/5/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett	
						NOTES: DRILL RIG: CME-550 (Buggy) CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-402

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 761.79 ft						DESCRIPTION		
501.0	261.0	R-50	100% (96%)			260.0-280.0 ft SHALE, moderately hard, fresh, dark gray (N3) to grayish black (N2), thickly to massive bedded, widely to extremely widely fractured, weak reaction to HCl, no staining, with fossiliferous layers, fossils replaced with calcite and pyrite, trace pyrite 261.1- ft Bedding plane separation, R.D. = 10°; filling: totally healed, moderately thin calcite, fresh, moderately hard; surface: moderately rough, fresh; moderately thin pyrite, fossiliferous laminae.		
500.0	262.0							
499.0	263.0							
498.0	264.0							
497.0	265.0							
496.0	266.0	R-51	100% (100%)					
495.0	267.0							
494.0	268.0							
493.0	269.0							
492.0	270.0							
491.0	271.0	R-52	100% (82%)	FD1		272.1-272.35 ft Joint, R.D. = 54°; filling: not healed, clean; surface: slightly rough. 272.75- ft Random fracture, R.D. = 37°; filling: totally healed, pyrite, fresh; surface: slightly rough, fresh. 274.15-274.9 ft Fracture zone, R.D. = 36°; filling: not healed, clean, fresh; surface: moderately rough, fresh; along cleavage planes.		
490.0	272.0							
489.0	273.0							
488.0	274.0							
487.0	275.0							
486.0	276.0	R-53	100% (100%)					
485.0	277.0							
484.0	278.0							
483.0	279.0							
482.0								
DATE STARTED: 5/5/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett		

REV 1 Final Boring B-402

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS					
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE							
GROUND SURFACE ELEVATION: 761.79 ft						DESCRIPTION						
481.0	281.0	R-54	100% (100%)	FD1		280.0-295.0 ft SHALE, moderately hard, fresh, dark gray (N3) to grayish black (N2), thickly to massive bedded, widely to extremely widely fractured, weak reaction to HCl, no staining, with fossiliferous layers, fossils replaced with calcite and pyrite						
480.0	282.0											
479.0	283.0											
478.0	284.0											
477.0	285.0											
476.0	286.0	R-55	100% (100%)									
475.0	287.0											
474.0	288.0											
473.0	289.0											
472.0	290.0											
471.0	291.0	R-56	100% (100%)									
470.0	292.0											
469.0	293.0											
468.0	294.0											
467.0	295.0											
466.0	296.0	R-57	100% (94%)									
465.0	297.0											
464.0	298.0											
463.0	299.0											
462.0												
DATE STARTED: 5/5/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky								DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:		
APPROVED BY: Rolando Benitez								DRILLER: D. Westbrook HELPER(S): J. Parlett				
						DRILL RIG: CME-550 (Buggy) CME-550 (Buggy) HAMMER ID: 925						





REV 1 Final Boring B-402

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 761.79 ft						DESCRIPTION	
461.0	301.0	R-58	100% (100%)			295.0-310.0 ft SHALE, moderately hard, fresh, dark gray (N3) to grayish black (N2), thickly to massive bedded, widely to extremely widely fractured, strong reaction to HCl, with a few sporadic zones with a weak reaction to HCl, with fossiliferous layers, trace pyrite	
460.0	302.0						
459.0	303.0						
458.0	304.0						
457.0	305.0	R-59	98% (98%)	FD1	303.6-303.8 ft Joint, R.D. = 58°; filling: not healed, very thin calcite, fresh; surface: moderately rough, fresh. 304.05-304.55 ft Joint, R.D. = 74°, moderately spaced; filling: partly healed, very thin calcite, fresh; surface: moderately rough, fresh. 304.45 ft Very closely spaced fossiliferous laminae, at approximately 33°		
456.0	306.0						
455.0	307.0				306- ft Random fracture, R.D. = 41°.		
454.0	308.0				307- ft Random fracture, R.D. = 25°.		
453.0	309.0	R-60	100% (84%)		310.0-335.0 ft SHALE, dark gray (N3) to grayish black (N2), thickly to massive bedded, closely to widely fractured, strong reaction to HCl, with zones with weak reaction to HCl, trace pyrite within fossiliferous layers		
452.0	310.0						
451.0	311.0						
450.0	312.0						
449.0	313.0	R-61	100% (87%)	FD5	315- ft Random fracture; filling: not healed, thin clay; surface: rough.		
448.0	314.0						
447.0	315.0						
446.0	316.0						
445.0	317.0				316.9- ft Joint, R.D. = 60°; filling: not healed, clean; surface: moderately rough.		
444.0	318.0				317.1- ft Joint, R.D. = 48°, one end visible; filling: partly healed, very thin, fresh; surface: slightly rough, fresh.		
443.0	319.0				317.55- ft Joint, R.D. = 78°; filling: partly healed, trace pyrite, slightly weathered to fresh; surface: moderately rough, slightly weathered.		
442.0					317.9- ft Joint, R.D. = 36°; filling: not healed, very thin clay; surface: moderately rough. 318.3- ft R.D. = 22°; filling: not healed, moderately thin clay; surface: slightly		
DATE STARTED: 5/5/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett	DRILL RIG: CME-550 (Buggy) CME-550 (Buggy) HAMMER ID: 925


REV 1 Final Boring B-402

PROJECT NO. 10-4310

						COORDINATES		USCS SYMBOL	REMARKS
						N. 340214.84 ft E. 2405121.84 ft			
						GROUND SURFACE ELEVATION: 761.79 ft			
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION			
441.0	321.0	R-62	75% (38%)	FD5		rough. 319.77-328.3 ft R.D. = 73°-77°, very closely to very widely spaced; filling: not healed to moderately healed, very thin to moderately thin calcite, very thin calcite and pyrite, fresh to slightly weathered, moderately soft; surface: rough to slightly rough, fresh to slightly weathered.			
440.0	322.0					310.0-335.0 ft SHALE, dark gray (N3) to grayish black (N2), thickly to massive bedded, closely to widely fractured, strong reaction to HCl, with zones with weak reaction to HCl, trace pyrite within fossiliferous layers			
439.0	323.0								
438.0	324.0								
437.0	325.0								
436.0	326.0	R-63	94% (44%)	FD6					
435.0	327.0								
434.0	328.0								
433.0	329.0								
432.0	330.0								
431.0	331.0	R-64	96% (71%)	FD1		330-331.45 ft Fracture zone, closely spaced; filling: not healed, clean, fresh to slightly weathered; surface: moderately rough, fresh; fractures include 36° and 56° with bedding at 10°.			
430.0	332.0								
429.0	333.0					331.95- ft Joint, R.D. = 24°, neither ends visible; filling: partly healed, thin calcite, fresh to slightly weathered; surface: polished, fresh; slickensides present; kink banding with normal displacement (61°) with 1.5 mm displacement.			
428.0	334.0								
427.0	335.0								
426.0	336.0	R-65	98% (86%)	FD5		335.0-335.5 ft SHALE, dark gray (N3), no reaction to HCl, Clay, Dark gray (N3), no reaction to HCl			
425.0	337.0					335.5-350.0 ft SHALE, moderately hard, fresh, dark gray (N3), massive to very thickly bedded, moderately to very widely fractured, no reaction to HCl			
424.0	338.0								
423.0	339.0								
422.0									
DATE STARTED: 5/5/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett		DRILL RIG: CME-550 (Buggy) CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-402

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS				
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE						
GROUND SURFACE ELEVATION: 761.79 ft						DESCRIPTION					
421.0	341.0	R-66	100% (100%)	FD0		335.5-350.0 ft SHALE, moderately hard, fresh, dark gray (N3), massive to very thickly bedded, moderately to very widely fractured, no reaction to HCl					
420.0	342.0										
419.0	343.0										
418.0	344.0										
417.0	345.0										
416.0	346.0	R-67	89% (86%)					---- Bottom of Boring at 350.00 ft.----			
415.0	347.0										
414.0	348.0										
413.0	349.0										
412.0	350.0										

REV 1 Final Boring B-403

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 340114.59 ft E. 2405041.43 ft							
GROUND SURFACE ELEVATION: 737.56 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
737.0	1.0	S-1	1-2-2 (4) 40%			0.0-1.5 ft Silt, (ml), 100% fines, non plastic, no dry strength, no dilatancy, no toughness; 0% gravel; 0% sand; dark yellowish brown (10YR 4/2), organic odor, moist, no HCl reaction, soft, with organics, with rock fragments	ml
736.0	2.0	S-2	3-4-4 (8) 93%			1.5-3.0 ft Gravelly silt/gravelly elastic silt, (ml/mh), 70% fines, low plasticity, no dry strength, no dilatancy, low toughness; 20% gravel, fine to coarse, subangular, hard hardness; 10% sand, fine; maximum grain size = 1.0 inches, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), no odor, moist, no HCl reaction, medium stiff	ml/mh
735.0	3.0						
734.0	4.0	S-3	12-15-16 (31) 100%			3.0-3.4 ft Silt with sand/elastic silt with sand, (ml/mh), 80% fines, medium plasticity, no dry strength, no dilatancy, low toughness; 10% gravel, fine to coarse; 10% sand, fine; maximum grain size = 2.0 inches, dark yellowish brown (10YR 4/2), moist, no HCl reaction, hard, trace roots	ml/mh
733.0	5.0	S-4	9-9-7 (16) 100%			3.4-4.5 ft Gravelly silt/gravelly elastic silt, (ml/mh), 70% fines, high plasticity, no dry strength, no dilatancy, low toughness; 20% gravel, fine to coarse, subangular; 10% sand, fine; maximum grain size = 0.5 inches, dark yellowish brown (10YR 4/2), moist, no HCl reaction, hard	GC
732.0	6.0						
731.0	7.0	S-5	5-11-12 (23) 100%			4.5-7.5 ft CLAYEY GRAVEL WITH SAND, (GC), 41% gravel, medium to coarse, subangular, hard hardness; 31% sand, fine to medium; 28% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.0 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, very stiff	
730.0	8.0	S-6	5-8-8 (16) 90%			7.5-9.0 ft SHALE, moderately soft, decomposed, dark yellowish orange (10YR 6/6), no reaction to HCl, iron oxide staining, boulder	
729.0	9.0						
728.0	10.0	S-7	18-13-11 (24) 60%			9.0-9.9 ft SHALE, moderately hard to hard, fresh, medium light gray (N6), no reaction to HCl, boulder	
727.0	11.0	S-8	6-18-16 (34) 93%			9.9-12.0 ft Gravelly silt/gravelly elastic silt, (ml/mh), 70% fines, high plasticity, no dry strength, no dilatancy, low toughness; 30% gravel, fine to coarse, subangular; 0% sand; maximum grain size = 1.0 inches, dark yellowish orange (10YR 6/6) with medium gray (N5), moist, no HCl reaction, very stiff to hard	ml/mh
726.0	12.0						
725.0	13.0	S-9	11-12-8 (20) 93%			12.0-13.5 ft Silty sand with gravel, (sm), 60% sand, fine to medium; 20% gravel, fine to coarse, subangular, hard hardness; 20% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.5 inches, dark yellowish orange (10YR 6/6) with medium gray (N5), moist, weak HCl reaction, medium dense	sm
724.0	14.0	S-10	9-17-31 (48) 100%			13.5-19.9 ft SHALE, soft to moderately hard, decomposed, yellowish gray (5Y 7/2) with dark yellowish orange (10YR 6/6), no reaction to HCl, iron oxide staining	
723.0	15.0						
722.0	16.0	S-11	21-31-38 (69) 100%				
721.0	17.0	S-12	40-30-30 (60) 100%				
720.0	18.0						
719.0	19.0	S-13	16-32-50/5 86%				
718.0		S-14	50/5				
DATE STARTED: 5/7/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-403

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES N. 340114.59 ft E. 2405041.43 ft GROUND SURFACE ELEVATION: 737.56 ft		USCS SYMBOL	REMARKS
DESCRIPTION										
717.0	21.0	R -1	100%	FD8			19.9-22.6 ft SHALE, moderately soft to moderately hard, intensely weathered, dark yellowish orange (10YR 6/6) with medium gray (N5), very closely to closely fractured, no reaction to HCl, iron oxide staining			SC-1, 26.0-26.45 ft, 1525, 5/7/10
716.0	22.0		47% (0%)							
715.0	23.0									
714.0	24.0	R -2	80% (9%)			21.8-26 ft Bedding plane separation, R.D. = 10°, very closely to closely spaced; surface: smooth, planar; iron oxide staining. 22.6-26.5 ft SHALE, moderately soft to moderately hard, moderately weathered, dark gray (N3) and dark yellowish orange (10YR 6/6), closely to very closely fractured, no reaction to HCl, iron oxide staining 22.8-24.5 ft R.D. = 56°, moderately spaced; surface: rough, planar; iron oxide staining.				
713.0	25.0									
712.0	26.0									
711.0	27.0	R -3	100% (8%)	FD6		26.5-31.8 ft SHALE, moderately hard to hard, fresh to slightly weathered, dark gray (N3), moderately to very closely fractured, no reaction to HCl, zones of slightly to moderately weathered along bedding and fractures 26.8-40.6 ft R.D. = 56°, closely to widely spaced; surface: rough, planar; Few are fresh in zone others are all weathered with iron oxide staining. 27.2-41.4 ft Bedding plane separation, R.D. = 10°, very closely to widely spaced; surface: smooth, planar; iron oxide staining. 28.3-40.3 ft R.D. = 31°-36°, moderately to very closely spaced; surface: rough, planar; iron oxide staining.				
710.0	28.0									
709.0	29.0									
708.0	30.0	R -4	100% (22%)			30.7-38.1 ft Random fracture, R.D. = 65°, very widely spaced; surface: rough, planar, slightly weathered; iron oxide staining. 31.8-36.8 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to closely fractured, no reaction to HCl				
707.0	31.0									
706.0	32.0									
705.0	33.0	R -5	100% (0%)			36.8-41.8 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to very closely fractured, no reaction to HCl				
704.0	34.0									
703.0	35.0									
702.0	36.0									
701.0	37.0									
700.0	38.0									
699.0	39.0									
698.0										
DATE STARTED: 5/7/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky							DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez							DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-403

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340114.59 ft E. 2405041.43 ft GROUND SURFACE ELEVATION: 737.56 ft DESCRIPTION		
697.0	41.0	R -5	100% (0%)	FD6		36.8-41.8 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to very closely fractured, no reaction to HCl		
696.0	42.0					41.8-51.8 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to very closely fractured, no reaction to HCl		
695.0	43.0					41.8-50.6 ft R.D. = 90°, very widely spaced; surface: rough, planar, slightly weathered; iron oxide staining.		
694.0	44.0	R -6	100% (0%)			42.1-51.8 ft Bedding plane separation, R.D. = 10°, moderately to closely spaced; surface: smooth, planar; iron oxide staining.		
693.0	45.0					42.8-50.2 ft R.D. = 36°, moderately to widely spaced; surface: rough, planar; iron oxide staining.		
692.0	46.0					43.3-51.6 ft R.D. = 56°, moderately to widely spaced; surface: rough, undulating; iron oxide staining.		
691.0	47.0			FD6		45.7-46.8 ft R.D. = 85°, moderately spaced; surface: rough, planar; iron oxide staining.		
690.0	48.0							
689.0	49.0	R -7	90% (0%)					
688.0	50.0							
687.0	51.0							
686.0	52.0					51.8-65.6 ft SHALE, moderately hard, fresh, dark gray (N3), closely to very closely fractured, no reaction to HCl		51.8-70.6 ft., poor recovery, drilling water is slightly brown, no recovery of clay in the core barrel, small rock fragments are coming up in drilling mud
685.0	53.0					51.8-70.6 ft Fractures (56° and 70°) and bedding (10°) appear in rock, difficult to determine fracture location due to poor recovery, fractures and bedding show fresh to slightly weathered with little to no iron oxide staining.		
684.0	54.0	R -8	28% (0%)					
683.0	55.0							
682.0	56.0			FD6				
681.0	57.0							
680.0	58.0	R -9	2% (0%)					
679.0	59.0							
678.0								
DATE STARTED: 5/7/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-403

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340114.59 ft E. 2405041.43 ft GROUND SURFACE ELEVATION: 737.56 ft DESCRIPTION		
677.0	61.0	R -9	2% (0%)			51.8-65.6 ft SHALE, moderately hard, fresh, dark gray (N3), closely to very closely fractured, no reaction to HCl		
676.0	62.0			FD6				
675.0	63.0							
674.0	64.0	R -10	14% (0%)					
673.0	65.0							
672.0	66.0					65.6-70.6 ft SHALE, very soft to hard, moderately to intensely weathered, dark gray (N3) with dark yellowish orange (10YR 6/6), very closely to moderately fractured, no reaction to HCl, iron oxide staining		
671.0	67.0							
670.0	68.0	R -11	29% (0%)	FD7				
669.0	69.0							
668.0	70.0							
667.0	71.0					70.6-75.6 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very closely to widely fractured, no reaction to HCl, trace pyrite, calcite healed fractures		
666.0	72.0					70.8-74.8 ft R.D. = 36°, very closely to widely spaced; surface: rough, planar; fractures at top of zone are fresh to slightly weathered with trace iron oxide staining.		
665.0	73.0	R -12	100% (49%)	FD6		71.1-73.4 ft R.D. = 56°, moderately to widely spaced; filling: moderately healed, very thin calcite, fresh to slightly weathered; surface: rough, planar, fresh; 71.1-71.2, no filling, fresh.		
664.0	74.0					72.8-73.1 ft R.D. = 75°; filling: totally healed, very thin calcite, fresh; surface: fresh.		
663.0	75.0							
662.0	76.0					75.6-80.6 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl		SC-2, 75.6-76.2 ft., 5/8/10, 1504
661.0	77.0					76.65-79.4 ft R.D. = 56°, moderately spaced; filling: totally healed, moderately thin calcite, fresh; surface: fresh.		
660.0	78.0	R -13	100% (100%)	FD0		77-78.4 ft R.D. = 36°, widely spaced; filling: totally healed, moderately thin calcite, fresh; surface: fresh.		
659.0	79.0					77.05-77.4 ft R.D. = 60°; filling: moderately healed, moderately thin calcite, fresh; surface: fresh.		
658.0						77.7-79.7 ft Bedding plane separation, R.D. = 10°; filling: moderately healed, moderately thin calcite, fresh; surface: fresh.		
DATE STARTED: 5/7/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-403

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 340114.59 ft E. 2405041.43 ft GROUND SURFACE ELEVATION: 737.56 ft		
657.0	81.0	R-13		FD0		80.6-91.4 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to very widely fractured, no reaction to HCl, trace pyrite and calcite replaced shell casts 80.75-82.45 ft Bedding plane separation, R.D. = 10°, very closely to widely spaced; surface: smooth, planar; iron oxide staining on bedding surface.		
656.0	82.0			FD5				
655.0	83.0	R-14	96% (74%)			83.3-84.3 ft R.D. = 36°; surface: rough, planar, slightly weathered; trace iron oxide staining.		
654.0	84.0							
653.0	85.0							
652.0	86.0							
651.0	87.0							
650.0	88.0	R-15	98% (92%)	FD3				
649.0	89.0					87.9-91.4 ft Bedding plane separation, R.D. = 10°; surface: smooth, planar.		
648.0	90.0							
647.0	91.0							
646.0	92.0							
645.0	93.0	R-16	100% (100%)			91.4-105.6 ft SHALE, moderately hard to hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace pyrite and calcite replaced shell casts		
644.0	94.0							
643.0	95.0							
642.0	96.0			FD0				
641.0	97.0							
640.0	98.0	R-17	100% (100%)					
639.0	99.0							
638.0								
DATE STARTED: 5/7/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-403

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 737.56 ft						DESCRIPTION	
DESCRIPTION							
637.0		R-17				91.4-105.6 ft SHALE, moderately hard to hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace pyrite and calcite replaced shell casts	
101.0							
636.0							
102.0							
635.0							
103.0		R-18	96% (96%)	FD0			
634.0							
104.0							
633.0							
105.0							
632.0							
106.0							
631.0							
107.0							
630.0							
108.0		R-19	100% (100%)	FD0			
629.0							
109.0							
628.0							
110.0							
627.0							
111.0							
626.0							
112.0							
625.0							
113.0		R-20	100% (95%)	FD3			
624.0							
114.0							
623.0							
115.0							
622.0							
116.0							
621.0							
117.0							
620.0							
118.0		R-21	100% (100%)	FD0			
619.0							
119.0							
618.0							
DATE STARTED: 5/7/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	
						NOTES:	
						DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-403

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340114.59 ft E. 2405041.43 ft GROUND SURFACE ELEVATION: 737.56 ft		
						DESCRIPTION		
617.0		R -21				105.6-125.6 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to extremely widely fractured, no reaction to HCl, trace calcite replaced shell casts and pyrite		
121.0								
616.0								
122.0								
615.0								
123.0		R -22	100% (100%)					
614.0								
124.0								
613.0								
125.0								
612.0								
126.0						125.6-145.6 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely to extremely widely fractured, no reaction to HCl, trace pyrite		
611.0				FD0				
127.0								
610.0								
128.0		R -23	98% (98%)					
609.0								
129.0								
608.0								
130.0								
607.0						130.15-130.16 ft Bedding plane separation, R.D. = 10°; filling: moderately healed, very thin calcite, fresh; surface: fresh.		
131.0								
606.0								
132.0								
605.0								
133.0		R -24	100% (100%)			132.3-132.5 ft R.D. = 10°, very closely spaced; filling: moderately healed, very thin calcite and pyrite, fresh; surface: polished, planar, fresh; slickensides on surface.		
604.0								
134.0								
603.0				FD1				
135.0								
602.0								
136.0								
601.0								
137.0								
600.0								
138.0		R -25	100% (100%)					
599.0				FD0				
139.0								
598.0								
DATE STARTED: 5/7/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-403

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						<p>N. 340114.59 ft E. 2405041.43 ft</p> <p>GROUND SURFACE ELEVATION: 737.56 ft</p>		
597.0	141.0	R -25				125.6-145.6 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely to extremely widely fractured, no reaction to HCl, trace pyrite		
596.0	142.0							
595.0	143.0	R -26	100% (100%)	FD0				
594.0	144.0							
593.0	145.0							
592.0	146.0					145.6-165.6 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely to extremely widely fractured, no reaction to HCl, trace pyrite and calcite shell casts		
591.0	147.0					146.7-146.75 ft R.D. = 36°; filling: clean; surface: smooth, planar; possible slickensides on surface.		
590.0	148.0	R -27	100% (100%)	FD1				
589.0	149.0							
588.0	150.0							
587.0	151.0							
586.0	152.0							
585.0	153.0	R -28	100% (100%)	FD1		153-153.01 ft R.D. = 10°; filling: clean; surface: smooth, planar.		SC-3, 153.0-154.1 ft., 5/9/10, 1024
584.0	154.0							
583.0	155.0							
582.0	156.0							
581.0	157.0							
580.0	158.0	R -29	100% (100%)	FD0		159.03-159.05 ft R.D. = 10°, very closely spaced; filling: totally healed, moderately thin calcite, fresh; surface: fresh; multiple bedding showing		
579.0	159.0							
578.0								
DATE STARTED: 5/7/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-403

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340114.59 ft E. 2405041.43 ft GROUND SURFACE ELEVATION: 737.56 ft		
						DESCRIPTION		
577.0		R -29				displacement within the zone.		
161.0						145.6-165.6 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely to extremely widely fractured, no reaction to HCl, trace pyrite and calcite shell casts		
576.0								
162.0								
575.0								
163.0		R -30	100% (100%)	FD0				
574.0								
164.0								
573.0								
165.0								
572.0						165.6-185.6 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely to extremely widely fractured, no reaction to HCl, trace pyrite and calcite shell casts		
166.0								
571.0								
167.0								
570.0								
168.0		R -31	100% (100%)	FD0		168.5-168.65 ft R.D. = 52°; filling: clean; surface: smooth, planar.		
569.0								
169.0								
568.0								
170.0								
567.0								
171.0								
566.0								
172.0								
565.0								
173.0		R -32	100% (100%)			173.45-173.65 ft R.D. = 56°; filling: clean; surface: rough, planar.		
564.0								
174.0								
563.0								
175.0								
562.0								
176.0						175.6-176 ft R.D. = 65°; filling: clean; surface: rough, planar.		
561.0								
177.0								
560.0								
178.0		R -33	100% (100%)					
559.0								
179.0								
558.0								
DATE STARTED: 5/7/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-403

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340114.59 ft E. 2405041.43 ft GROUND SURFACE ELEVATION: 737.56 ft		
						DESCRIPTION		
557.0		R -33		FD1		165.6-185.6 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely to extremely widely fractured, no reaction to HCl, trace pyrite and calcite shell casts		
181.0								
556.0								
182.0								
555.0								
183.0		R -34	100% (100%)	FD1		183.05-183.15 ft R.D. = 56°; filling: clean; surface: rough, planar.		
554.0								
184.0								
553.0								
185.0								
552.0								
186.0				FD0		185.6-200.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely to extremely widely fractured, no reaction to HCl, trace pyrite		
551.0								
187.0								
550.0								
188.0		R -35	100% (100%)					
549.0								
189.0								
548.0								
190.0								
547.0								
191.0								
546.0								
192.0								
545.0								
193.0		R -36	100% (100%)					
544.0								
194.0								
543.0								
195.0								
542.0								
196.0								
541.0								
197.0								
540.0								
198.0		R -37	100% (100%)					
539.0								
199.0								
538.0								
DATE STARTED: 5/7/10 DATE FINISHED: 5/9/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						Bottom of Boring at 200.00 ft.---- DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-404

PROJECT NO. 10-4310

						COORDINATES		USCS SYMBOL	REMARKS
						N. 340031.69 ft E. 2405136.97 ft			
						GROUND SURFACE ELEVATION: 744.44 ft			
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION			
744.0	1.0	S-1	2-2-2 (4) 87%			0.0-1.5 ft Clayey sand, (sc), 80% sand; 20% fines, low plasticity, low toughness; 0% gravel; dark yellowish orange (10YR 6/6), moist, no HCl reaction, very loose		sc	4.5-4.9 ft, ST-1, down pressure of 1000 psi
743.0	2.0	S-2	3-21-22 (43) 47%			1.5-3.0 ft Silty sand, (sm), 70% sand, fine to medium; 30% fines, medium plasticity, low toughness; 0% gravel; maximum grain size = 0.5 inches, dark yellowish orange (10YR 6/6) and dark gray (N3), moist, no HCl reaction, dense, single piece of gravel		sm	
742.0	3.0	S-3	12-33-39 (72) 93%			3.0-4.5 ft Well graded sand with silt and gravel, (sw-sm), 60% sand, fine to medium; 30% gravel, fine to medium, subangular, medium hardness; 10% fines, low plasticity, low toughness; maximum grain size = 1 inches, dark yellowish orange (10YR 6/6) and very pale orange (10YR 8/2), moist, no HCl reaction, very dense		sw-sm	
741.0	4.0	ST-1	100%			4.5-4.9 ft Silty sand with gravel, (sm), 60% sand, fine to medium; 20% gravel, fine, subangular, medium hardness; 20% fines, low plasticity, low toughness; maximum grain size = .25 inches, dark yellowish orange (10YR 6/6) and very pale orange (10YR 8/2), dry, no HCl reaction		sm	
740.0	5.0					4.9-6.0 ft Interval not sampled			Decomposed shale starting at approximately 12 ft
739.0	6.0	S-4	9-16-11 (27) 93%			6.0-9.0 ft SILTY, CLAYEY SAND WITH GRAVEL, (SC-SM), 42.62% sand, fine to medium; 33.85% gravel, fine to medium, subrounded to subangular, medium hardness; 23.53% fines, low plasticity, low toughness; maximum grain size = 0.5 inches, dark yellowish orange (10YR 6/6) and dark gray (N3), dry, no HCl reaction, medium dense, gravel is weathered shale		SC-SM	
738.0	7.0	S-5	9-13-12 (25) 93%			9.0-10.5 ft Silty sand, (sm), 70% sand, fine to medium; 20% fines, medium plasticity, low toughness; 10% gravel, fine; maximum grain size = 1 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, dense, one 1 inch piece of gravel stuck in shoe		sm	
737.0	8.0	S-6	12-22-23 (45) 33%			10.5-12.0 ft Clayey sand, (sc), 60% sand, fine to medium; 30% fines, medium plasticity, low toughness; 10% gravel, fine; maximum grain size = .75 inches, dark yellowish orange (10YR 6/6) and grayish orange (10YR 7/4), moist, no HCl reaction, medium dense, weathered shale fragments		sc	
736.0	9.0	S-7	7-8-9 (17) 87%			12.0-13.5 ft Poorly graded sand with silt and gravel, (sp-sm), 50% sand, fine to medium; 40% gravel, fine to medium; 10% fines, high plasticity, low toughness; maximum grain size = 0.5 inches, dark yellowish orange (10YR 6/6) and grayish orange (10YR 7/4), dry, no HCl reaction, dense, increasingly weathered shale dark gray (N3)		sp-sm	
735.0	10.0	S-8	10-16-16 (32) 80%			13.5-15.0 ft Poorly graded gravel with silt and sand, (gp-gm), 50% gravel, fine to medium; 40% sand, fine to medium; 10% fines, medium plasticity, low toughness; maximum grain size = 0.7 inches, dark yellowish orange (10YR 6/6) and dark gray (N3), moist, no HCl reaction, medium dense, mainly weathered shale		gp-gm	
734.0	11.0	S-9	7-11-14 (25) 73%			15.0-16.42 ft Silty sand with gravel, (sm), 50% sand, fine to medium; 30% gravel, fine; 20% fines, medium plasticity, low toughness; maximum grain size = 0.05 inches, very pale orange (10YR 8/2) and dark gray (N3), dry, no HCl reaction, very dense, refusal, weathered shale		sm	
733.0	12.0	S-10	17-34-50/5 93%		16.42-16.5 ft Interval not sampled.		gp-gm		
732.0	13.0	S-11	26-50/5 89%		16.5-17.42 ft Poorly graded gravel with silt and sand, (gp-gm), 60% gravel, fine to medium, subangular, medium hardness; 30% sand, fine to medium; 10% fines, low plasticity, low toughness; maximum grain size = 0.05 inches, very pale orange (10YR 8/2) and dark gray (N3), dry, no HCl reaction, very dense				
731.0	14.0				17.42-17.75 ft Interval not sampled.				
730.0	15.0	R-1	42% (0%)	FD7					
729.0	16.0								
728.0	17.0								
727.0	18.0								
726.0	19.0								
725.0									
DATE STARTED: 4/24/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES: Drilling with 6 1/4 inch hollow stem auger	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-404

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 340031.69 ft E. 2405136.97 ft GROUND SURFACE ELEVATION: 744.44 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
724.0	21.0	R-2	36% (0%)	FD7		17.75-20.15 ft SHALE, soft to moderately hard, intensely weathered, grayish orange (10YR 7/4) and dark gray (N3), very closely to closely fractured, no reaction to HCl, iron oxide staining, intensely broken, most of sample washed out during drilling.	
723.0	22.0					20.15-25.15 ft SHALE, soft to moderately hard, intensely weathered, dark yellowish orange (10YR 6/6) and dark gray (N3), very closely to closely fractured, no reaction to HCl, iron oxide staining, shale weathering into clay.	
722.0	23.0						
721.0	24.0						
720.0	25.0						
719.0	26.0	R-3	64% (0%)	FD7		25.15-30.15 ft SHALE, interbedded, soft to moderately hard, intensely weathered, yellowish gray (5Y 7/2) and dark yellowish orange (10YR 6/6), closely fractured, no reaction to HCl, iron oxide staining, with zones of intensely weathered shale into dark gray (N3) clay.	
718.0	27.0						
717.0	28.0						
716.0	29.0						
715.0	30.0						
714.0	31.0	R-4	80% (0%)	FD7		30.15-35.15 ft SHALE, interbedded, soft to moderately hard, intensely weathered, dark gray (N3) and yellowish gray (5Y 7/2), closely fractured, no reaction to HCl, iron oxide staining, shale weathering to clay	
713.0	32.0						
712.0	33.0						
711.0	34.0						
710.0	35.0						
709.0	36.0	R-5	0% (0%)			35.15-40.15 ft Sample washed out, zero recovery.	
708.0	37.0						
707.0	38.0						
706.0	39.0						
705.0							
DATE STARTED: 4/24/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES: Drilling with 6 1/4 inch hollow stem auger
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-404

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS		
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE				
GROUND SURFACE ELEVATION: 744.44 ft									
DESCRIPTION									
704.0	41.0	R-6	86% (12%)	FD7		40.15-45.15 ft SHALE, interbedded, moderately hard, moderately to intensely weathered, dark gray (N3) and yellowish gray (5Y 7/2), very closely to closely fractured, no reaction to HCl, iron oxide staining	SC-1 40.3-41.0 ft., 1130, 4/26/10.		
703.0	42.0								
702.0	43.0								
701.0	44.0								
700.0	45.0								
699.0	46.0	R-7	96% (32%)	FD6				45.15-50.15 ft SHALE, interbedded, moderately hard, fresh to slightly weathered, dark gray (N3), very closely to moderately fractured, no reaction to HCl, iron oxide staining, iron oxide staining on all fracture faces.	
698.0	47.0								45.15-50.15 ft Joint, R.D. = 10°, very closely spaced; surface: smooth, planar. Fracture set #F-1.
697.0	48.0								
696.0	49.0								
695.0	50.0							R-8	88% (0%)
694.0	51.0	51.7-54.7 ft Joint, R.D. = 70°, moderately spaced; filling: not healed, thin quartz, moderately weathered; surface: moderately rough, moderately weathered. Fracture set #F-2.							
693.0	52.0								
692.0	53.0								
691.0	54.0	R-9	56% (0%)	FD7					
690.0	55.0								
689.0	56.0								
688.0	57.0								
687.0	58.0								
686.0	59.0								
685.0									
DATE STARTED: 4/24/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES: Drilling with 6 1/4 inch hollow stem auger	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-404

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS				
N. 340031.69 ft E. 2405136.97 ft											
GROUND SURFACE ELEVATION: 744.44 ft											
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION					
684.0		R-10	92% (9%)	FD7		60.15-65.15 ft SHALE, soft to moderately hard, slightly to moderately weathered, dark gray (N3) and yellowish gray (5Y 7/2), closely to moderately fractured, no reaction to HCl, iron oxide staining, weathered quartz infilled fracture 61.5-62.2 ft.					
683.0						60.5-61 ft Joint, R.D. = 60°, closely spaced, slightly open; filling: slightly weathered; surface: slightly rough, undulating, slightly weathered; iron oxide staining on fracture faces. Fracture set #F-3.					
682.0						61.2-64.4 ft Joint, R.D. = 10°, closely spaced, slightly open; surface: slightly rough, undulating; weathered quartz infilling near bottom. Fracture set #F-4.					
681.0											
680.0											
679.0		R-11	84% (8%)	FD5		65.15-70.15 ft SHALE, soft to moderately hard, fresh to moderately weathered, dark gray (N3) and yellowish gray (5Y 7/2), moderately fractured, no reaction to HCl, iron oxide staining, weathered quartz filled fractures 67.4-68.6 ft.					
678.0						65.15-65.9 ft Joint, R.D. = 25°-70°, closely spaced; filling: partly healed, very thin quartz, slightly weathered, moderately hard; surface: moderately rough, slightly weathered. Fracture set #F-5.					
677.0						66.1-68.9 ft R.D. = 70°, closely spaced; filling: partly healed, quartz, slightly to moderately weathered, moderately soft; surface: moderately rough, slightly weathered; intensely weathered at 67.8-68.3 ft.. Fracture set #F-6.					
676.0											
675.0											
674.0		R-12	100% (20%)	FD5		70.15-75.15 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining, quartz filled fractures throughout					
673.0						70.15-75.15 ft Joint, R.D. = 70°, closely spaced, slightly open; filling: partly healed, moderately thin quartz, slightly weathered, moderately soft; surface: moderately rough, slightly weathered. Fracture set #F-7.					
672.0											
671.0											
670.0											
669.0		R-13	100% (24%)	FD5		75.15-80.15 ft SHALE, moderately hard, fresh, dark gray (N3), moderately fractured, no reaction to HCl, iron oxide staining, quartz filled fracture at 77.6-77.7					
668.0						75.15-80.15 ft R.D. = 70°, closely spaced, slightly open; surface: slightly rough, planar; set of quartz healed, very thin, 70 ° fractures at 77.7-78.3 ft., quartz filled fracture at 77.6-77.7 ft. Fracture set #F-8.					
667.0											
666.0											
665.0											
DATE STARTED: 4/24/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon					
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick					
						NOTES: Drilling with 6 1/4 inch hollow stem auger					
						DRILL RIG: CME-55 (Truck) HAMMER ID: 955					

REV 1 Final Boring B-404

PROJECT NO. 10-4310

						COORDINATES		USCS SYMBOL	REMARKS
						N. 340031.69 ft E. 2405136.97 ft			
						GROUND SURFACE ELEVATION: 744.44 ft			
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION			
664.0	81.0	R-14	100% (14%)	FD5		80.15-85.15 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining			SC-2 90.3-90.9 ft., 0840, 4/27/10.
663.0	82.0					80.15-85.15 ft Joint, R.D. = 60°-70°, closely spaced, slightly open; filling: moderately healed, moderately thin quartz, fresh to moderately weathered, moderately soft; surface: slightly rough, planar, fresh; thin to moderately thick quartz healed fractures throughout, 84.9-85.15 ft. quartz crystals (2-3 mm diameter), fracture gouge moderately weathered. Fracture set #F-9.			
662.0	83.0								
661.0	84.0								
660.0	85.0								
659.0	86.0	R-15	98% (32%)	FD5		85.15-90.15 ft SHALE, soft to moderately hard, fresh to moderately weathered, dark gray (N3) and yellowish gray (5Y 7/2), closely to moderately fractured, no reaction to HCl, iron oxide staining, shale weathering into clay, several totally to partially quartz-healed fractures.			
658.0	87.0					85.15-90.15 ft Joint, R.D. = 15°-25°, closely spaced, slightly open; filling: moderately healed, moderately thin quartz, fresh to moderately weathered, moderately soft to moderately hard; surface: slightly rough, planar, fresh. Fracture set #F-10.			
657.0	88.0								
656.0	89.0								
655.0	90.0								
654.0	91.0	R-16	78% (25%)	FD5		90.15-95.15 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3) with yellowish gray (5Y 7/2), closely to moderately fractured, no reaction to HCl, iron oxide staining, thin, moderately healed with slightly weathered quartz fracture at 92.0-92.4 ft.			
653.0	92.0					90.9-93.9 ft Joint, R.D. = 25°, closely spaced; surface: slightly rough, planar; iron oxide staining on fracture faces, thin, moderately healed with slightly weathered quartz fracture dipping 70° at 92.2-92.6 ft.. Fracture set #F-11.			
652.0	93.0								
651.0	94.0								
650.0	95.0								
649.0	96.0	R-17	92% (92%)	FD0		95.15-200.15 ft SHALE, massive, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace fossils and pyrite			
648.0	97.0								
647.0	98.0					97.1-99.2 ft Joint, R.D. = 30°, moderately spaced; filling: totally healed, moderately thin calcite, fresh, moderately hard; surface: smooth, planar, fresh. Fracture set #F-12.			
646.0	99.0								
645.0									
DATE STARTED: 4/24/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES: Drilling with 6 1/4 inch hollow stem auger	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

PROJECT NO. 10-4310

BORING NO. B-404 SHEET 6 OF 11

REV 1 Final Boring B-404

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 744.44 ft						DESCRIPTION		
624.0		R-22	97% (97%)	FD0		95.15-200.15 ft SHALE, massive, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace fossils and pyrite		
121.0								
623.0								
122.0								
622.0								
123.0		R-23	100% (100%)	FD0		123.4-123.45 ft Joint, R.D. = 10°, very closely spaced; filling: totally healed, moderately thin calcite, fresh, moderately soft; surface: slightly rough, undulating, fresh; broken apart during retrieval. Fracture set #F-16.		
124.0								
620.0								
125.0								
619.0								
126.0		R-24	100% (100%)	FD1		128.85-128.9 ft Joint, R.D. = 10°, very closely spaced; filling: totally healed, very thin calcite, fresh, moderately soft; surface: smooth, planar, fresh; mechanically broken. Fracture set #F-17.		
618.0								
127.0								
617.0								
128.0								
616.0		R-25	98% (98%)	FD0		134.1-134.12 ft Joint, R.D. = 10°, very widely spaced, slightly open; surface: slightly rough, planar. Fracture set #F-18.		
129.0								
615.0								
130.0								
614.0								
131.0								
613.0								
132.0								
612.0								
133.0								
611.0								
134.0								
610.0								
135.0								
609.0								
136.0								
608.0								
137.0								
607.0								
138.0								
606.0								
139.0								
605.0								
DATE STARTED: 4/24/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES: Drilling with 6 1/4 inch hollow stem auger
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-404

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 340031.69 ft E. 2405136.97 ft GROUND SURFACE ELEVATION: 744.44 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
604.0		R-26	100% (100%)	FD0		95.15-200.15 ft SHALE, massive, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace fossils and pyrite		
141.0								
603.0								
142.0								
602.0								
143.0		R-27	96% (96%)	FD0				
144.0								
600.0								
145.0								
599.0								
146.0		R-28	98% (98%)	FD0			SC-4 146.4-147.3 ft., 1310 4/27/10.	
147.0								
598.0								
148.0								
597.0								
149.0		R-29	100% (100%)	FD0				
150.0								
595.0								
151.0								
594.0								
152.0		R-29	100% (100%)	FD0				
153.0								
593.0								
154.0								
592.0								
155.0		R-29	100% (100%)	FD0				
156.0								
589.0								
157.0								
588.0								
158.0		R-29	100% (100%)	FD0				
159.0								
587.0								
159.0								
586.0								
585.0		R-29	100% (100%)	FD0				
159.0								
585.0								
159.0								
585.0								
DATE STARTED: 4/24/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES: Drilling with 6 1/4 inch hollow stem auger
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-404

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS	
		N. 340031.69 ft E. 2405136.97 ft GROUND SURFACE ELEVATION: 744.44 ft									
							DESCRIPTION				
							undulating, fresh; broken open during retrieval. Fracture set #F-19. 95.15-200.15 ft SHALE, massive, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace fossils and pyrite				
584.0		161.0	R-30	94% (94%)	FD0						
583.0		162.0									
582.0		163.0									
581.0		164.0									
580.0		165.0									
579.0		166.0	R-31	94% (94%)	FD0						
578.0		167.0									
577.0		168.0									
576.0		169.0									
575.0		170.0									
574.0		171.0	R-32	100% (100%)	FD0						
573.0		172.0									
572.0		173.0									
571.0		174.0									
570.0		175.0									
569.0		176.0	R-33	100% (100%)	FD0						
568.0		177.0									
567.0		178.0									
566.0		179.0									
565.0											
DATE STARTED: 4/24/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon				NOTES: Drilling with 6 1/4 inch hollow stem auger	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick				DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-404

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 744.44 ft						DESCRIPTION	
DESCRIPTION							
564.0		R-34	100% (100%)	FD0		95.15-200.15 ft SHALE, massive, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace fossils and pyrite	
181.0							
563.0							
182.0							
562.0							
183.0							
561.0							
184.0							
560.0							
185.0							
559.0		R-35	96% (96%)	FD0			
186.0							
558.0							
187.0							
557.0							
188.0							
556.0							
189.0							
555.0							
190.0							
554.0		R-36	96% (96%)	FD0			
191.0							
553.0							
192.0							
552.0							
193.0							
551.0							
194.0							
550.0							
195.0							
549.0		R-37	100% (100%)	FD0			
196.0							
548.0							
197.0							
547.0							
198.0							
546.0							
199.0							
545.0							
DATE STARTED: 4/24/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	
						NOTES: Drilling with 6 1/4 inch hollow stem auger	
						DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-404							PROJECT NO. 10-4310	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340031.69 ft E. 2405136.97 ft GROUND SURFACE ELEVATION: 744.44 ft		
DESCRIPTION								
544.0						--- Bottom of Boring at 200.15 ft.---		
DATE STARTED: 4/24/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES: Drilling with 6 1/4 inch hollow stem auger
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-405

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)		SAMPLE OR RUN NO.	BLOW(Sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 340131.91 ft E. 2405221.36 ft											
									GROUND SURFACE ELEVATION: 757.56 ft		
									DESCRIPTION		
757.0	1.0	S-1	3-2-5 (7) 13%					0.0-1.5 ft Well graded gravel, (gw), 95% gravel, medium, medium hardness; 5% fines, low plasticity, low toughness; maximum grain size = 0.1 inches, pinkish gray (5YR 8/1), dry, no HCl reaction, dense, homogeneous	gw	4.5 ft., attempted to push Shelby tube, no recovery of sample; down pressure 4000 psi	
756.0	2.0	S-2	8-16-16 (32) 93%					1.5-3.0 ft Well graded gravel, (gw), 95% gravel, medium, medium hardness; 5% fines, medium plasticity, low toughness; maximum grain size = 0.1 inches, pinkish gray (5YR 8/1), dry, no HCl reaction, dense, homogeneous	gw		
755.0	3.0	S-3	25-15-25 (40) 87%					3.0-4.5 ft Poorly graded gravel, (gp), 90% gravel, medium to coarse, medium hardness; 5% sand; 5% fines, medium plasticity, low toughness; maximum grain size = 0.1 inches, light olive gray (5Y 5/2), dry, no HCl reaction, dense, homogeneous	gp		
754.0	4.0								4.5-5.0 ft Interval not sampled.		
753.0	5.0	S-4	12-9-8 (17) 100%					5.0-6.5 ft Clayey sand, (sc), 70% sand, medium, subangular, soft hardness; 25% fines, medium plasticity, low toughness; 5% gravel, medium, subangular, elongated, medium hardness; maximum grain size = 0.05 inches, very pale orange (10YR 8/2) and light brown (5YR 6/4), moist, no HCl reaction, medium dense, homogeneous	sc		
752.0	6.0								6.5-9.5 ft Well graded gravel, (gw), 84% gravel, medium to coarse, subangular, flat and elongated, medium hardness; 14% sand, fine to coarse; maximum grain size = 1.5 inches, pale yellowish brown (10YR 6/2) and moderate yellowish brown (10YR 5/4), moist, no HCl reaction, loose, trace fines		GW
751.0	7.0	S-5	7-7-7 (14) 93%					9.5-11.0 ft Poorly graded sand with gravel, (sp), medium plasticity, low toughness; 50% gravel, medium, subangular, flat and elongated, medium hardness; 50% sand, fine to medium, subrounded, soft hardness; maximum grain size = 0.5 inches, moderate yellowish brown (10YR 5/4) and pale yellowish brown (10YR 6/2), moist, no HCl reaction, loose, homogeneous	sp		
750.0	8.0	S-6	6-9-11 (20) 80%								
749.0	9.0	S-7	13-18-21 (39) 100%					11.0-14.0 ft SHALE, horizontal, soft to moderately hard, very intensely weathered, dark yellowish orange (10YR 6/6) and dark gray (N3), very closely to closely fractured, no reaction to HCl, iron oxide staining, 10° bedding angle			
748.0	10.0										
747.0	11.0	R-1	100% (0%)					14.0-19.0 ft SHALE, horizontal, soft to moderately hard, very intensely weathered, dark yellowish orange (10YR 6/6) and dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding angle			
746.0	12.0										
745.0	13.0	R-2	100% (54%)					15.7-19 ft Joint, R.D. = 53°, closely spaced; filling: not healed, moderately thin, very intensely weathered, soft; surface: slightly rough, very intensely weathered. Fracture set #F-1.			
744.0	14.0										
743.0	15.0	R-3	96% (34%)					19-24 ft Joint, R.D. = 60°, closely spaced; filling: not healed, very thin clay, slightly weathered, soft; surface: slightly rough, slightly weathered; iron			
742.0	16.0										
741.0	17.0										
740.0	18.0										
739.0	19.0										
738.0											
DATE STARTED: 4/26/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky								DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:		
APPROVED BY: Rolando Benitez								DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665		

REV 1 Final Boring B-405

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS			
		N. 340131.91 ft E. 2405221.36 ft GROUND SURFACE ELEVATION: 757.56 ft											
						DESCRIPTION							
737.0	21.0	R-3	96% (34%)	FD7		oxidation in the fractures.. Fracture set #F-2. 19.0-24.0 ft SHALE, horizontal, soft to moderately hard, very intensely weathered, pale yellowish orange (10YR 8/6) and dark gray (N3), very closely to moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding angle			SC-2, 12.0-12.9 ft., 13:30, 4/26/10.				
736.0	22.0												
735.0	23.0												
734.0	24.0												
733.0	25.0	R-4	80% (12%)	24.0-29.0 ft SHALE, horizontal, soft to moderately hard, very intensely weathered, pale yellowish orange (10YR 8/6) and dark gray (N3), very closely to closely fractured, no reaction to HCl, iron oxide staining, 10° bedding angle									
732.0	26.0			24-29 ft Joint, R.D. = 23°, closely spaced; filling: not healed, moderately weathered; surface: slightly rough, moderately weathered. Fracture set #F-3.									
731.0	27.0												
730.0	28.0												
729.0	29.0	R-5	88% (0%)	FD6		29.0-34.0 ft SHALE, horizontal, soft to moderately hard, very intensely weathered, pale yellowish orange (10YR 8/6) and dark gray (N3), very closely to closely fractured, no reaction to HCl, iron oxide staining, 10° bedding angle							
728.0	30.0					29-31 ft Joint, R.D. = 42°, moderately spaced; filling: intensely weathered; surface: slightly rough, intensely weathered; iron oxidation staining in the fractures.. Fracture set #F-4.							
727.0	31.0												
726.0	32.0												
725.0	33.0	R-6	100% (12%)	34.0-39.0 ft SHALE, horizontal, soft to moderately hard, very intensely weathered, pale yellowish orange (10YR 8/6) and dark gray (N3), very closely to closely fractured, no reaction to HCl, iron oxide staining, 10° bedding angle									
724.0	34.0			34-39 ft Joint, R.D. = 35°, closely spaced; filling: not healed, moderately thin clay, moderately weathered, soft; surface: slightly rough, moderately weathered. Fracture set #F-5.									
723.0	35.0												
722.0	36.0												
721.0	37.0	R-7	100% (44%)	39-44 ft Joint, R.D. = 10°-50°, closely spaced; dry but shows evidence of flow, filling: not healed, moderately weathered; surface: slightly rough,									
720.0	38.0												
719.0	39.0												
718.0													
DATE STARTED: 4/26/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon				NOTES:			
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley				DRILL RIG: CME-55 (Track) HAMMER ID: 340665			

REV 1 Final Boring B-405

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340131.91 ft E. 2405221.36 ft GROUND SURFACE ELEVATION: 757.56 ft DESCRIPTION		
717.0	41.0	R-7	100% (44%)	FD6		moderately weathered; iron oxidation staining in the fractures.. Fracture set #F-6.		
716.0	42.0					39.0-44.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding angle		
715.0	43.0							
714.0	44.0							
713.0	45.0	R-8	100% (10%)	FD6		44.0-49.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding angle		
712.0	46.0					44-61.7 ft Joint, R.D. = 68°, closely spaced; filling: not healed; surface: slightly rough; iron oxidation in the fractures, bedding plane fractures at 10°.		
711.0	47.0					Fracture set #F-7.		
710.0	48.0							
709.0	49.0	R-9	100% (10%)	FD6		49.0-54.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding angle		
708.0	50.0							
707.0	51.0							
706.0	52.0							
705.0	53.0	R-10	100% (32%)	FD5		54.0-59.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding angle		
704.0	54.0							
703.0	55.0							
702.0	56.0							
701.0	57.0	R-11	100% (54%)	FD5				
700.0	58.0							
699.0	59.0							
698.0								
DATE STARTED: 4/26/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

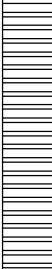
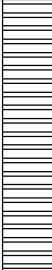
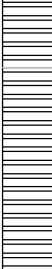
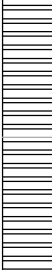
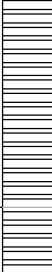
REV 1 Final Boring B-405

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 340131.91 ft E. 2405221.36 ft GROUND SURFACE ELEVATION: 757.56 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
697.0	61.0	R-11	100% (54%)	FD5		59.0-64.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding angle		
696.0	62.0					61.8-61.81 ft Joint, R.D. = 11°; filling: totally healed. Fracture set #F-8. 61.85-72.6 ft Joint, R.D. = 89°, very closely spaced; filling: not healed; surface: slightly rough. Fracture set #F-9.		
695.0	63.0							
694.0	64.0	R-12	100% (36%)	FD5		64.0-69.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding angle		
693.0	65.0							
692.0	66.0							
691.0	67.0	R-13	100% (60%)	FD6		69.0-74.0 ft SHALE, horizontal, moderately hard, moderately weathered, dark gray (N3) and dark yellowish orange (10YR 6/6), closely to moderately fractured, no reaction to HCl, dry, iron oxide staining, 10° bedding angle.		
690.0	68.0					70.5-84 ft Joint, R.D. = 90°-80°, closely spaced; filling: moderately healed, quartz, moderately weathered; surface: moderately weathered. Fracture set #F-10.		
689.0	69.0							
688.0	70.0	R-14	100% (0%)	FD6		74.0-79.0 ft SHALE, horizontal, moderately hard, moderately to intensely weathered, dark gray (N3) and dark yellowish orange (10YR 6/6), closely to widely fractured, no reaction to HCl, dry, iron oxide staining, 10° bedding angle, fracture zones filled with weathered shale and quartz crystals.		
687.0	71.0							
686.0	72.0							
685.0	73.0	R-15	100% (0%)					
684.0	74.0							
683.0	75.0							
682.0	76.0							
681.0	77.0							
680.0	78.0							
679.0	79.0							
678.0								
DATE STARTED: 4/26/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benítez						DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665

REV 1 Final Boring B-405

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 340131.91 ft E. 2405221.36 ft								
GROUND SURFACE ELEVATION: 757.56 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
677.0	81.0	R-15	100% (0%)	FD6		79.0-84.0 ft SHALE, horizontal, moderately hard, intensely weathered, pitted, typical diameter: 0.1 in. max size: 0.4 in., dark gray (N3) and dark yellowish orange (10YR 6/6), closely to widely fractured, no reaction to HCl, 10° bedding, fractures are filled with quartz crystals and weathered shale; the quartz crystals are stained		
676.0	82.0							
675.0	83.0							
674.0	84.0							
673.0	85.0	R-16	100% (50%)			84.0-89.0 ft SHALE, horizontal, moderately hard, moderately to intensely weathered, dark gray (N3) and dark yellowish orange (10YR 6/6), closely to widely fractured, no reaction to HCl, dry, iron oxide staining, 10° bedding angle, fracture zones filled with weathered shale and quartz crystals.		
672.0	86.0					84-88.4 ft Joint, R.D. = 60°-90°, widely spaced; filling: moderately healed, moderately thin quartz crystals, moderately weathered, moderately hard; surface: slightly rough, moderately weathered. Fracture set #F-11.		
671.0	87.0							
670.0	88.0							
669.0	89.0	R-17	96% (22%)	FD6		88.3-88.31 ft Joint, R.D. = 11°; surface: smooth; iron oxidation in the fracture. Fracture set #F-12.		
668.0	90.0					89.0-94.0 ft SHALE, horizontal, moderately hard, moderately weathered, dark gray (N3) and dark yellowish orange (10YR 6/6), very closely to moderately fractured, no reaction to HCl, dry, iron oxide staining, 10° bedding angle		
667.0	91.0					89-94 ft Joint, R.D. = 88°, very closely to moderately spaced; filling: partly healed, quartz crystals; surface: slightly rough. Fracture set #F-17.		
666.0	92.0							
665.0	93.0	R-18	100% (0%)			94.0-99.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), very closely to moderately fractured, no reaction to HCl, 10° bedding angle		
664.0	94.0					94.1-94.3 ft Joint, R.D. = 6°; filling: not healed; surface: slightly rough; iron oxidation staining in the fracture. Fracture set #F-18.		
663.0	95.0					94.6-99 ft Joint, R.D. = 86°, very closely to moderately spaced; filling: moderately healed, moderately thin quartz and galena, slightly weathered, moderately soft; surface: slightly rough, slightly weathered. Fracture set #F-19.		
662.0	96.0							
661.0	97.0	R-19	100% (100%)	FD4				
660.0	98.0							
659.0	99.0							
658.0								
DATE STARTED: 4/26/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		
						DRILL RIG: CME-55 (Track) HAMMER ID: 340665		

REV 1 Final Boring B-405

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 340131.91 ft E. 2405221.36 ft								
GROUND SURFACE ELEVATION: 757.56 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
657.0	101.0	R-19	100% (100%)			99.9-101.75 ft Joint, R.D. = 45°&90°, closely spaced; filling: totally healed, clean quartz, slightly weathered, moderately soft; surface: slightly weathered. Fracture set #F-20.		
656.0	102.0					99.0-104.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), closely to very widely fractured, no reaction to HCl, 10° bedding angle		
655.0	103.0							
654.0	104.0							
653.0	105.0	R-20	100% (100%)	FD4		104.0-109.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), very closely to moderately fractured, no reaction to HCl, 10° bedding angle, quartz clast at 105.3-105.7 ft.		
652.0	106.0							
651.0	107.0					106-107.5 ft Joint, R.D. = 45°, very closely spaced; filling: totally healed, clean quartz, slightly weathered, moderately soft; surface: slightly weathered. Fracture set #F-21.		
650.0	108.0					107.5-114 ft Joint, R.D. = 89°, very closely spaced; filling: totally healed, clean quartz, slightly weathered, moderately soft; surface: slightly weathered. Fracture set #F-22.		
649.0	109.0	R-21	100% (100%)			109.0-204.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), very closely to extremely widely fractured, no reaction to HCl		
648.0	110.0					109.1- ft Joint, R.D. = 10°, very closely spaced; filling: totally healed, quartz, slightly weathered, moderately soft; surface: slightly weathered. Fracture set #F-23.		
647.0	111.0							
646.0	112.0							
645.0	113.0	R-22	100% (100%)	FD1		113.7- ft Joint, R.D. = 11°; filling: totally healed, quartz, slightly weathered, moderately soft; surface: slightly weathered. Fracture set #F-24.		
644.0	114.0							
643.0	115.0							
642.0	116.0							
641.0	117.0	R-23	100% (100%)					
640.0	118.0							
639.0	119.0							
638.0								
DATE STARTED: 4/26/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		
						DRILL RIG: CME-55 (Track) HAMMER ID: 340665		

REV 1 Final Boring B-405

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 757.56 ft						DESCRIPTION		
DESCRIPTION								
637.0	121.0	R-23	100% (100%)	FD1		109.0-204.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), very closely to extremely widely fractured, no reaction to HCl 120.3-122.7 ft Joint, R.D. = 70°, very closely spaced; filling: totally healed, clean quartz, slightly weathered, moderately soft; surface: slightly weathered. Fracture set #F-25.		
636.0	122.0							
635.0	123.0							
634.0	124.0							
633.0	125.0	R-24	100% (100%)	FD1		123.9-124.5 ft Joint, R.D. = 77°, closely spaced; filling: moderately healed, very thin quartz, slightly weathered, moderately soft; surface: slightly rough, slightly weathered. Fracture set #F-27.		
632.0	126.0							
631.0	127.0							
630.0	128.0							
629.0	129.0	R-25	100% (100%)	FD0			SC-4, 129.0-129.6 ft., 12:09, 4/27/10.	
628.0	130.0							
627.0	131.0							
626.0	132.0							
625.0	133.0	R-26	100% (100%)	FD0				
624.0	134.0							
623.0	135.0							
622.0	136.0							
621.0	137.0	R-27	100% (100%)	FD0				
620.0	138.0							
619.0	139.0							
618.0								
DATE STARTED: 4/26/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665

REV 1 Final Boring B-405

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 757.56 ft						DESCRIPTION	
DESCRIPTION							
617.0	141.0	R-27	100% (100%)	FD0		109.0-204.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), very closely to extremely widely fractured, no reaction to HCl	
616.0	142.0						
615.0	143.0						
614.0	144.0	R-28	100% (100%)				
613.0	145.0						
612.0	146.0						
611.0	147.0	R-29	100% (100%)	FD0			
610.0	148.0						
609.0	149.0						
608.0	150.0	R-30	100% (100%)				
607.0	151.0						
606.0	152.0						
605.0	153.0	R-31	100% (100%)	FD0		156.7-156.71 ft Joint, R.D. = 16°; filling: totally healed, calcite, slightly weathered, very soft; surface: slightly weathered; calcite measured 0.1 ft. Fracture set #F-28.	
604.0	154.0						
603.0	155.0						
602.0	156.0	R-32	100% (100%)				
601.0	157.0						
600.0	158.0						
599.0	159.0	R-33	100% (100%)				
598.0	160.0						
597.0	161.0						
DATE STARTED: 4/26/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665

REV 1 Final Boring B-405

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 757.56 ft						DESCRIPTION	
109.0-204.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), very closely to extremely widely fractured, no reaction to HCl							
597.0		R-31	100% (100%)	FD0			
161.0							
596.0							
162.0		R-32	100% (100%)	FD0			
595.0							
163.0							
594.0		R-33	98% (98%)	FD0			
164.0							
593.0							
165.0		R-34	100% (100%)	FD0			
592.0							
166.0							
591.0		R-35	100% (100%)	FD0			
167.0							
590.0							
168.0		R-36	100% (100%)	FD0			
589.0							
169.0							
588.0		R-37	100% (100%)	FD0			
170.0							
587.0							
171.0		R-38	100% (100%)	FD0			
586.0							
172.0							
585.0		R-39	100% (100%)	FD0			
173.0							
584.0							
174.0		R-40	100% (100%)	FD0			
583.0							
175.0							
582.0		R-41	100% (100%)	FD0			
176.0							
581.0							
177.0		R-42	100% (100%)	FD0			
580.0							
178.0							
579.0		R-43	100% (100%)	FD0			
179.0							
578.0							
DATE STARTED: 4/26/10						NOTES:	
DATE FINISHED: 4/27/10							
FIELD GEOLOGIST: Jason Lucey							
CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ	DRILL RIG: CME-55 (Track)
						DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman	
						HELPER(S): J. Tousley	HAMMER ID: 340665


REV 1 Final Boring B-405

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340131.91 ft E. 2405221.36 ft GROUND SURFACE ELEVATION: 757.56 ft		
						DESCRIPTION		
577.0						109.0-204.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), very closely to extremely widely fractured, no reaction to HCl		
181.0								
576.0								
182.0	R-35	100% (100%)		FD0				
575.0								
183.0								
574.0								
184.0								
573.0								
185.0								
572.0								
186.0								
571.0	R-36	100% (100%)						
187.0								
570.0								
188.0								
569.0								
189.0								
568.0								
190.0								
567.0								
191.0								
566.0	R-37	100% (100%)						
192.0								
565.0								
193.0				FD0				
564.0								
194.0								
563.0								
195.0								
562.0								
196.0								
561.0	R-38	100% (100%)						
197.0								
560.0								
198.0								
559.0								
199.0								
558.0	R-39	100% (100%)						
DATE STARTED: 4/26/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-405

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 757.56 ft						DESCRIPTION	
557.0	201.0	R-39	100% (100%)	FD0		109.0-204.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), very closely to extremely widely fractured, no reaction to HCl	
556.0	202.0						
555.0	203.0			FD0			
554.0	204.0						
---- Bottom of Boring at 204.00 ft.----							
DATE STARTED: 4/26/10 DATE FINISHED: 4/27/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						NOTES:	
APPROVED BY: Rolando Benitez						DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-406

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES N. 340286.99 ft E. 2405115.50 ft GROUND SURFACE ELEVATION: 771.88 ft		USCS SYMBOL	REMARKS
							DESCRIPTION			
771.0	1.0	S-1	1-2-2 (4) 60%		FD8		0.0-1.5 ft Clayey sand, (sc), 75% sand, fine to medium, rounded, very soft hardness; 25% fines, medium plasticity, low toughness; moderate brown (5YR 3/4), moist, no HCl reaction, loose, homogeneous, weak cementation	sc	Decomposed shale starting at 3.0 ft.	
770.0	2.0	S-2	5-6-8 (14) 93%				1.5-3.0 ft Clayey sand with gravel, (sc), 56% sand, fine to medium, subrounded, very soft hardness; 25% gravel, fine to medium, subangular, flat and elongated, medium hardness; 19% fines, medium plasticity, low toughness; maximum grain size = 0.05 inches, light brown (5YR 5/6) and light olive gray (5Y 5/2), no HCl reaction, medium dense, homogeneous	sc		
769.0	3.0	S-3	13-20-25 (45) 93%				3.0-6.0 ft Well graded gravel with clay and sand, (gw-gc), 69% gravel, fine to medium, subrounded to subangular, very soft hardness; 25% sand, fine to coarse; maximum grain size = 0.5 inches, light brown (5YR 5/6) and light gray (N7), moist, no HCl reaction, dense, trace fines	GW-GC		
768.0	4.0									
767.0	5.0	S-4	11-16-22 (38) 73%				6.0-7.5 ft Poorly graded sand with clay and gravel, (sp-sc), 55% sand, fine to medium, subangular, soft hardness; 35% gravel, medium to coarse, subangular, elongated, medium hardness; 10% fines, medium plasticity, low toughness; maximum grain size = 0.1 inches, light gray (N7), dry, no HCl reaction, loose, homogeneous	sp-sc	9.0 ft, ST-1 at 9.0-9.4 ft on 4/21/10	
766.0	6.0	S-5	7-8-7 (15) 73%							
765.0	7.0						S-6	9-10-11 (21) 73%		7.5-9.0 ft Poorly graded gravel with silt and sand, (gp-gm), 55% gravel, medium, subrounded, very soft hardness; 35% sand, fine to medium, subangular, flat and elongated, medium hardness; 10% fines, low plasticity, low toughness; maximum grain size = 0.05 inches, light olive gray (5Y 5/2) and light brown (5YR 6/4), dry, no HCl reaction, loose, weak cementation
764.0	8.0									
763.0	9.0	ST-1		9.4-9.5 ft Interval not sampled						
762.0	10.0	S-7	21-28-28 (56) 73%	9.5-11.0 ft Well graded gravel with sand, (gw), 75% gravel, medium to coarse, subangular, flat and elongated, medium hardness; 25% sand, medium, subangular, elongated, soft hardness; maximum grain size = 0.1 inches, medium gray (N5), dry, no HCl reaction, medium dense, blocky, weak cementation, weathering occurring on the gravel sample.	gw	SC-1 at 11.3 - 12.2 ft. at 13:00, 4/21/10				
761.0	11.0									
760.0	12.0	R-1	96% (18%)	11.0-16.0 ft SHALE, horizontal, moderately hard, moderately weathered, dark gray (N3), moderately fractured, no reaction to HCl, dry, bedding is at a 10° angle 12.2-16 ft Joint, R.D. = 40-76°, moderately spaced; filling: not healed, clay; surface: slightly rough. Fracture set #F-1.						
759.0	13.0									
758.0	14.0									
757.0	15.0									
756.0	16.0									
755.0	17.0	R-2	94% (27%)	16.0-21.0 ft SHALE, horizontal, moderately hard, moderately weathered, dark gray (N3), closely fractured, no reaction to HCl, moist, iron oxide staining, bedding is at a 10 ° angle 16-21 ft Joint, R.D. = 58°, closely spaced; filling: not healed, clay, fresh; surface: slightly rough, fresh. Fracture set #F-2.						
754.0	18.0									
753.0	19.0									
752.0										
DATE STARTED: 4/21/10 DATE FINISHED: 4/23/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky							DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:		
APPROVED BY: Rolando Benitez							DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665		

REV 1 Final Boring B-406

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 771.88 ft						DESCRIPTION	
DESCRIPTION							
751.0	21.0	R-2	94% (27%)	FD8		30.0 - 35.0 ft. 100% water recovery	
750.0	22.0	R-3	98% (0%)				
749.0	23.0						
748.0	24.0						
747.0	25.0	R-4	100% (34%)	FD6			
746.0	26.0						
745.0	27.0						
744.0	28.0	R-5	96% (66%)	FD6			
743.0	29.0						
742.0	30.0						
741.0	31.0	R-6	98% (60%)	FD6			
740.0	32.0						
739.0	33.0						
738.0	34.0	R-6	98% (60%)	FD6			
737.0	35.0						
736.0	36.0						
735.0	37.0	R-6	98% (60%)	FD6			
734.0	38.0						
733.0	39.0						
732.0							
DATE STARTED: 4/21/10 DATE FINISHED: 4/23/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665

REV 1 Final Boring B-406

PROJECT NO. 10-4310

						COORDINATES		USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	N. 340286.99 ft E. 2405115.50 ft GROUND SURFACE ELEVATION: 771.88 ft			
						DESCRIPTION			
731.0	41.0	R-7	88% (22%)			40.0-45.0 ft SHALE, horizontal, moderately hard, intensely weathered, dark gray (N3) and medium light gray (N6), closely fractured, no reaction to HCl, iron oxide staining, 10 ° bedding angle, clay infilling is moderate orange pink (5YR 8/4)			SC-2 at 43.9-44.5 ft at 09:30 on 4/22/10 Lost water circulation at 45.0-50.0 ft.
730.0	42.0					40-45 ft Joint, R.D. = 66°, very closely to moderately spaced; filling: moderately healed, very thin clay, fresh, very soft; surface: slightly rough, fresh. Fracture set #F-6.			
729.0	43.0								
728.0	44.0								
727.0	45.0								
726.0	46.0	R-8	88% (34%)	FD6		45.0-50.0 ft SHALE, horizontal, moderately hard, very intensely weathered, dark gray (N3) and very pale orange (10YR 8/2), closely fractured, no reaction to HCl, iron oxide staining, less than a 10 ° angle on the bedding			
725.0	47.0					45-50 ft Joint, R.D. = 52°, closely spaced; filling: not healed, very thin clay, fresh, very soft; surface: slightly rough, fresh; iron oxide on some of the joint fractures. Fracture set #F-7.			
724.0	48.0								
723.0	49.0								
722.0	50.0								
721.0	51.0	R-9	100% (20%)			50.0-55.0 ft SHALE, horizontal, moderately hard, very intensely weathered, yellowish gray (5Y 7/2) and dark gray (N3), very closely to widely fractured, no reaction to HCl, iron oxide staining, fracture infilled with clay, some have iron oxidation on the fracture			
720.0	52.0					50-55 ft Joint, R.D. = 46°, very closely to very widely spaced; filling: not healed, very thin clay, fresh to slightly weathered, very soft; surface: smooth, fresh; some fractures have clay filling, and others have been oxidized. Fracture set #F-8.			
719.0	53.0								
718.0	54.0								
717.0	55.0								
716.0	56.0	R-10	80% (50%)	FD6		55.0-60.0 ft SHALE, horizontal, moderately hard, moderately weathered, dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining, 10 ° bedding, fractures are filled with clay and quartz			
715.0	57.0					55-58.5 ft Joint, R.D. = 43°, closely spaced; filling: not healed, very thin quartz and clay, slightly weathered, very soft to moderately hard; surface: slightly rough, slightly weathered. Fracture set #F-9.			
714.0	58.0								
713.0	59.0								
712.0									
DATE STARTED: 4/21/10 DATE FINISHED: 4/23/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-406

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS				
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE						
GROUND SURFACE ELEVATION: 771.88 ft						DESCRIPTION					
DESCRIPTION											
711.0	61.0	R-11	86% (40%)	FD6		60.0-65.0 ft SHALE, horizontal, moderately hard, moderately weathered, dark gray (N3) and yellowish gray (5Y 7/2), closely fractured, no reaction to HCl, iron oxide staining, 10 ° angle of bedding, fracture at 63.8 ft. is filled with quartz, other fractures have clay filling, 60.2-60.45 ft. clay seam, light olive brown (5Y 5/6)	SC-3 at 70.3-71.05 ft, 13:15, 4/22/10				
710.0	62.0					60-65 ft Joint, R.D. = 35°, very closely to moderately spaced; filling: not healed, moderately thin quartz and clay, fresh to moderately weathered, very soft to moderately hard; surface: slightly rough, fresh. Fracture set #F-10.					
709.0	63.0										
708.0	64.0										
707.0	65.0	R-12	100% (30%)	FD6		65.0-70.0 ft SHALE, horizontal, moderately hard, moderately weathered, dark gray (N3) and yellowish gray (5Y 7/2), closely to moderately fractured, no reaction to HCl, iron oxide staining, 10 ° angle of the bedding, clay infilling has a light olive brown (5Y 5/6)					
706.0	66.0					65-69.2 ft Joint, R.D. = 18°, closely spaced; filling: moderately thin clay, fresh, very soft; surface: slightly rough, fresh. Fracture set #F-11.					
705.0	67.0										
704.0	68.0										
703.0	69.0	R-13	100% (60%)	FD3		69.1-69.2 ft Joint, R.D. = 30°, closely spaced; filling: moderately weathered; surface: stepped, moderately weathered. Fracture set #F-12.					
702.0	70.0					70.0-75.0 ft SHALE, horizontal, moderately hard, moderately to slightly weathered, yellowish gray (5Y 7/2) and dark gray (N3), closely fractured, no reaction to HCl, dry, iron oxide staining, 10 ° on the bedding, fossilized shells, strong reaction to HCl from 73.5-75.0ft.					
701.0	71.0					70-73.5 ft Joint, R.D. = 12°, closely spaced; filling: not healed, moderately thin clay, fresh to slightly weathered, very soft; surface: slightly rough, fresh. Fracture set #F-12.					
700.0	72.0										
699.0	73.0	R-14	100% (100%)	FD3		75.0-80.0 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), moderately to widely fractured, no reaction to HCl, fossilized shells throughout					
698.0	74.0										
697.0	75.0										
696.0	76.0										
695.0	77.0	R-15	100% (100%)	FD3							
694.0	78.0										
693.0	79.0										
692.0	80.0										
DATE STARTED: 4/21/10 DATE FINISHED: 4/23/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:				
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665				

REV 1 Final Boring B-406

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 771.88 ft						DESCRIPTION		
DESCRIPTION								
691.0	81.0	R-15	100% (100%)	FD3		80.0-95.0 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), widely to very widely fractured, no reaction to HCl, fossilized shells throughout		
690.0	82.0							
689.0	83.0							
688.0	84.0							
687.0	85.0	R-16	100% (100%)					
686.0	86.0							
685.0	87.0							
684.0	88.0							
683.0	89.0	R-17	100% (92%)	FD1		90.7-91.2 ft Joint, R.D. = 70°, very closely spaced; filling: slightly weathered; surface: smooth, slightly weathered; iron oxide staining in the fracture. Fracture set #F-13.		
682.0	90.0							
681.0	91.0							
680.0	92.0							
679.0	93.0	R-18	100% (94%)			95.0-100.0 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), widely fractured, no reaction to HCl, fossilized shells throughout, few calcite laminae 95.5-95.8 ft Joint, R.D. = 63°; filling: slightly weathered; surface: slightly rough, slightly weathered; iron oxide in the fracture. Fracture set #F-14.		
678.0	94.0							
677.0	95.0							
676.0	96.0							
675.0	97.0			FD1		99.5-99.6 ft R.D. = 14°; surface: slightly rough; iron oxide in fracture. Fracture		
674.0	98.0							
673.0	99.0							
672.0								
DATE STARTED: 4/21/10 DATE FINISHED: 4/23/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		
						DRILL RIG: CME-55 (Track) HAMMER ID: 340665		

REV 1 Final Boring B-406

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 771.88 ft						DESCRIPTION		
DESCRIPTION								
671.0	101.0	R-19	100% (96%)			set #F-15.		
670.0	102.0					100.0-115.0 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), closely to very widely fractured, no reaction to HCl, few calcite laminae		
669.0	103.0					102.6-102.95 ft Joint, R.D. = 70°, very closely spaced; filling: not healed, very thin calcite, fresh, soft; surface: slightly rough, fresh; calcite lamina. Fracture set #F-16.		
668.0	104.0					Fracture set #F-16.		
667.0	105.0	R-20	100% (100%)	FD1				
666.0	106.0							
665.0	107.0							
664.0	108.0							
663.0	109.0	R-21	100% (74%)					
662.0	110.0							
661.0	111.0							
660.0	112.0							
659.0	113.0	R-22	100% (100%)	FD0		112.8-114.6 ft Joint, R.D. = 10°, closely spaced; surface: slightly rough; iron oxide staining in the fracture joints. Fracture set #F-17.		
658.0	114.0							
657.0	115.0							
656.0	116.0					115.0-120.0 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, fossilized shells throughout, few calcite laminae		
655.0	117.0							
654.0	118.0							
653.0	119.0							
652.0								
DATE STARTED: 4/21/10 DATE FINISHED: 4/23/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665

REV 1 Final Boring B-406

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 771.88 ft						DESCRIPTION		
651.0	121.0	R-23	100% (100%)	FD0		120.0-135.0 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, 10 ° bedding		
650.0	122.0							
649.0	123.0							
648.0	124.0							
647.0	125.0							
646.0	126.0	R-24	100% (100%)					
645.0	127.0							
644.0	128.0							
643.0	129.0							
642.0	130.0							
641.0	131.0	R-25	100% (100%)	FD0				
640.0	132.0							
639.0	133.0							
638.0	134.0							
637.0	135.0							
636.0	136.0	R-26	100% (100%)			135.0-175.0 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, fossilized shells throughout		
635.0	137.0							
634.0	138.0							
633.0	139.0							
632.0								
DATE STARTED: 4/21/10 DATE FINISHED: 4/23/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		
						DRILL RIG: CME-55 (Track) HAMMER ID: 340665		

REV 1 Final Boring B-406

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS		
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE				
GROUND SURFACE ELEVATION: 771.88 ft						DESCRIPTION			
631.0	141.0	R-27	100% (100%)			135.0-175.0 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, fossilized shells throughout			
630.0	142.0								
629.0	143.0								
628.0	144.0								
627.0	145.0								
626.0	146.0	R-28	100% (100%)	FD0					
625.0	147.0								
624.0	148.0								
623.0	149.0								
622.0	150.0								
621.0	151.0	R-29	100% (100%)						
620.0	152.0								
619.0	153.0								
618.0	154.0								
617.0	155.0								
616.0	156.0	R-30	100% (100%)	FD0					
615.0	157.0								
614.0	158.0								
613.0	159.0								
612.0									
DATE STARTED: 4/21/10								NOTES:	
DATE FINISHED: 4/23/10									
FIELD GEOLOGIST: Jason Lucey									
CHECKED BY: Jennifer Ostrowsky								DRILLING METHOD: 6" Solid Flight Auger, NQ	DRILL RIG: CME-55 (Track)
								DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez								DRILLER: S. Silverman	HAMMER ID: 340665
								HELPER(S): J. Tousley	

REV 1 Final Boring B-406

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS					
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE							
GROUND SURFACE ELEVATION: 771.88 ft						DESCRIPTION						
611.0	161.0	R-31	100% (100%)	FD0		135.0-175.0 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, fossilized shells throughout						
610.0	162.0					161.6-162.4 ft Joint, R.D. = 58°, very closely spaced; dry, tight or filled, no flow, filling: totally healed, clean calcite, fresh, soft; surface: fresh; calcite is 0.6 inches thick. Fracture set #F-18.						
609.0	163.0											
608.0	164.0											
607.0	165.0	R-32	98% (98%)	FD0								
606.0	166.0											
605.0	167.0											
604.0	168.0											
603.0	169.0	R-33	100% (100%)			169.2-169.7 ft Joint, R.D. = 70°, very closely spaced; filling: totally healed, calcite, fresh, soft; surface: fresh. Fracture set #F-19.						
602.0	170.0											
601.0	171.0											
600.0	172.0											
599.0	173.0	R-34	100% (100%)	FD0		175.0-180.0 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl						
598.0	174.0											
597.0	175.0											
596.0	176.0											
595.0	177.0											
594.0	178.0											
593.0	179.0											
592.0												
DATE STARTED: 4/21/10 DATE FINISHED: 4/23/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:				
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665				

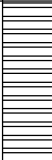
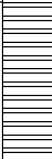
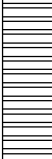
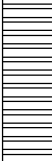
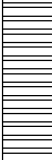
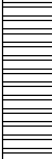
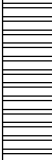
REV 1 Final Boring B-406

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 771.88 ft						DESCRIPTION		
DESCRIPTION								
591.0	181.0	R-35	100% (100%)	FD0		180.0-185.0 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, 10 ° bedding angle, fossilized shells throughout		
590.0	182.0							
589.0	183.0							
588.0	184.0							
587.0	185.0	R-36	100% (100%)			185.0-195.0 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, 10 ° bedding angle		
586.0	186.0							
585.0	187.0							
584.0	188.0							
583.0	189.0	R-37	100% (100%)					
582.0	190.0							
581.0	191.0							
580.0	192.0							
579.0	193.0	R-38	100% (100%)	FD0		195.0-200.0 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), widely to very widely fractured, no reaction to HCl, 197.6 ft. pyrite clast, 10 ° bedding angle		
578.0	194.0							
577.0	195.0							
576.0	196.0							
575.0	197.0					196.65-196.66 ft Joint, R.D. = 15°; filling: totally healed, calcite, fresh; surface: fresh. Fracture set #F-20.		
574.0	198.0							
573.0	199.0							
572.0								
DATE STARTED: 4/21/10 DATE FINISHED: 4/23/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665

REV 1 Final Boring B-406

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 771.88 ft						DESCRIPTION	
DESCRIPTION							
571.0	201.0	R-39	100% (100%)	FD0		200.0-220.0 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl	
570.0	202.0						
569.0	203.0						
568.0	204.0	R-40	100% (100%)			203.35-204 ft Joint, R.D. = 14°, very closely spaced; filling: moderately healed, thin calcite, fresh, soft; surface: smooth, fresh. Fracture set #F-21.	
567.0	205.0						
566.0	206.0						
565.0	207.0	R-41	100% (100%)	FD0			
564.0	208.0						
563.0	209.0						
562.0	210.0	R-42	100% (100%)				
561.0	211.0						
560.0	212.0						
559.0	213.0	R-42	100% (100%)				
558.0	214.0						
557.0	215.0						
556.0	216.0	R-42	100% (100%)				
555.0	217.0						
554.0	218.0						
553.0	219.0	R-42	100% (100%)				
552.0	220.0						
Bottom of Boring at 220.00 ft.----							
DATE STARTED: 4/21/10 DATE FINISHED: 4/23/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	
						DRILL RIG: CME-55 (Track)	
						HAMMER ID: 340665	

REV 1 Final Boring B-407

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW(SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340169.21 ft E. 2404971.67 ft GROUND SURFACE ELEVATION: 734.19 ft		
						DESCRIPTION		
734.0		S-1	3-3-3 (6) 100%			0.0-1.5 ft Well graded sand with clay, (sw-sc), 90% sand, fine to medium, subrounded, soft hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; light brown (5YR 5/6), moist, no HCl reaction, medium dense, medium plasticity	sw-sc	
733.0	1.0							
732.0	2.0	S-2	5-31-16 (47) 90%			1.5-3.0 ft Well graded sand with gravel, (sw), 70% sand, fine to medium, subrounded, soft hardness; 25% gravel, medium, subangular, medium hardness; 5% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.1 inches, light brown (5YR 5/6) and pale brown (5YR 5/2), moist, no HCl reaction, medium dense to dense, medium plasticity	sw	
731.0	3.0							
730.0	4.0	S-3	10-13-13 (26) 100%			3.0-4.5 ft Poorly graded gravel with sand, (gp), 75% gravel, medium, subangular, medium hardness; 20% sand, fine to medium, subrounded, soft hardness; 5% fines, medium plasticity, no dry strength, no dilatancy, medium toughness; maximum grain size = 0.1 inches, dark yellowish brown (10YR 4/2), moist, no HCl reaction, dense, homogeneous	gp	
729.0	5.0	S-4	11-9-6 (15) 100%			4.5-6.0 ft Poorly graded sand with clay and gravel, (sp-sc), 50% sand, fine to medium, subrounded, soft hardness; 40% gravel, medium, subangular, flat and elongated, medium hardness; 10% fines, low plasticity, no dry strength, no dilatancy, no toughness; maximum grain size = 0.06 inches, very pale orange (10YR 8/2), dry, no HCl reaction, medium dense	sp-sc	
728.0	6.0							
727.0	7.0	S-5	4-5-6 (11) 93%			6.0-7.5 ft Clayey sand, (sc), 65% sand, fine to medium, subrounded, soft hardness; 25% fines, low plasticity, no dry strength, no dilatancy, no toughness; 10% gravel, medium to coarse, subangular, flat, medium hardness; maximum grain size = 0.03 inches, light brown (5YR 5/6), dry, no HCl reaction, medium dense	sc	
726.0	8.0	S-6	6-6-6 (12) 100%			7.5-9.0 ft Well graded sand with clay and gravel, (sw-sc), 60% sand, fine to medium, subrounded, soft hardness; 30% gravel, medium, subangular, flat, medium hardness; 10% fines, low plasticity, no dry strength, no dilatancy, no toughness; maximum grain size = 0.01 inches, light brown (5YR 5/6) and light brown (5YR 6/4), dry, no HCl reaction, medium dense	sw-sc	
725.0	9.0							
724.0	10.0	S-7	7-7-7 (14) 100%			9.0-10.5 ft Well graded sand with clay and gravel, (sw-sc), 60% sand, fine to medium, subrounded, soft hardness; 30% gravel, medium, subangular, flat and elongated, medium hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.05 inches, light brown (5YR 5/6) and light brown (5YR 6/4), dry, no HCl reaction, medium dense	sw-sc	
723.0	11.0	S-8	12-50 0%			10.5-11.5 ft No recovery		
722.0	12.0					11.5-12.0 ft Interval not sampled		
721.0	13.0	S-9	30-19-16 (35) 40%			12.0-13.5 ft Well graded sand with clay and gravel, (sw-sc), 70% sand, fine to medium, subrounded, soft hardness; 20% gravel, medium, subangular, flat and elongated, medium hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.04 inches, light brown (5YR 5/6) and light brown (5YR 6/4), dry, no HCl reaction, medium dense	sw-sc	
720.0	14.0	S-10	13-24-20 (44) 73%			13.5-15.0 ft Well graded gravel with sand, (gw), 65% gravel, medium, subangular, flat and elongated, medium hardness; 35% sand, fine to medium, subrounded, soft hardness; 0% fines; maximum grain size = 0.1 inches, pale yellowish brown (10YR 6/2), dry, no HCl reaction, medium dense, homogeneous	gw	
719.0	15.0							
718.0	16.0	S-11	15-22-45 (67) 100%			15.0-16.5 ft Well graded gravel with sand, (gw), 65% gravel, medium, subangular, flat and elongated, medium hardness; 35% sand, fine to medium, subrounded, soft hardness; 0% fines; maximum grain size = 0.1 inches, pale yellowish brown (10YR 6/2), dry, no HCl reaction, medium dense, homogeneous	gw	
717.0	17.0	S-12	30-32-40 (72) 73%					
716.0	18.0	S-13	26-50 100%					
715.0	19.0	S-14					sw	
DATE STARTED: 5/24/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-407

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340169.21 ft E. 2404971.67 ft GROUND SURFACE ELEVATION: 734.19 ft DESCRIPTION		
714.0		S-14	29-21-16 (37) 100%			16.5-18.0 ft SHALE, intensely weathered, very pale orange (10YR 8/2) and light brown (5YR 6/4), no reaction to HCl, dry, moderately soft	SW	SC-1 at 34.4 - 35.0 ft., 14:20, 5/24/10
713.0	21.0					18.0-19.0 ft SHALE, intensely weathered, very pale orange (10YR 8/2) and light brown (5YR 6/4), no reaction to HCl, dry, moderately soft		
712.0	22.0	S-15	16-22-41 (63) 100%			19.0-21.0 ft Well graded sand with gravel, (sw), 70% sand, fine to medium, subangular, soft hardness; 30% gravel, medium, subangular, flat and elongated, medium hardness; maximum grain size = 0.05 inches, light brown (5YR 6/4) and dark gray (N3), moist, no HCl reaction, medium dense, medium plasticity, low toughness on silty clay trace	SW	
711.0	23.0	S-16	21-28-22 (50) 100%			21.0-22.5 ft Well graded sand with gravel, (sw), 70% sand, fine to medium, subangular, soft hardness; 20% gravel, medium, subangular, flat and elongated, medium hardness; 10% fines; maximum grain size = 0.05 inches, light brown (5YR 6/4) and dark gray (N3), moist, no HCl reaction, medium dense, medium plasticity, 10% silty clay, medium plasticity, low toughness	SW	
710.0	24.0	S-17	20-50 100%			22.5-24.0 ft Well graded sand with gravel, (sw), 70% sand, fine to medium, subangular, soft hardness; 20% gravel, medium, subangular, flat and elongated, medium hardness; 10% fines; maximum grain size = 0.05 inches, light brown (5YR 6/4) and dark gray (N3), moist, no HCl reaction, medium dense, medium plasticity, 10% silty clay, medium plasticity, low toughness	SW-SC	
709.0	25.0					24.0-25.0 ft Well graded sand with clay and gravel, (sw-sc), 70% sand, fine to medium, subangular, soft hardness; 20% gravel, medium, subangular, flat and elongated, medium hardness; 10% fines, no dry strength, no dilatancy, no toughness; maximum grain size = 0.01 inches, light brown (5YR 6/4) and light brown (5YR 5/6), moist, no HCl reaction, medium dense, medium plasticity		
708.0	26.0					25.0-25.5 ft Interval not sampled		
707.0	27.0					25.5-30.5 ft SHALE, moderately soft to moderately hard, very intensely weathered, pale yellowish brown (10YR 6/2) and dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining, mechanically broken		
706.0	28.0	R-1	70% (0%)			25.5-50.5 ft Joint, R.D. = 21°, closely spaced; filling: not healed, moderately thin clay, intensely weathered, very soft; surface: slightly rough, planar, intensely weathered; iron oxide staining in the fracture face with clay fill. Fracture set #F-1.		
705.0	29.0					30.5-35.5 ft SHALE, moderately soft to moderately hard, very intensely weathered, pale yellowish brown (10YR 6/2) and dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining, mechanically broken		
704.0	30.0					35.5-40.5 ft SHALE, moderately hard, very intensely weathered, pale yellowish brown (10YR 6/2) and dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining, mechanically broken		
703.0	31.0							
702.0	32.0							
701.0	33.0	R-2	88% (12%)	FD7				
700.0	34.0							
699.0	35.0							
698.0	36.0							
697.0	37.0							
696.0	38.0	R-3	100% (28%)					
695.0	39.0							
DATE STARTED: 5/24/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-407

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 340169.21 ft E. 2404971.67 ft GROUND SURFACE ELEVATION: 734.19 ft		
694.0		R-3						
693.0	41.0			FD7		40.5-45.5 ft SHALE, moderately hard, very intensely weathered, pale yellowish brown (10YR 6/2) and dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining, mechanically broken		
692.0	42.0							
691.0	43.0	R-4	60% (0%)					
690.0	44.0							
689.0	45.0							
688.0	46.0					45.5-50.5 ft SHALE, moderately hard, very intensely weathered, pale yellowish brown (10YR 6/2) and dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining, mechanically broken		
687.0	47.0							
686.0	48.0	R-5	100% (34%)					
685.0	49.0							
684.0	50.0			FD5				
683.0	51.0					50.5-55.5 ft SHALE, moderately hard, very intensely weathered, pale yellowish brown (10YR 6/2) and dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining, mechanically broken		
682.0	52.0					50.5-55.5 ft Joint, R.D. = 78-85°, closely to moderately spaced; filling: not healed; surface: slightly rough; fracture face has iron oxide staining. Fracture set #F-2.		
681.0	53.0	R-6	100% (28%)					
680.0	54.0							
679.0	55.0							
678.0	56.0					55.5-60.5 ft SHALE, moderately hard, very intensely weathered, pale yellowish brown (10YR 6/2) and dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining, mechanically broken		
677.0	57.0					55.5-60.5 ft Joint, R.D. = 25°, closely spaced; filling: not healed; surface: slightly rough, planar; iron oxide on the fracture faces. Fracture set #F-3.		
676.0	58.0	R-7	100% (54%)					
675.0	59.0			FD4				
DATE STARTED: 5/24/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-407

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						<p>N. 340169.21 ft E. 2404971.67 ft</p> <p>GROUND SURFACE ELEVATION: 734.19 ft</p>		
674.0		R-7				<p>60.5-65.5 ft SHALE, moderately hard, very intensely weathered, pale yellowish brown (10YR 6/2) and dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining, mechanically broken</p> <p>60.5-65.5 ft Joint, R.D. = 50°, very closely to closely spaced; filling: not healed, intensely weathered; surface: slightly rough, planar, intensely weathered; bedding plane fractures, iron oxidation staining on the fracture faces. Fracture set #F-4.</p>		
673.0	61.0							
672.0	62.0							
671.0	63.0	R-8	100% (60%)					
670.0	64.0							
669.0	65.0							
668.0	66.0					<p>65.5-70.5 ft SHALE, horizontal, moderately hard, slightly to moderately weathered, medium dark gray (N4), closely to moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding plane</p> <p>65.5-70.5 ft Joint, R.D. = 20-30°, closely spaced; surface: slightly rough, planar; iron oxide staining on the fracture face. Fracture set #F-5.</p>		
667.0	67.0			FD4				
666.0	68.0	R-9	100% (48%)					
665.0	69.0							
664.0	70.0							
663.0	71.0					<p>70.5-75.5 ft SHALE, horizontal, moderately hard, moderately to slightly weathered, dark gray (N3), very closely to widely fractured, no reaction to HCl, 10° bedding plane, fossilized shell casts</p>		
662.0	72.0							
661.0	73.0	R-10	100% (76%)					
660.0	74.0							
659.0	75.0			FD0		<p>74.3-75.5 ft Joint, R.D. = 87°, very closely spaced; filling: not healed; surface: slightly rough, planar; iron oxide staining on the fracture face. Fracture set #F-6.</p>		
						<p>--- Bottom of Boring at 75.50 ft.---</p>		
<p>DATE STARTED: 5/24/10</p> <p>DATE FINISHED: 5/24/10</p> <p>FIELD GEOLOGIST: Jason Lucey</p> <p>CHECKED BY: Jennifer Ostrowsky</p>						<p>DRILLING METHOD: 6" Solid Flight Auger, NQ</p> <p>DRILLING CO. Terracon</p>	NOTES:	
<p>APPROVED BY: Rolando Benitez</p>						<p>DRILLER: S. Silverman</p> <p>HELPER(S): J. Tousley</p>	<p>DRILL RIG: CME-55 (Track)</p> <p>HAMMER ID: 340665</p>	

REV 1 Final Boring B-408

PROJECT NO. 10-4310

						COORDINATES		USCS SYMBOL	REMARKS	
						N. 340045.08 ft E. 2404983.01 ft				
						GROUND SURFACE ELEVATION: 728.44 ft				
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW(SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION				
728.0	1.0	S-1	1-2-2 (4) 53%			0.0-1.5 ft Silty sand, (sm), 65% sand, fine; 35% fines, non plastic, no toughness; 0% gravel; dark yellowish brown (10YR 4/2), moist, no HCl reaction, very loose		sm		
727.0	2.0	S-2	2-4-5 (9) 87%			1.5-3.0 ft Silty sand, (sm), 80% sand, fine; 15% fines, non plastic; 5% gravel, fine, subangular; maximum grain size = .15 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, loose		sm		
726.0	3.0									
725.0	4.0	S-3	2-10-15 (25) 93%			3.0-4.5 ft Silty sand, (sm), 75% sand, fine; 20% fines, non plastic, no toughness; 5% gravel, fine, subangular, medium hardness; maximum grain size = 0.1 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, medium dense, small shale dark gray (N3) fragments, LL = 25%, PL = 17%, PI = 8%, SG = 2.6		sm (CL)		
724.0	5.0	S-4	37-30-31 (61) 47%			4.5-6.0 ft Silty sand, (sm), 80% sand, fine; 15% fines, non plastic, no toughness; 5% gravel, fine, subangular, medium hardness; maximum grain size = 1.0 inches, moderate yellowish brown (10YR 5/4) with dark yellowish orange (10YR 6/6), moist, no HCl reaction, very dense, sampling through boulder medium light gray (N6), coarse sand to fine gravel sized pieces broken during sampling, single 1.0 inch piece in driving shoe, LL = 25%, PL = 17%, PI = 8%, SG = 2.6		sm (CL)		
723.0	6.0	S-5	15-50/2 100%					sw-sm		
722.0	7.0									
721.0	8.0	S-6	9-19-20 (39) 100%			6.0-6.65 ft Well graded sand with silt, (sw-sm), 80% sand, fine to medium; 10% gravel, fine, subangular, medium hardness; 10% fines, non plastic, no toughness; maximum grain size = 0.1 inches, moderate yellowish brown (10YR 5/4) with dark gray (N3), moist, no HCl reaction, very dense		sm		
720.0	9.0					6.65-7.5 ft Interval not sampled				
719.0	10.0	S-7	9-14-30 (44) 100%			7.5-9.0 ft Silty sand, (sm), 80% sand, fine to coarse; 20% fines, non plastic, no toughness; maximum grain size = 0.1 inches, moderate yellowish brown (10YR 5/4) and yellowish gray (5Y 7/2), moist, no HCl reaction, dense, coarse sand sized fragments of shale, dark gray (N3)		sm		
718.0	11.0	S-8	6-11-14 (25) 100%			9.0-10.5 ft Silty sand, (sm), 75% sand, fine to coarse; 20% fines, low plasticity, low dry strength; 5% gravel, fine; maximum grain size = 0.1 inches, light brown (5YR 5/6) and yellowish gray (5Y 7/2), dry, no HCl reaction, dense, some weathered shale fragments		sm		
717.0	12.0									
716.0	13.0	S-9	7-8-12 (20) 87%			10.5-12.0 ft Silty sand, (sm), 80% sand, fine to coarse; 15% fines, non plastic, low dry strength; 5% gravel, fine, subangular; maximum grain size = 0.1 inches, light brown (5YR 5/6) and yellowish gray (5Y 7/2), dry, no HCl reaction, medium dense		sm		
715.0	14.0	S-10	4-4-5 (9) 100%			12.0-13.5 ft Silty sand, (sm), 80% sand, fine to coarse; 20% fines, non plastic, low dry strength; 0% gravel; light brown (5YR 5/6) and yellowish gray (5Y 7/2), dry, no HCl reaction, medium dense		sm		
714.0	15.0									
713.0	16.0	S-11	4-6-6 (12) 100%			13.5-15.0 ft Silty sand, (sm), 80% sand, fine to coarse; 20% fines, non plastic, low toughness; 0% gravel; light brown (5YR 5/6) and moderate orange pink (10R 7/4), dry, no HCl reaction, loose, some weathered shale fragments, dark gray (N3)		sm		
712.0	17.0	S-12	6-9-9 (18) 100%			15.0-16.5 ft Silty sand, (sm), 75% sand, fine to coarse; 20% fines, non plastic, low toughness; 5% gravel, fine, subangular, medium hardness; maximum grain size = 0.25 inches, light brown (5YR 5/6) with moderate orange pink (10R 7/4), dry, no HCl reaction, medium dense		sm		
711.0	18.0									
710.0	19.0	S-13	4-10-13 (23) 100%			16.5-18.0 ft Silty sand, (sm), 80% sand, fine to coarse; 20% fines, non plastic, no toughness; 0% gravel; pale yellowish orange (10YR 8/6) with moderate reddish brown (10R 4/6), dry, no HCl reaction, medium dense, moderate reddish brown (10 R 4/6) weathered shale pieces		sm		
709.0		S-14				18.0-19.5 ft Silty sand, (sm), 75% sand, fine to coarse; 20% fines, non		sm		
DATE STARTED: 5/9/10 DATE FINISHED: 5/11/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon			NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle			DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-408

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 340045.08 ft E. 2404983.01 ft GROUND SURFACE ELEVATION: 728.44 ft		
708.0	21.0	S-14	9-15-16 (31) 100%			plastic, no toughness; 5% gravel, fine, subangular, medium hardness; maximum grain size = 0.25 inches, light brown (5YR 5/6) and pale yellowish orange (10YR 8/6), dry, no HCl reaction, medium dense, some weathered shale fragments, moderate yellowish brown (10R 4/6)	sm	
707.0	22.0	S-15	6-14-31 (45) 100%				sm	
706.0	23.0	S-16	23-50/5 100%				gm	Switching to casing advancer with tri-cone
705.0	24.0	S-17	50/5 71%				gm	Refusal at 24.42 ft., drilling to 25.0 ft. and begins coring
704.0	25.0							
703.0	26.0							
702.0	27.0	R-1	100% (0%)	FD7				
701.0	28.0							
700.0	29.0							
699.0	30.0							
698.0	31.0							
697.0	32.0	R-2	100% (0%)	FD7				
696.0	33.0							
695.0	34.0							
694.0	35.0					19.5-21.0 ft Silty sand, (sm), 75% sand, fine to coarse; 20% fines, non plastic, no toughness; 5% gravel, fine, angular, medium hardness; maximum grain size = 0.1 inches, light brown (5YR 5/6) and pale yellowish orange (10YR 8/6), moist, dense, coarse sand to fine gravel size weathered shale fragments dark gray (N3) and moderate reddish brown (10R 4/6)		
693.0	36.0					21.0-22.5 ft Silty sand, (sm), 70% sand, fine to coarse; 20% fines, non plastic, no toughness; 10% gravel, fine, subangular, flat and elongated, medium hardness; maximum grain size = 0.5 inches, light brown (5YR 5/6) and yellowish gray (5Y 7/2), dry, dense, sample transitions into larger, drier, less/slightly weathered shale, dark gray (N3) fragments		
692.0	37.0	R-3	100% (0%)	FD7		22.5-23.42 ft Silty gravel with sand, (gm), 60% gravel, fine to medium, angular, flat and elongated, medium hardness; 20% sand, fine; 20% fines, non plastic, no toughness; maximum grain size = 0.5 inches, dark yellowish orange (10YR 6/6) and yellowish gray (5Y 7/2), moist, very dense, moderately to intensely weathered shale, some dark gray (N3) pieces.		
691.0	38.0							
690.0	39.0							
689.0		R-4		FD5		23.42-24.0 ft Interval not sampled		
DATE STARTED: 5/9/10 DATE FINISHED: 5/11/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	


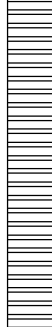
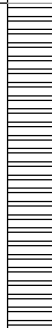


REV 1 Final Boring B-408

PROJECT NO. 10-4310

						COORDINATES		USCS SYMBOL	REMARKS
						N. 340045.08 ft E. 2404983.01 ft			
						GROUND SURFACE ELEVATION: 728.44 ft			
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION			
688.0	41.0	R-4	100% (63%)	FD5		24.0-24.42 ft Silty gravel with sand, (gm), 60% gravel, fine to medium, angular, flat and elongated, medium hardness; 20% sand, fine; 20% fines, non plastic, no toughness; maximum grain size = 0.5 inches, dark yellowish orange (10YR 6/6) and yellowish gray (5Y 7/2), moist, very dense, moderately to intensely weathered shale, some dark gray (N3) pieces.			
687.0						24.42-25.0 ft Interval not sampled			
686.0	43.0	R-5	100% (38%)	FD6		25.0-29.5 ft SHALE, interbedded, soft to moderately hard, moderately to intensely weathered, dark gray (N3) and pale yellowish orange (10YR 8/6), very closely to closely fractured, no reaction to HCl, iron oxide staining			
685.0						29.5-34.5 ft SHALE, soft to moderately hard, slightly to intensely weathered, dark gray (N3) and yellowish gray (5Y 7/2), very closely to closely fractured, no reaction to HCl, iron oxide staining			
684.0	45.0	R-6	100% (34%)	FD7		34.5-39.5 ft SHALE, soft to moderately hard, slightly to intensely weathered, dark gray (N3) with pale yellowish orange (10YR 8/6), very closely to closely fractured, no reaction to HCl, iron oxide staining			
683.0						39.5-44.5 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), moderately fractured, no reaction to HCl, iron oxide staining, intensely weathered at 42.2-42.4 ft.,trace fossils and pyrite throughout sample			
682.0	47.0	R-7	100% (17%)	FD7		44.5-49.5 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite			
681.0						45.1-46.3 ft Joint, R.D. = 85-90°, slightly open; surface: slightly rough, planar. Fracture set #F-1.			
680.0	49.0	R-8		FD8		46.5-48.15 ft Joint, R.D. = 40°, moderately spaced, slightly open; surface: slightly rough, planar. Fracture set #F-2.			
679.0						49.2-50.15 ft Joint, R.D. = 40°, closely spaced, slightly open; surface: slightly rough, planar; 70° fracture at 49.2-49.5 ft., slightly open, slightly rough/planar, iron oxide staining on surfaces. Fracture set #F-3.			
678.0	51.0					49.5-54.5 ft SHALE, moderately soft to moderately hard, fresh to moderately weathered, dark gray (N3) and dark yellowish orange (10YR 6/6), closely to moderately fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite			
677.0						50.4-50.8 ft Joint, R.D. = 10°, closely spaced, moderately open; surface: slightly rough, planar. Fracture set #F-4.			
676.0	53.0					51.25-52.3 ft Joint, R.D. = 70-85°, closely spaced, slightly open; surface: slightly rough, undulating. Fracture set #F-5.			
675.0						52.3-56.1 ft Joint, R.D. = 25-40°, moderately spaced, slightly open; surface: slightly rough, planar, slightly weathered, moderately hard. Fracture set #F-6.			
674.0	55.0					54.5-59.5 ft SHALE, moderately soft to moderately hard, fresh to intensely weathered, dark gray (N3) and yellowish gray (5Y 7/2), closely to moderately fractured, no reaction to HCl, iron oxide staining, moderately to intensely weathered 56.0-58.4 ft., trace fossils and pyrite throughout			
673.0						56.4-60.3 ft Joint, R.D. = 70-80°, closely spaced, slightly open; surface: slightly rough, planar, moderately weathered, moderately hard; greater weathering 56.2-58.2 ft. Fracture set #F-7.			
672.0	57.0								
671.0									
670.0	59.0								
669.0									
DATE STARTED: 5/9/10 DATE FINISHED: 5/11/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

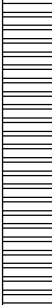
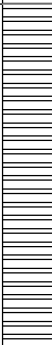
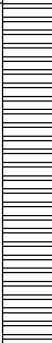
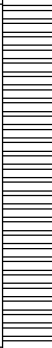

REV 1 Final Boring B-408

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS				
N. 340045.08 ft E. 2404983.01 ft											
GROUND SURFACE ELEVATION: 728.44 ft											
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION					
668.0		R-8	100% (20%)	FD8		59.5-64.5 ft SHALE, soft to moderately hard, slightly to intensely weathered, dark gray (N3) and yellowish gray (5Y 7/2), very closely to moderately fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite	SC-2 63.5-64.5 ft., 09:00 on 5/10/10				
667.0	61.0					60.4-63.1 ft Joint, R.D. = 40°, closely spaced, slightly open; surface: slightly rough, undulating, moderately weathered. Fracture set #F-8.					
666.0	62.0					63.1-66.4 ft Joint, R.D. = 70-85°, closely spaced; filling: partly healed, moderately thin, moderately to intensely weathered, soft; surface: slightly rough, planar, moderately to moderately weathered. Fracture set #F-9.					
665.0	63.0					64.5-69.5 ft SHALE, soft to moderately hard, slightly to intensely weathered, dark gray (N3) and yellowish gray (5Y 7/2), closely fractured, no reaction to HCl, iron oxide staining, intensely weathered 67.3-69.2 ft.					
664.0	64.0	R-9	100% (22%)	FD7		66.5-74.5 ft R.D. = 40°, closely spaced, slightly open; surface: slightly rough, undulating, intensely weathered, soft to moderately hard. Fracture set #F-10.					
663.0	65.0					69.5-74.5 ft SHALE, soft to moderately hard, slightly to intensely weathered, dark gray (N3) and yellowish gray (5Y 7/2), closely fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite					
662.0	66.0										
661.0	67.0										
660.0	68.0	R-10	100% (9%)	FD7							
659.0	69.0										
658.0	70.0										
657.0	71.0										
656.0	72.0	R-11	100% (58%)	FD4		74.5-79.5 ft SHALE, moderately hard, fresh to moderately weathered, dark gray (N3) and yellowish gray (5Y 7/2), closely to widely fractured, no reaction to HCl, iron oxide staining, moderately weathered quartz healed fracture 74.5-76.3 ft., trace fossils and pyrite throughout					
655.0	73.0					74.5-76.3 ft R.D. = 70°, closely spaced, slightly open; filling: moderately healed, moderately thick quartz, slightly to moderately weathered, moderately hard to moderately hard; surface: slightly rough, planar, slightly to moderately weathered, moderately hard. Fracture set #F-11.					
654.0	74.0					76.7-84.7 ft Joint, R.D. = 70°, moderately spaced; filling: totally healed, moderately thin calcite, fresh, moderately hard; surface: smooth, planar, fresh. Fracture set #F-12.					
653.0	75.0										
652.0	76.0	R-12		FD1							
651.0	77.0										
650.0	78.0										
649.0	79.0										
DATE STARTED: 5/9/10 DATE FINISHED: 5/11/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:				
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931				

REV 1 Final Boring B-408

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 728.44 ft						DESCRIPTION		
DESCRIPTION								
648.0	81.0	R-12	100% (89%)	FD1		79.5-84.5 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), very widely to widely fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite	SC-3 83.2-84.15 ft., 10:10 on 5/10/10	
647.0	82.0							
646.0	83.0							
645.0	84.0							
644.0	85.0							
643.0	86.0	R-13	100% (90%)	FD2		84.5-204.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace fossils and pyrite		
642.0	87.0							
641.0	88.0							
640.0	89.0							
639.0	90.0							
638.0	91.0	R-14	100% (95%)	FD2				
637.0	92.0							
636.0	93.0							
635.0	94.0							
634.0	95.0							
633.0	96.0	R-15	98% (98%)	FD1		96.95-98 ft R.D. = 40°, moderately spaced; filling: not healed, clean calcite, moderately hard; surface: slightly rough, undulating, moderately hard. Fracture set #F-13.		
632.0	97.0							
631.0	98.0							
630.0	99.0							
629.0								
		R-16		FD0				
DATE STARTED: 5/9/10 DATE FINISHED: 5/11/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

REV 1 Final Boring B-408

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 728.44 ft						DESCRIPTION	
84.5-204.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace fossils and pyrite							
628.0		R-16	100% (100%)	FD0			
101.0							
627.0							
102.0							
626.0							
103.0							
625.0		R-17	98% (98%)	FD0			
104.0							
624.0							
105.0							
623.0							
106.0							
622.0		R-18	100% (100%)	FD0			
107.0							
621.0							
108.0							
620.0							
109.0							
619.0		R-19	98% (98%)	FD0			
110.0							
618.0							
111.0							
617.0							
112.0							
616.0		R-20		FD1			
113.0							
615.0							
114.0							
614.0							
115.0							
613.0							
116.0							
612.0							
117.0							
611.0							
118.0							
610.0							
119.0							
609.0							
DATE STARTED: 5/9/10 DATE FINISHED: 5/11/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky				DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez				DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-408

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 340045.08 ft E. 2404983.01 ft GROUND SURFACE ELEVATION: 728.44 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
608.0		R-20	100% (100%)	FD1		84.5-204.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace fossils and pyrite		
121.0								
607.0								
122.0								
606.0		R-21	100% (100%)	FD1		123.51-129.1 ft Joint, R.D. = 0°, slightly open; filling: not healed, moderately thin calcite, fresh, moderately hard; surface: slightly rough, undulating, fresh, moderately hard. Fracture set #F-14.		
123.0								
605.0								
124.0								
604.0		R-22	100% (100%)	FD0				
125.0								
603.0								
126.0								
602.0		R-23	100% (100%)	FD0				
127.0								
601.0								
128.0								
600.0		R-24	100% (100%)	FD0				
129.0								
599.0								
130.0								
598.0		R-25	100% (100%)	FD0				
131.0								
597.0								
132.0								
596.0		R-26	100% (100%)	FD0				
133.0								
595.0								
134.0								
594.0		R-27	100% (100%)	FD0				
135.0								
593.0								
136.0								
592.0		R-28	100% (100%)	FD0				
137.0								
591.0								
138.0								
590.0		R-29	100% (100%)	FD0				
139.0								
589.0								
DATE STARTED: 5/9/10						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
DATE FINISHED: 5/11/10								
FIELD GEOLOGIST: Jesse Merkel						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931
CHECKED BY: Jennifer Ostrowsky								
APPROVED BY: Rolando Benitez								

REV 1 Final Boring B-408

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 340045.08 ft E. 2404983.01 ft GROUND SURFACE ELEVATION: 728.44 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
588.0	141.0	R-24	100% (100%)	FD0		84.5-204.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace fossils and pyrite		
587.0	142.0							
586.0	143.0							
585.0	144.0							
584.0	145.0	R-25	100% (100%)	FD0				
583.0	146.0							
582.0	147.0							
581.0	148.0							
580.0	149.0	R-26	100% (100%)	FD0				
579.0	150.0							
578.0	151.0							
577.0	152.0							
576.0	153.0	R-27	100% (100%)	FD0				
575.0	154.0							
574.0	155.0							
573.0	156.0							
572.0	157.0	R-28	100% (100%)	FD0				
571.0	158.0							
570.0	159.0							
569.0								
DATE STARTED: 5/9/10 DATE FINISHED: 5/11/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		

REV 1 Final Boring B-408

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 728.44 ft							
DESCRIPTION							
568.0		R-28	100% (100%)	FD0		84.5-204.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace fossils and pyrite	
161.0							
567.0							
162.0							
566.0							
163.0							
565.0							
164.0							
564.0		R-29	100% (100%)	FD0			
165.0							
563.0							
166.0							
562.0							
167.0							
561.0		R-30	100% (100%)	FD0			
168.0							
560.0							
169.0							
559.0							
170.0							
558.0		R-31	100% (100%)	FD0			
171.0							
557.0							
172.0							
556.0							
173.0							
555.0		R-32	100% (100%)	FD0			
174.0							
554.0							
175.0							
553.0							
176.0							
552.0		R-31	100% (100%)	FD0			
177.0							
551.0							
178.0							
550.0							
179.0							
549.0		R-32		FD0			
DATE STARTED: 5/9/10 DATE FINISHED: 5/11/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky				DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez				DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	


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PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 728.44 ft							
DESCRIPTION							
548.0		R-32	100% (100%)	FD0		84.5-204.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace fossils and pyrite	
181.0							
547.0							
182.0							
546.0							
183.0							
545.0							
184.0							
544.0		R-33	100% (100%)	FD0			
185.0							
543.0							
186.0							
542.0							
187.0							
541.0		R-34	100% (100%)	FD0			
188.0							
540.0							
189.0							
539.0							
190.0		R-35	100% (100%)	FD0			
538.0							
191.0							
537.0							
192.0							
536.0		R-36	100% (100%)	FD0			
193.0							
535.0							
194.0							
534.0							
195.0		R-37	100% (100%)	FD0			
533.0							
196.0							
532.0							
197.0							
531.0		R-38	100% (100%)	FD0			
198.0							
530.0							
199.0							
529.0							
DATE STARTED: 5/9/10 DATE FINISHED: 5/11/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931











REV 1 Final Boring B-408

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 340045.08 ft E. 2404983.01 ft							
GROUND SURFACE ELEVATION: 728.44 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
528.0		R-36	100% (100%)	FD0		84.5-204.5 ft SHALE, massive, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace fossils and pyrite	
201.0							
527.0							
202.0							
526.0							
203.0							
525.0							
204.0							
524.0							
---- Bottom of Boring at 204.50 ft.----							
DATE STARTED: 5/9/10						NOTES:	
DATE FINISHED: 5/11/10							
FIELD GEOLOGIST: Jesse Merkel						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ	
CHECKED BY: Jennifer Ostrowsky						DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez						DRILL RIG: Diedrich D-120 (ATV)	
						HAMMER ID: 931	

REV 1 Final Boring B-409

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS			
N. 339978.74 ft E. 2405035.71 ft										
GROUND SURFACE ELEVATION: 735.15 ft										
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION				
735.0		S-1	7-10-7 (17) 93%			0.0-0.5 ft Organic soil with sand, (ol/oh), 80% fines, non plastic, low dry strength, no dilatancy, no toughness; 10% gravel, fine to medium; 10% sand, fine; maximum grain size = 0.5 in inches, dark yellowish brown (10YR 4/2), organic odor, moist, no HCl reaction, with roots, some rock fragments	ol/oh			
734.0	1.0							gp		
733.0	2.0	S-2	7-17-24 (41) 100%			0.5-1.5 ft Poorly graded gravel, (gp), 100% gravel, coarse, hard hardness; 0% fines; maximum grain size = 1.0 in inches, pale reddish brown (10R 5/4) to blackish red (5R 2/2), no HCl reaction	ml			
732.0	3.0	S-3	24-16-12 (28) 93%			1.5-3.0 ft SANDSTONE, hard, slightly weathered, boulder sized particles, medium gray (N5), thinly bedded, no odor, no reaction to HCl, no staining, sandstone boulder, max grain size 2.0 inches				
731.0	4.0					3.0-6.0 ft Silt with sand, (ml), 75% fines, low plasticity, low dry strength, slow dilatancy, low toughness; 25% sand, fine to coarse, subrounded, elongated, hard hardness; dark yellowish orange (10YR 6/6) to moderate brown (5YR 3/4), moist, no HCl reaction				
730.0	5.0	S-4	6-7-8 (15) 100%							
729.0	6.0	S-5	9-9-12 (21) 0%			6.0-7.5 ft Interval not sampled	ml			
728.0	7.0									
727.0	8.0	S-6	7-12-16 (28) 33%			7.5-9.0 ft Silt with sand, (ml), 75% fines, low plasticity, low dry strength, slow dilatancy, low toughness; 25% sand, fine to coarse, subrounded, elongated, hard hardness; dark yellowish orange (10YR 6/6) to moderate brown (5YR 3/4), moist, no HCl reaction				
726.0	9.0	S-7	10-11-11 (22) 100%			9.0-12.0 ft SHALE, soft, decomposed, pale yellowish brown (10YR 6/2) with light brown (5YR 5/6), no reaction to HCl, iron oxide staining				
725.0	10.0									
724.0	11.0	S-8	16-25-35 (60) 100%				12.0-14.75 ft SHALE, moderately soft, decomposed to intensely weathered, grayish orange (10YR 7/4) and light olive gray (5Y 5/2), no reaction to HCl, iron oxide staining			
723.0	12.0	S-9	20-32-28 (60) 100%							
722.0	13.0									
721.0	14.0	S-10	15-37-50/3 96%			14.75-17.5 ft Interval not sampled				
720.0	15.0									
719.0	16.0	R-1	87% (0%)			17.5-39.0 ft SHALE, moderately to very intensely weathered, dark gray (N3) with light olive gray (5Y 6/1), thinly to moderately bedded, very closely to closely fractured, no reaction to HCl				
718.0	17.0					17.5-28.05 ft Fracture, R.D. = 10 - 90°, closely to widely spaced; filling: not healed, very thin clay, slightly to intensely weathered, soft to hard; surface: smooth, slightly weathered; iron oxide staining.				
717.0	18.0			FD9						
716.0	19.0			FD7						
DATE STARTED: 5/10/10						NOTES:				
DATE FINISHED: 5/11/10										
FIELD GEOLOGIST: Adam Meyer						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ				
CHECKED BY: Jennifer Ostrowsky						DRILLING CO. Terracon				
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck)			
							HAMMER ID: 925			

REV 1 Final Boring B-409

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 339978.74 ft E. 2405035.71 ft GROUND SURFACE ELEVATION: 735.15 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
715.0		R-1				17.5-39.0 ft SHALE, moderately to very intensely weathered, dark gray (N3) with light olive gray (5Y 6/1), thinly to moderately bedded, very closely to closely fractured, no reaction to HCl		
714.0	21.0							
713.0	22.0							
712.0	23.0	R-2	78% (0%)					
711.0	24.0							
710.0	25.0							
709.0	26.0							
708.0	27.0							
707.0	28.0	R-3	93% (0%)					
706.0	29.0							
705.0	30.0			FD7		28.05-39.2 ft Fracture zone, R.D. = 8 - 34°, closely to moderately spaced, neither ends visible; filling: not healed, very thin clay, moderately weathered; surface: rough, moderately weathered. Fracture set #3.		
704.0	31.0							
703.0	32.0							
702.0	33.0	R-4	100% (7%)					
701.0	34.0							
700.0	35.0							
699.0	36.0							
698.0	37.0							
697.0	38.0	R-5	98% (8%)					
696.0	39.0			FD5				39.2-54.2 ft Fracture zone, R.D. = 0 - 50°, very closely to moderately spaced; filling: not healed, slightly weathered; surface: moderately rough, slightly
DATE STARTED: 5/10/10 DATE FINISHED: 5/11/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 925

REV 1 Final Boring B-409

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 339978.74 ft E. 2405035.71 ft								
GROUND SURFACE ELEVATION: 735.15 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
695.0		R-5		FD5		weathered; surface has iron oxide staining. Fracture set #4. 39.0-70.8 ft SHALE, clayey, moderately hard, slightly to moderately weathered, clay sized particles, dark gray (N3) to grayish black (N2), moderately bedded, R.D. = 15°, very closely to widely fractured		
694.0	41.0							
693.0	42.0							
692.0	43.0	R-6	100% (0%)	FD7				
691.0	44.0							
690.0	45.0							
689.0	46.0							
688.0	47.0							
687.0	48.0	R-7	99% (17%)	FD6				
686.0	49.0							
685.0	50.0					54.2-60.05 ft Fracture zone, R.D. = 72 - 84°, very closely spaced, slightly open; filling: not healed, very thin clay, slightly weathered; surface: moderately rough, slightly weathered; iron oxide staining. Fracture set #5.		
684.0	51.0							
683.0	52.0			FD4				
682.0	53.0	R-8	98% (42%)					
681.0	54.0							
680.0	55.0							
679.0	56.0							
678.0	57.0			FD6				
677.0	58.0	R-9	100% (7%)					
676.0	59.0							
DATE STARTED: 5/10/10 DATE FINISHED: 5/11/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick		
						DRILL RIG: CME-55 (Truck) HAMMER ID: 925		

REV 1 Final Boring B-409

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 735.15 ft						DESCRIPTION	
DESCRIPTION							
675.0		R-9				39.0-70.8 ft SHALE, clayey, moderately hard, slightly to moderately weathered, clay sized particles, dark gray (N3) to grayish black (N2), moderately bedded, R.D. = 15°, very closely to widely fractured 60.05-71.5 ft Fracture zone, R.D. = 13 -35°, very closely to moderately spaced, slightly open; filling: not healed, slightly to moderately weathered; surface: slightly rough, slightly weathered; iron oxide staining. Fracture set #6.	SC-2, 60.8 - 61.17 ft., 10:20, 5/11/10
674.0	61.0						
673.0	62.0						
672.0	63.0	R-10	93% (8%)				
671.0	64.0						
670.0	65.0						
669.0	66.0			FD6			
668.0	67.0						
667.0	68.0	R-11	94% (13%)				
666.0	69.0						
665.0	70.0					70.8-100.5 ft SHALE, moderately hard, slightly weathered to fresh, dark gray (N3), thinly to moderately bedded, closely to widely fractured, no staining, highly pitted 80.05-80.5 ft, pitting at 91.9-92.15 ft 73.05-74 ft Joint, R.D. = 81°, neither ends visible, slightly open; filling: not healed, very thin iron oxide, slightly weathered; surface: slightly rough, slightly weathered. 74.95-75.2 ft Joint, R.D. = 42°, neither ends visible, tight; filling: not healed, clean, slightly weathered to fresh; surface: moderately rough, slightly weathered. 75.2-82 ft Fracture zone, R.D. = 0 - 54°, closely spaced, slightly open; filling: not healed, very thin calcite, fresh, moderately soft; surface: rough, fresh. Fracture set #8.	
664.0	71.0						
663.0	72.0						
662.0	73.0	R-12	97% (82%)				
661.0	74.0						
660.0	75.0						
659.0	76.0			FD3			
658.0	77.0						
657.0	78.0	R-13	90% (64%)				
656.0	79.0						
DATE STARTED: 5/10/10 DATE FINISHED: 5/11/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 925

REV 1 Final Boring B-409

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						<p>N. 339978.74 ft E. 2405035.71 ft</p> <p>GROUND SURFACE ELEVATION: 735.15 ft</p>		
655.0		R-13		FD7		70.8-100.5 ft SHALE, moderately hard, slightly weathered to fresh, dark gray (N3), thinly to moderately bedded, closely to widely fractured, no staining, highly pitted 80.05-80.5 ft, pitting at 91.9-92.15 ft		
654.0	81.0			FD7				
653.0	82.0					82-82.15 ft Joint, R.D. = 68°, one end visible; filling: moderately healed, very thin calcite, slightly weathered to fresh; surface: slightly rough, slightly weathered.		
652.0	83.0	R-14	68% (54%)	FD5				
651.0	84.0					82.3-82.45 ft Joint, R.D. = 70°, one end visible; filling: moderately healed, very thin calcite, fresh, moderately hard; surface: slightly rough, fresh.		
650.0	85.0					82.87-83.3 ft Joint, R.D. = 88°, one end visible; filling: partly healed, very thin iron oxide, slightly weathered; surface: slightly rough, slightly weathered.		
649.0	86.0					83.3-100.5 ft Fracture zone, R.D. = 10 - 56°, very closely to closely spaced; filling: not healed, very thin iron oxide staining, slightly to moderately weathered; surface: moderately rough, slightly to moderately weathered.		
648.0	87.0			FD3		Fracture set #9.		
647.0	88.0	R-15	100% (51%)					
646.0	89.0							
645.0	90.0							
644.0	91.0			FD7				
643.0	92.0							
642.0	93.0	R-16	90% (26%)					
641.0	94.0							
640.0	95.0							
639.0	96.0							
638.0	97.0							
637.0	98.0	R-17	100% (100%)	FD2				
636.0	99.0							
DATE STARTED: 5/10/10 DATE FINISHED: 5/11/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 925	

REV 1 Final Boring B-409

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/Min & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES N. 339978.74 ft E. 2405035.71 ft GROUND SURFACE ELEVATION: 735.15 ft	USCS SYMBOL	REMARKS
						DESCRIPTION		
635.6		R-17		FD2		---- Bottom of Boring at 100.50 ft.----		
DATE STARTED: 5/10/10 DATE FINISHED: 5/11/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 925

REV 1 Final Boring B-410

PROJECT NO. 10-4310

						COORDINATES		USCS SYMBOL	REMARKS
						N. 339957.85 ft E. 2405145.85 ft			
						GROUND SURFACE ELEVATION: 744.85 ft			
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW(SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION			
744.0	1.0	S-1	3-2-2 (4) 93%			0.0-1.5 ft Silty sand, (sm), 65% sand, fine; 30% fines, medium plasticity, low toughness; 5% gravel, fine, subrounded, medium hardness; maximum grain size = 0.25 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, very loose		sm	ST-1 9.0-11.0 ft, 500 psi down pressure
743.0	2.0	S-2	1-3-5 (8) 100%			1.5-3.0 ft Silty sand, (sm), 65% sand, fine to medium; 30% fines, medium plasticity, low toughness; 5% gravel, fine, subangular, medium hardness; maximum grain size = 1.25 inches, dark yellowish orange (10YR 6/6), moist, no HCl reaction, loose		sm	
742.0	3.0					3.0-4.5 ft Silty sand, (sm), 70% sand, fine to medium; 20% fines, medium plasticity, low toughness; 10% gravel, fine to medium, subangular, medium hardness; maximum grain size = 0.5 inches, moderate brown (5YR 4/4), dry, no HCl reaction, dense, sampling trough boulder, pieces med - coars gravel, (10R 8/2)		sm	
741.0	4.0	S-3	3-7-24 (31) 87%						
740.0	5.0	S-4	20-30-20 (50) 67%			4.5-6.0 ft Silty sand with gravel, (sm), 60% sand, fine to coarse; 20% gravel, fine to medium, medium hardness; 20% fines, medium plasticity, low toughness; maximum grain size = 0.5 inches, light brown (5YR 5/6) with pale yellowish orange (10YR 8/6), dry, no HCl reaction, dense, sampling through boulder/cobble (10R 8/2).		sm	
739.0	6.0								
738.0	7.0	S-5	10-12-50/3 100%			6.0-7.25 ft Silty sand, (sm), 70% sand, fine to medium; 20% fines, medium plasticity, low toughness; 10% gravel, fine, subangular, medium hardness; maximum grain size = 1.0 inches, light brown (5YR 5/6), dry, no HCl reaction, very dense		sm	
737.0	8.0	S-6	10-10-10 (20) 100%			7.25-7.5 ft Interval not sampled		sp-sm	
736.0	9.0					7.5-9.0 ft Poorly graded sand with silt and gravel, (sp-sm), 70% sand, fine to coarse; 20% gravel, fine, subangular, medium hardness; 10% fines, medium plasticity, medium toughness; maximum grain size = 0.25 inches, dark yellowish orange (10YR 6/6) and pale yellowish orange (10YR 8/6), dry, no HCl reaction, medium dense			
735.0	10.0	ST-1	65%			9.0-11.0 ft Shelby Tube sample			
734.0	11.0					11.0-11.5 ft Interval not sampled			
733.0	12.0	S-7	6-6-14 (20) 93%			11.5-13.0 ft Poorly graded sand with silt, (sp-sm), 80% sand; 10% gravel, fine, subangular, medium hardness; 10% fines, medium plasticity, low toughness; maximum grain size = 0.75 inches, moderate reddish brown (10R 4/6) and very pale orange (10YR 8/2), dry, no HCl reaction, medium dense, weathered shale		sp-sm	
732.0	13.0								
731.0	14.0	S-8	11-15-24 (39) 93%			13.0-14.5 ft Silty gravel with sand, (gm), 50% gravel, fine, angular, flat and elongated, medium hardness; 30% sand, fine to medium; 20% fines, medium plasticity, low toughness; maximum grain size = 0.5 inches, medium gray (N5) and very pale orange (10YR 8/2), dry, no HCl reaction, dense, weathered shale		gm	
730.0	15.0	S-9	16-28-30 (58) 100%			14.5-16.0 ft Silty sand with gravel, (sm), 50% sand, fine to coarse; 30% fines, medium plasticity, low toughness; 20% gravel, fine, subangular, flat and elongated, medium hardness; maximum grain size = 0.5 inches, yellowish gray (5Y 8/1) and very pale orange (10YR 8/2), dry, no HCl reaction, very dense, weathered shale		sm	
729.0	16.0								
728.0	17.0	S-10	34-50/5 100%			16.0-16.9 ft Silty sand with gravel, (sm), 40% sand, fine to coarse; 30% gravel, fine to medium, subangular, flat and elongated, medium hardness; 30% fines, medium plasticity, low toughness; maximum grain size = 0.25 inches, yellowish gray (5Y 7/2) and medium gray (N5), dry, no HCl reaction, very dense, weathered shale		sm	
727.0	18.0					16.9-17.5 ft Interval not sampled			
726.0	19.0	R-1	57% (0%)	FD7		17.5-19.8 ft SHALE, interbedded, soft to moderately hard, moderately to intensely weathered, yellowish gray (5Y 7/2) and dark gray (N3), very			Water recirculation is minimal
725.0		R-2							
DATE STARTED: 4/29/10 DATE FINISHED: 5/5/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon			NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick			DRILL RIG: CME-55 (Truck) HAMMER ID: 955




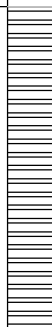
REV 1 Final Boring B-410

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS									
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE											
GROUND SURFACE ELEVATION: 744.85 ft						DESCRIPTION										
DESCRIPTION																
724.0	21.0	R-2	100% (0%)	FD6		closely fractured, no reaction to HCl, iron oxide staining 19.8-24.8 ft SHALE, soft to moderately hard, moderately to intensely weathered, yellowish gray (5Y 7/2) and dark gray (N3), very closely to closely fractured, no reaction to HCl, iron oxide staining										
723.0	22.0			FD6												
722.0	23.0															
721.0	24.0															
720.0	25.0	R-3	100% (8%)	FD5				24.8-29.8 ft SHALE, soft to moderately hard, slightly to intensely weathered, dark gray (N3) with yellowish gray (5Y 7/2), closely to moderately fractured, no reaction to HCl, iron oxide staining, shale weathering to clay (10YR 6/6) in spots								
719.0	26.0															
718.0	27.0															
717.0	28.0															
716.0	29.0	R-4	98% (13%)	FD6						29.8-34.8 ft SHALE, soft to moderately hard, slightly to moderately weathered, dark gray (N3) with grayish orange (10YR 7/4), closely fractured, no reaction to HCl, iron oxide staining, shale weathering to clay	SC-1 28.9-29.35 ft, 09:35, 5/4/10					
715.0	30.0															
714.0	31.0															
713.0	32.0															
712.0	33.0	R-5	94% (7%)	FD6								34.8-39.8 ft SHALE, soft to moderately hard, slightly to intensely weathered, dark gray (N3) with, closely fractured, no reaction to HCl, iron oxide staining				
711.0	34.0															
710.0	35.0															
709.0	36.0															
708.0	37.0	R-6														
707.0	38.0															
706.0	39.0															
705.0																
DATE STARTED: 4/29/10 DATE FINISHED: 5/5/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon										NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick										DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-410

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 339957.85 ft E. 2405145.85 ft								
GROUND SURFACE ELEVATION: 744.85 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
704.0	41.0	R-6	100% (7%)	FD6		39.8-44.8 ft Joint, R.D. = 10,50,70°, closely spaced, slightly open; surface: slightly rough, planar; iron oxide staining on fracture surfaces, vertical fracture 41.4-41.8 ft.. Fracture set #F-1. 39.8-44.8 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining		
703.0	42.0							
702.0	43.0							
701.0	44.0							
700.0	45.0							
699.0	46.0	R-7	100% (26%)	FD6		44.8-49.8 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining 45.4-46.3 ft Joint, R.D. = 85°, slightly open; surface: moderately rough, undulating, moderately soft; iron oxide staining. Fracture set #F-2.		
698.0	47.0							
697.0	48.0							
696.0	49.0							
695.0	50.0							
694.0	51.0	R-8	88% (0%)	FD6		49.8-54.8 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3) and yellowish gray (5Y 7/2), very closely to closely fractured, no reaction to HCl, iron oxide staining, quartz-filled fracture 52.2-52.4 and 53.2-54.8, last portion mechanically broken		
693.0	52.0							
692.0	53.0							
691.0	54.0							
690.0	55.0							
689.0	56.0	R-9	68% (0%)	FD7		54.8-59.8 ft SHALE, soft to moderately hard, slightly to moderately weathered, dark gray (N3) and yellowish gray (5Y 7/2), closely to very closely fractured, iron oxide staining, moderately to intensely weathered quartz on fracture faces 54.8-55.4 ft.		
688.0	57.0							
687.0	58.0							
686.0	59.0							
685.0						R-10		
DATE STARTED: 4/29/10 DATE FINISHED: 5/5/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-410

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 744.85 ft						DESCRIPTION	
684.0	61.0	R-10	96% (52%)	FD5		59.8-64.8 ft SHALE, soft to moderately hard, fresh to moderately weathered, dark gray (N3) and yellowish gray (5Y 7/2), closely to moderately fractured, no reaction to HCl, iron oxide staining, sample becomes fresh at 61.1 ft. calcite infilling over quartz healed fractures throughout, calcite content increases with depth, trace fossils 60.7-64.8 ft Joint, R.D. = 70-80°, closely spaced; filling: moderately healed, moderately thin calcite infilling over, fresh to moderately weathered, moderately soft to moderately hard; surface: slightly rough, planar, fresh; jumbled, totally-healed section, with fragments of shale, 62.5-63.4 ft.. Fracture set #F-7.	
683.0	62.0			FD5			
682.0	63.0						
681.0	64.0						
680.0	65.0	R-11	100% (54%)	FD4		64.8-69.8 ft SHALE, moderately hard, fresh, dark gray (N3), moderately to widely fractured, no reaction to HCl, iron oxide staining, trace fossils 65.6-68.3 ft R.D. = 55-70°, closely spaced, slightly open; filling: moderately healed, thin quartz and calcite, fresh to moderately weathered, moderately soft to moderately hard; surface: moderately rough, planar, fresh. Fracture set #F-8.	
679.0	66.0						
678.0	67.0						
677.0	68.0						
676.0	69.0	R-12	90% (52%)	FD5		68.3-68.9 ft Joint, R.D. = 10°, closely spaced, slightly open; filling: not healed, very thin quartz, intensely weathered; surface: moderately rough, planar, intensely weathered; iron oxide staining on surfaces. Fracture set #F-9.	
675.0	70.0						
674.0	71.0						
673.0	72.0						
672.0	73.0	R-13	100% (60%)	FD4		69.8-74.8 ft SHALE, moderately hard, fresh, dark gray (N3), moderately fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite 70.3-71 ft Joint, R.D. = 70°, closely spaced, slightly open; surface: moderately rough, undulating, moderately hard. Fracture set #F-10. 71.15-72.15 ft Joint, R.D. = 10°, closely spaced, slightly open; surface: smooth, planar, moderately hard. Fracture set #F-11.	
671.0	74.0						
670.0	75.0						
669.0	76.0						
668.0	77.0	R-14				72.5-73 ft Joint, R.D. = 40°, closely spaced, slightly open; surface: slightly rough, planar. Fracture set #F-12.	
667.0	78.0						
666.0	79.0					74-79.8 ft R.D. = 50-70°, closely spaced, slightly open; surface: slightly rough, planar, moderately hard; mechanically broken 75.9-76.4 ft. Fracture set #F-13.	
665.0						74.8-79.8 ft SHALE, moderately hard, fresh, dark gray (N3), moderately to widely fractured, iron oxide staining, trace fossils and pyrite	
DATE STARTED: 4/29/10 DATE FINISHED: 5/5/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-410

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS			
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE					
GROUND SURFACE ELEVATION: 744.85 ft						DESCRIPTION				
DESCRIPTION										
664.0	81.0	R-14	100% (72%)	FD3		SC-3 84.1-84.8 ft, 12:50, 5/4/10				
663.0	82.0			FD3						
662.0	83.0									
661.0	84.0									
660.0	85.0									
659.0	86.0	R-15	100% (92%)	FD2						
658.0	87.0									
657.0	88.0									
656.0	89.0									
655.0	90.0									
654.0	91.0	R-16	100% (86%)	FD2						
653.0	92.0									
652.0	93.0									
651.0	94.0									
650.0	95.0									
649.0	96.0	R-17	90% (58%)	FD6						
648.0	97.0									
647.0	98.0									
646.0	99.0									
645.0										
DATE STARTED: 4/29/10 DATE FINISHED: 5/5/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:			
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955			

REV 1 Final Boring B-410							PROJECT NO. 10-4310	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339957.85 ft E. 2405145.85 ft GROUND SURFACE ELEVATION: 744.85 ft		
						DESCRIPTION		
						---- Bottom of Boring at 100.00 ft.----		
DATE STARTED: 4/29/10 DATE FINISHED: 5/5/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-411

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339979.47 ft E. 2405273.90 ft GROUND SURFACE ELEVATION: 758.15 ft		
						DESCRIPTION		
758.0		S-1	3-5-10 (15) 100%			0.0-1.5 ft Silty sand, (sm), 75% sand, fine to medium; 20% fines, low plasticity, low toughness; 5% gravel, fine, subangular, flat and elongated, medium hardness; maximum grain size = 0.3 inches, moderate yellowish brown (10YR 5/4), dry, medium dense	sm	
757.0	1.0							
756.0	2.0	S-2	11-11-13 (24) 100%			1.5-3.0 ft Silty sand, (sm), 70% sand, fine to coarse; 20% fines, low plasticity, no dry strength, no dilatancy, low toughness; 10% gravel, fine, rounded, medium hardness; maximum grain size = 0.25 inches, moderate yellowish brown (10YR 5/4) and dark yellowish orange (10YR 6/6), dry, medium dense	sm	
755.0	3.0							
754.0	4.0	S-3	8-12-14 (26) 100%			3.0-4.5 ft Poorly graded sand with silt and gravel, (sp-sm), 55% sand, fine to coarse; 35% gravel, fine to medium, subangular, medium hardness; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.5 inches, moderate yellowish brown (10YR 5/4) and light olive gray (5Y 6/1), dry, medium dense, some shale (N3) fragments coarse sand to fine gravel in size.	sp-sm	
753.0	5.0	S-4	9-16-27 (43) 100%				sp-sm	
752.0	6.0							
751.0	7.0	S-5	8-21-29 (50) 93%			4.5-6.0 ft Poorly graded sand with silt and gravel, (sp-sm), 45% gravel, fine to coarse, subangular, medium hardness; 45% sand, fine to coarse; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.0 inches, dark yellowish orange (10YR 6/6) and very light gray (N8), dry, dense, sampling through boulder	sm	
750.0	8.0	S-6	17-24-12 (36) 100%			6.0-7.5 ft Silty sand with gravel, (sm), 60% sand, fine to coarse; 25% gravel, fine to medium, subangular, medium hardness; 15% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.5 inches, moderate yellowish brown (10YR 5/4) and light gray (N7), dry, dense, sampling through boulder	sp-sm	
749.0	9.0							
748.0	10.0	S-7	11-14-50/3 92%			7.5-9.0 ft Poorly graded sand with silt and gravel, (sp-sm), 75% sand, fine to coarse; 15% gravel, fine to medium, subangular, medium hardness; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.5 inches, moderate yellowish brown (10YR 5/4) and very light gray (N8), dry, dense	sm	
747.0	11.0					9.0-10.25 ft Silty sand, (sm), 70% sand, fine to medium; 20% fines, low plasticity, no dry strength, no dilatancy, low toughness; 10% gravel, fine to medium, subangular, medium hardness; maximum grain size = 0.5 inches, moderate yellowish brown (10YR 5/4) and grayish pink (5R 8/2), dry, very dense, sampling through boulder		SPT sampling stopped at 10.25 ft. due to boulder. Did not sample 10.5-14.65 ft. due to boulder; drillers used a roller bit and casing advancer to drill through.
746.0	12.0					10.25-14.65 ft Interval not sampled (boulder)		
745.0	13.0							
744.0	14.0							
743.0	15.0	S-8	9-9-7 (16) 73%			14.65-16.15 ft Silty sand with gravel, (sm), 60% sand, fine to coarse; 20% gravel, fine to medium; 20% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.5 inches, dark yellowish orange (10YR 6/6) with dark gray (N3), moist, medium dense	sm	
742.0	16.0							
741.0	17.0	S-9	4-4-5 (9) 87%			16.15-17.65 ft Weathered shale, 90% fines, medium plasticity, medium dry strength, slow dilatancy, low toughness; 10% gravel, fine to medium, subangular, flat and elongated, medium hardness; 0% sand; maximum grain size = 0.2 inches, moderate brown (5YR 4/4), moist, stiff, laminated, trace sand		16.15 ft. Decomposed Shale
740.0	18.0	S-10	7-9-13 (22) 87%			17.65-19.15 ft Weathered shale, 65% gravel, fine to medium, subangular, elongated, medium hardness; 30% fines, medium plasticity, medium dry strength, slow dilatancy, low toughness; 5% sand, fine to medium, subangular, flat and elongated, medium hardness; maximum grain size = 0.3 inches, moderate brown (5YR 4/4) with very pale orange (10YR 8/2),		
739.0	19.0	S-11	11-18-20 (38) 100%					
DATE STARTED: 5/5/10 DATE FINISHED: 5/6/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-411

PROJECT NO. 10-4310

						COORDINATES		USCS SYMBOL	REMARKS
						N. 339979.47 ft E. 2405273.90 ft			
						GROUND SURFACE ELEVATION: 758.15 ft			
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION			
738.0		S -11				moist, medium dense, homogeneous			
737.0	21.0	S -12	14-29-26 (55) 93%			19.15-20.65 ft Weathered shale, 80% fines, medium plasticity, medium dry strength, slow dilatancy, low toughness; 15% gravel, fine, subangular, elongated, medium hardness; 5% sand, fine to medium, subangular, elongated, medium hardness; maximum grain size = 0.3 inches, pale yellowish brown (10YR 6/2) with moderate yellowish brown (10YR 5/4), moist, hard, All sand and gravel are derived from the shale			
736.0	22.0		19-40-50/3			20.65-22.15 ft Weathered shale, 85% fines, medium plasticity, medium dry strength, slow dilatancy, low toughness; 10% sand, fine to medium, subangular, flat and elongated, medium hardness; 5% gravel, fine to medium, subangular, flat and elongated, medium hardness; maximum grain size = 0.2 inches, pale yellowish brown (10YR 6/2) with moderate yellowish brown (10YR 5/4), dry, no HCl reaction, hard			
735.0	23.0	S -13	100%			22.15-23.45 ft Weathered shale, 80% fines, medium plasticity, medium dry strength, slow dilatancy, low toughness; 10% gravel, fine to coarse, subangular, flat and elongated, medium hardness; 10% sand, fine to medium, subangular, flat and elongated, medium hardness; maximum grain size = 0.2 inches, moderate yellowish brown (10YR 5/4) to medium dark gray (N4), dry, hard			
734.0	24.0	R-1	83% (0%)			23.45-34.4 ft SHALE, silty, interbedded, moderately soft to moderately hard, intensely to moderately weathered, clay sized particles, moderate yellowish brown (10YR 5/4) with medium dark gray (N4), moderately bedded, R.D. = 0° to 45°, lower contact is conformable and jointed-contact not welded, closely to very closely fractured, no reaction to HCl, iron oxide staining, alternating weathered and slightly weathered shale			
733.0	25.0					23.45-35.3 ft Bedding plane separation, R.D. = 10°, closely to very closely spaced, slightly open; dry but shows evidence of flow, filling: not healed, very thin, intensely to moderately weathered, moderately hard to soft; surface: slightly rough, planar, intensely weathered, moderately hard; bedding planes.			
732.0	26.0				FD8				
731.0	27.0	R-2	70% (0%)						
730.0	28.0								
729.0	29.0								
728.0	30.0								
727.0	31.0								
726.0	32.0	R-3	58% (0%)						
725.0	33.0								
724.0	34.0								
723.0	35.0					34.4-39.9 ft SHALE, inclined, horizontal, moderately hard, moderately to slightly weathered, clay sized particles, medium dark gray (N4) with moderate yellowish brown (10YR 5/4), moderately bedded, R.D. = 15° to 75°, lower contact is conformable and jointed-contact not welded to healed (by secondary process), closely fractured, no reaction to HCl, moist, iron oxide staining, presence of vertical to subvertical open fracture, not healed			
722.0	36.0					35.3-69.9 ft Joint, R.D. = 35-60°, widely to moderately spaced, tight; filling: partly healed, clean, slightly weathered, moderately hard; surface: slightly rough, planar, slightly weathered, moderately hard; cleavage.			
721.0	37.0	R-4	100% (0%)		FD6	36-39.9 ft Joint, R.D. = 90°, widely spaced, both ends visible, tight; dry but shows evidence of flow, filling: not healed, very thin, moderately weathered, moderately hard; surface: rough, undulating, moderately weathered, moderately hard.			
720.0	38.0								
719.0	39.0								
DATE STARTED: 5/5/10 DATE FINISHED: 5/6/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-411

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339979.47 ft E. 2405273.90 ft GROUND SURFACE ELEVATION: 758.15 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
718.0		R-5				39.9-64.9 ft SHALE, inclined, horizontal, moderately hard, moderately to slightly weathered, clay sized particles, medium dark gray (N4), moderately bedded, R.D. = 15° to 75°, lower contact is conformable and jointed-contact not welded to healed (by secondary process), closely to moderately fractured, no reaction to HCl, moist, iron oxide staining, presence of subvertical open fractures, not healed, iron stained very thin coating in fractures.	SC-1, 47.30 - 47.70 ft., 12:00, 5/6/10
	41.0						
717.0							
	42.0	R-5	100% (0%)				
716.0							
	43.0						
715.0							
	44.0						
714.0							
	45.0						
713.0							
	46.0						
712.0							
	47.0	R-6	100% (46%)				
711.0							
	48.0						
710.0							
	49.0						
709.0							
	50.0			FD6			
708.0							
	51.0						
707.0							
	52.0	R-7	100% (14%)				
706.0							
	53.0						
705.0							
	54.0						
704.0							
	55.0						
703.0							
	56.0						
702.0							
	57.0	R-8	100% (24%)				
701.0							
	58.0						
700.0							
	59.0						
699.0							
DATE STARTED: 5/5/10 DATE FINISHED: 5/6/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-411

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339979.47 ft E. 2405273.90 ft							
GROUND SURFACE ELEVATION: 758.15 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
698.0		R-9				39.9-64.9 ft SHALE, inclined, horizontal, moderately hard, moderately to slightly weathered, clay sized particles, medium dark gray (N4), moderately bedded, R.D. = 15° to 75°, lower contact is conformable and jointed-contact not welded to healed (by secondary process), closely to moderately fractured, no reaction to HCl, moist, iron oxide staining, presence of subvertical open fractures, not healed, iron stained very thin coating in fractures.	
697.0	61.0						
696.0	62.0	R-9	100% (36%)				
695.0	63.0					64.9-69.9 ft SHALE, inclined, horizontal, moderately hard, moderately to intensely weathered, clay sized particles, medium dark gray (N4), moderately bedded, R.D. = 15° to 75°, lower contact is conformable and jointed-contact not welded to healed (by secondary process), closely fractured, no reaction to HCl, moist, iron oxide staining, presence of vertical to subvertical open fractures	
694.0	64.0						
693.0	65.0			FD6			
692.0	66.0					69.9-77.7 ft SHALE, inclined, horizontal, moderately hard, intensely to moderately weathered, clay sized particles, medium dark gray (N4), moderately bedded, R.D. = 15° to 60°, lower contact is jointed-contact not welded to healed (by secondary process), very closely fractured, no reaction to HCl, moist, iron oxide staining, presence of iron oxide stain and quartz filled thin to very thin healed open fractures	
691.0	67.0	R-10	100% (26%)				
690.0	68.0						
689.0	69.0					69.9-75.5 ft Joint, R.D. = 10-60°, very closely spaced, very continuous, tight; dry but shows evidence of flow, filling: moderately healed, very thin quartz but only in one, moderately weathered, moderately hard to moderately soft; surface: slightly rough, planar, moderately weathered, moderately hard.	
688.0	70.0						
687.0	71.0	R-11	50% (0%)				
686.0	72.0					75.5-100.9 ft Joint, R.D. = 30-60°, widely to moderately spaced, very continuous, tight; filling: not healed, clean, slightly weathered; surface: moderately rough, planar, slightly weathered, moderately hard.	
685.0	73.0						
684.0	74.0			FD9			
683.0	75.0					77.7-100.9 ft SHALE, inclined, horizontal, hard, moderately to slightly weathered, clay sized particles, medium dark gray (N4), thickly bedded, R.D. = 15° to 60°, lower contact is conformable and intact to jointed-contact not welded, widely to moderately fractured, no reaction to HCl, moist, iron oxide staining, presence of subvertical open fractures, not healed. iron stained very thin coating in fractures.	
682.0	76.0						
681.0	77.0	R-12	100% (40%)				
680.0	78.0						
679.0	79.0			FD5			
DATE STARTED: 5/5/10 DATE FINISHED: 5/6/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-411

PROJECT NO. 10-4310

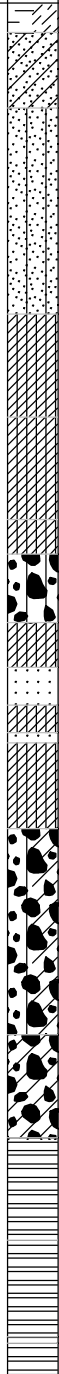
COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 758.15 ft						DESCRIPTION	
DESCRIPTION							
678.0		R-13		FD5		77.7-100.9 ft SHALE, inclined, horizontal, hard, moderately to slightly weathered, clay sized particles, medium dark gray (N4), thickly bedded, R.D. = 15° to 60°, lower contact is conformable and intact to jointed-contact not welded, widely to moderately fractured, no reaction to HCl, moist, iron oxide staining, presence of subvertical open fractures, not healed. iron stained very thin coating in fractures.	SC-2, 81.5 - 82.4 ft., 14:20, 5/6/10
677.0	81.0						
676.0	82.0	R-13	100% (100%)				
675.0	83.0						
674.0	84.0						
673.0	85.0						
672.0	86.0						
671.0	87.0	R-14	94% (76%)				
670.0	88.0						
669.0	89.0						
668.0	90.0			FD3			
667.0	91.0						
666.0	92.0	R-15	100% (88%)				
665.0	93.0						
664.0	94.0						
663.0	95.0						
662.0	96.0						
661.0	97.0	R-16	100% (97%)				
660.0	98.0						
659.0	99.0						
DATE STARTED: 5/5/10 DATE FINISHED: 5/6/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955

PROJECT NO. 10-4310

BORING NO. B-411 SHEET 6 OF 6

REV 1 Final Boring B-412

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS		
						N. 340068.40 ft E. 2405294.49 ft GROUND SURFACE ELEVATION: 763.35 ft				
						DESCRIPTION				
763.0	1.0	S-1	1-3-1 (4) 47%			0.0-0.4 ft Organic soil, (ol/oh), 100% fines; 85% sand, fine to medium, subrounded, very soft hardness; dusky yellowish brown (10YR 2/2) and dark yellowish brown (10YR 4/2), dry, no HCl reaction, medium dense to spongy, homogeneous, composed of roots and leaves	ol/oh	12.0 ft Decomposed shale		
762.0	2.0	S-2	2-7-8 (15) 87%			0.4-1.5 ft Clayey sand, (sc), 60% sand, fine; 40% fines, low plasticity, low toughness; dark yellowish brown (10YR 4/2) and dark yellowish orange (10YR 6/6), moist, no HCl reaction, soft	sc			
761.0	3.0	S-3	4-8-7 (15) 93%			1.5-4.5 ft SILTY SAND WITH GRAVEL, (SM), 47% sand, fine to coarse; 33% fines, low plasticity, low toughness; 20% gravel, fine to coarse, subangular, flat and elongated, hard hardness; maximum grain size = 1.0 inches, dark yellowish brown (10YR 4/2) and moderate yellowish brown (10YR 5/4), moist, no HCl reaction, stiff, trace roots	SM			
760.0	4.0	S-4	6-26-33 (59) 100%			4.5-6.0 ft Gravelly lean clay/gravelly silt, (cl-ml), 70% fines, low plasticity, low toughness; 25% gravel, medium to coarse; 5% sand, fine; dark yellowish brown (10YR 4/2) and light brown (5YR 5/6), moist, no HCl reaction, hard	cl-ml			
759.0	5.0	S-5	20-30-25 (55) 100%			6.0-7.5 ft Gravelly lean clay/gravelly silt, (cl-ml), 60% fines; 30% gravel, medium to coarse, subangular, hard hardness; 10% sand, fine; grayish brown (5YR 3/2) with moderate yellowish brown (10YR 5/4), moist, no HCl reaction, hard	cl-ml			
758.0	6.0	S-6	41-35-31 (66) 67%			7.5-8.0 ft Lean clay/silt, (cl-ml), 100% fines, low plasticity, low toughness; moderate yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/2), moist, no HCl reaction, hard, trace roots	cl-ml			
757.0	7.0	S-7	24-28-32 (60) 93%			8.0-9.0 ft Silty gravel, (gm), 85% gravel; 15% fines; grayish orange (10YR 7/4), dry, no HCl reaction, hard	gm			
756.0	8.0	S-8	25-16-14 (30) 100%			9.0-9.65 ft Lean clay with gravel/silt with gravel, (cl-ml), 85% fines, low plasticity, low toughness; 15% gravel, fine to medium, subangular; dusky yellowish brown (10YR 2/2) and dark yellowish brown (10YR 4/2), moist, no HCl reaction, hard	cl-ml			
755.0	9.0	S-9	7-9-8 (17) 100%			9.65-10.2 ft 100% gravel, medium to coarse; dark yellowish orange (10YR 6/6), dry, no HCl reaction, very dense, sandstone rock fragment	cl-ml			
754.0	10.0	S-10	7-7-11 (18) 100%			10.2-10.6 ft Sandy lean clay with gravel/sandy silt with gravel, (cl-ml), 50% fines, low plasticity, low toughness; 30% sand, fine; 20% gravel, fine to medium, subangular, medium hardness; very dark red (5R 2/6) with grayish orange (10YR 7/4), moist, no HCl reaction, hard	GC-GM			
753.0	11.0	S-11	12-12-15 (27) 100%			10.6-10.75 ft 100% gravel, medium to coarse; dark yellowish orange (10YR 6/6), dry, no HCl reaction, medium dense, sandstone rock fragment	gc			
752.0	12.0	S-12	19-29-39 (68) 100%			10.75-12.0 ft Sandy lean clay with gravel/sandy silt with gravel, (cl-ml), 50% fines, low plasticity, low toughness; 40% gravel, fine to medium, subangular, medium hardness; 10% sand, medium; very dark red (5R 2/6) with dark yellowish brown (10YR 4/2), moist, no HCl reaction, very stiff				
751.0	13.0	S-13	25-43-50/5 100%			12.0-15.0 ft SILTY, CLAYEY GRAVEL WITH SAND, (GC-GM), 53% gravel, fine to coarse, angular to subangular, medium hard hardness; 29% sand, fine to coarse; 18% fines, low plasticity, low toughness; maximum grain size = 1.5 inches, moderate brown (5YR 4/4) with grayish black (N2), moist, no HCl reaction, decomposed shale				
750.0	14.0	S-14	50 100%			15.0-16.5 ft Clayey gravel, (gc), 60% gravel, medium to coarse, medium hardness; 40% fines, low plasticity, low toughness; moderate brown (5YR 4/4) with grayish black (N2), dry, no HCl reaction, decomposed shale				
749.0	15.0						16.5-18.0 ft 100% gravel, medium hardness; very pale orange (10YR 8/2) with grayish black (N2), dry, no HCl reaction, decomposed shale			
748.0	16.0						18.0-19.4 ft 100% gravel; dry, no HCl reaction, decomposed shale			
747.0	17.0									
746.0	18.0									
745.0	19.0									
744.0										
DATE STARTED: 4/21/10 DATE FINISHED: 4/22/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:			
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931			

REV 1 Final Boring B-412

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340068.40 ft E. 2405294.49 ft GROUND SURFACE ELEVATION: 763.35 ft DESCRIPTION		
743.0			(82%)			19.4-19.5 ft Interval not sampled		Casing set at 22.0 ft
742.0	21.0					19.5-20.0 ft 100% gravel; dry, no HCl reaction, decomposed shale		
741.0	22.0					20.0-22.0 ft Interval not sampled (SHALE)		
740.0	23.0	R -1	100% (21%)			22.0-34.4 ft SHALE, moderately soft to moderately hard, intensely to moderately weathered, grayish orange (10YR 7/4) and dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining, mottling with various shades between the colors previously mentioned (22.0-29.4ft)		SC-1, 23.5-24.0 ft., 12:10, 4/21/10
739.0	24.0					22-29.4 ft R.D. = 54-56°, closely spaced; surface: rough, planar.		
738.0	25.0					22.1-40.8 ft Bedding plane separation, R.D. = 10°, closely to widely spaced; surface: rough, planar.		
737.0	26.0							
736.0	27.0	R -2	92% (23%)			26.4-26.9 ft Fracture, R.D. = 76°; surface: rough, planar.		
735.0	28.0			FD6				
734.0	29.0							
733.0	30.0					29.4-40.8 ft R.D. = 55-56°, closely to very closely spaced; filling: very thin clay; surface: rough, planar; some contain no clay filling.		
732.0	31.0							
731.0	32.0	R -3	98% (0%)					
730.0	33.0							
729.0	34.0							
728.0	35.0					34.4-40.8 ft SHALE, moderately soft to moderately hard, moderately weathered, dark gray (N3) and moderate greenish yellow (10Y 7/4), very closely to moderately fractured, no reaction to HCl, iron oxide staining		
727.0	36.0							
726.0	37.0	R -4	66% (0%)					
725.0	38.0			FD9				
724.0	39.0							
		R -5						
DATE STARTED: 4/21/10 DATE FINISHED: 4/22/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-412

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 340068.40 ft E. 2405294.49 ft GROUND SURFACE ELEVATION: 763.35 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
723.0	41.0	R -5	100% (8%)	FD9		40.7-54.4 ft Bedding plane separation, R.D. = 10°, moderately to closely spaced; filling: not healed; surface: smooth, planar; moderate to trace iron oxide staining on face. 40.8-54.4 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to closely fractured, no reaction to HCl, oily sheen on rock (40.8~44.9 ft.) 41.5-49.4 ft R.D. = 36°; filling: not healed; surface: rough, planar; trace to moderate iron oxide staining. 41.6-49.4 ft R.D. = 54-56°, moderately spaced; filling: not healed; surface: rough, planar; moderate to trace iron oxide staining and maganesium oxide.		
722.0	42.0							
721.0	43.0							
720.0	44.0							
719.0	45.0							
718.0	46.0	R -6	100% (15%)	FD6	47.5-49.4 ft R.D. = 76°, moderately spaced; filling: not healed; surface: rough, undulating; moderate iron oxide staining. 49.4-54.4 ft R.D. = 56°, moderately spaced; filling: not healed; surface: rough, undulating; moderate iron oxide staining, trace galena.			
717.0	47.0							
716.0	48.0							
715.0	49.0							
714.0	50.0							
713.0	51.0	R -7	100% (42%)	FD2	54.4-69.4 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to closely fractured, no reaction to HCl, trace pyrite 54.4-64.4 ft R.D. = 10°, widely to closely spaced; surface: rough, planar, slightly weathered; half show trace iron oxide the other half are clean.			
712.0	52.0							
711.0	53.0							
710.0	54.0							
709.0	55.0							
708.0	56.0	R -8	100% (34%)	FD6				
707.0	57.0							
706.0	58.0							
705.0	59.0							
704.0								
		R -9						
DATE STARTED: 4/21/10 DATE FINISHED: 4/22/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		
						DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931		


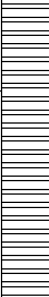
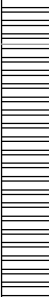
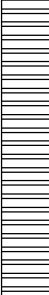

REV 1 Final Boring B-412

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS		
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE				
GROUND SURFACE ELEVATION: 763.35 ft						DESCRIPTION			
DESCRIPTION									
703.0		R -9	100% (0%)	FD6		54.4-69.4 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to closely fractured, no reaction to HCl, trace pyrite			
61.0									
702.0									
62.0									
701.0									
63.0									
700.0									
64.0									
699.0		R -10	100% (32%)	FD5		64.4-74.4 ft R.D. = 56°; filling: not healed; surface: rough, planar, slightly weathered; trace iron oxide staining.			
65.0									
698.0									
66.0									
697.0									
67.0									
696.0									
68.0									
695.0		R -11	100% (62%)	FD5		69.4-74.4 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to closely fractured, no reaction to HCl			
694.0									
70.0									
693.0									
71.0									
692.0									
72.0									
691.0									
73.0		R -12	100% (27%)	FD6		74.4-89.4 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to closely fractured, no reaction to HCl			
689.0						74.85- ft Bedding plane separation, R.D. = 10°, moderately to very closely spaced; filling: not healed; surface: smooth, planar, slightly weathered; trace iron oxide staining on face.			
688.0						75.5-76.4 ft R.D. = 36°, widely spaced; filling: not healed; surface: rough, planar; trace to moderate iron oxide staining on bedding surface.			
687.0						76.4-81.9 ft R.D. = 55-56°, widely to closely spaced; filling: not healed; surface: rough, planar; moderate to heavy iron oxide staining on fracture faces.			
77.0									
686.0									
78.0									
685.0									
79.0		R -13							
684.0									
DATE STARTED: 4/21/10 DATE FINISHED: 4/22/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-412

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 340068.40 ft E. 2405294.49 ft GROUND SURFACE ELEVATION: 763.35 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
683.0		R-13	100% (16%)	FD6		74.4-89.4 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to closely fractured, no reaction to HCl		
81.0						81.9-83 ft R.D. = 56°, closely spaced; filling: partly healed, very thin quartz, fresh; surface: fresh.		
682.0								
82.0						84.4-86 ft R.D. = 56°, moderately to very closely spaced; filling: partly healed, moderately thin quartz, fresh; surface: fresh; few mechanically open.		
681.0								
83.0		R-14	100% (67%)	FD6		86-89.4 ft R.D. = 36°, moderately to closely spaced; filling: partly healed, moderately thin quartz.		
680.0								
84.0								
679.0								
85.0								
678.0		R-15	100% (77%)	FD5		89.4-99.4 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately fractured, no reaction to HCl, trace pyrite		
86.0						89.7- ft R.D. = 90°, moderately spaced; filling: totally healed, moderately thin quartz, fresh to slightly weathered, very hard; surface: fresh; few spots within the quartz show iron oxide staining.		
677.0						89.8-92.35 ft R.D. = 10°, moderately to closely spaced; filling: totally healed, thin quartz, fresh to slightly weathered, very hard; surface: fresh to slightly weathered; few open from drilling, zone contains fresh healed planes while others are fresh to slightly weathered quatz filling, 92.4 ft. no quartz only moderate iron oxide staining.		
87.0								
676.0								
88.0		R-16	100% (68%)	FD5		93.45-93.9 ft R.D. = 55°, very closely spaced; filling: totally healed, thin quartz, fresh to slightly weathered, very hard; surface: rough, planar, fresh; 93.65 ft. fracture quatz filling shows iron oxide staining to crystals while fracture at 93.45 ft. shows fresh quartz crystals.		
675.0						94.8-95.6 ft R.D. = 55-56°, closely to very closely spaced; filling: totally healed, moderately thick quartz, fresh, very hard; surface: rough, planar, fresh; fracture at 94.8 ft., no quartz healing.		
89.0						95.8-99.4 ft R.D. = 71-75°, closely to very closely spaced; filling: totally healed, moderately thick quartz, fresh to slightly weathered, very hard; surface: rough, planar, fresh; fully formed crystals, clear, yellow, orange and dusky red (5R 3/4), some with thin filling.		
674.0								
90.0								
673.0		R-17				99.5- ft Bedding plane, R.D. = 10°, widely to closely spaced; filling: not		
672.0								
91.0								
671.0								
92.0								
670.0								
93.0								
669.0								
94.0								
668.0								
95.0								
667.0								
96.0								
666.0								
97.0								
665.0								
98.0								
664.0								
99.0								
664.0								
DATE STARTED: 4/21/10 DATE FINISHED: 4/22/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931


REV 1 Final Boring B-412

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR % REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						<p>N. 340068.40 ft E. 2405294.49 ft</p> <p>GROUND SURFACE ELEVATION: 763.35 ft</p>		
663.0						healed; surface: smooth, planar.		
101.0								
662.0								
102.0		R-17	100% (86%)			99.6-100.6 ft R.D. = 90°, closely spaced; filling: totally healed, thin quartz, fresh, very hard; surface: fresh.		
661.0						99.4-114.4 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately fractured, no reaction to HCl		
103.0						101.5-121.2 ft Bedding plane separation, R.D. = 10°, very closely to moderately spaced; filling: totally healed, very thin calcite, fresh, hard; surface: smooth, planar, fresh; 90% of bedding healed, 10% not healed, mechanically open.		
660.0						103.45-103.8 ft R.D. = 53°; filling: totally healed, very thin quartz, fresh; surface: fresh.		
104.0						105-109 ft R.D. = 80-90°; filling: totally healed, thick quartz, very hard; surface: rough, planar; fracture from 105.0 -106.0 ft of visible fracture face show slickensides, fully formed crystals (clear with sporadic zones of dark yellow orange (10YR 6/6).		
659.0								
105.0								
658.0								
106.0								
657.0								
107.0		R-18	100% (70%)					
656.0								
108.0								
655.0								
109.0								
654.0								
110.0						109.4-110.2 ft R.D. = 56°, very closely spaced; filling: totally healed, moderately thin quartz, fresh to slightly weathered, very hard; surface: rough, planar, fresh.		
653.0								
111.0								
652.0								
112.0		R-19	100% (54%)			111-121.2 ft R.D. = 31-36°, widely to closely spaced; filling: totally healed, calcite, fresh; surface: rough, planar, fresh; mostly all healed with a few fresh non-healed fractures.		
651.0								
113.0								
650.0								
114.0								
649.0						114.4-121.2 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately fractured, no reaction to HCl, Trace pyrite		
115.0						115.25-120.6 ft R.D. = 56°, widely to moderately spaced; filling: totally healed, very thin calcite, fresh, hard; surface: smooth, planar, fresh; of set only one of the fractures is not healed with calcite, face of fracture fresh.		
648.0								
116.0								
647.0								
117.0		R-20	97% (84%)					
646.0								
118.0								
645.0								
119.0								
644.0		R-21						
DATE STARTED: 4/21/10 DATE FINISHED: 4/22/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	




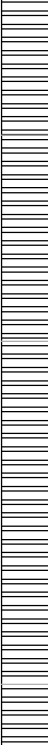
REV 1 Final Boring B-412

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS	
						N. 340068.40 ft	E. 2405294.49 ft			
						GROUND SURFACE ELEVATION: 763.35 ft				
						DESCRIPTION				
643.0	121.0	R -21	100% (92%)	FD5		114.4-121.2 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately fractured, no reaction to HCl, Trace pyrite			Water depth after drilling at 57.5 ft. 4/22/10	
						---- Bottom of Boring at 121.20 ft.----				
DATE STARTED: 4/21/10 DATE FINISHED: 4/22/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon			NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle			DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-413

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 340208.12 ft E. 2405283.00 ft GROUND SURFACE ELEVATION: 772.20 ft										
DESCRIPTION										
772.0			S-1	2-2-3 (5) 67%			0.0-1.5 ft Clayey sand, (sc), 85% sand, fine to medium, subrounded, very soft hardness; 15% fines, low plasticity, no toughness; moderate brown (5YR 4/4), moist, no HCl reaction, medium dense, homogeneous	sc	Decomposed shale starting at 4.5 ft.	
771.0	1.0									
770.0	2.0		S-2	4-7-10 (17) 100%			1.5-3.0 ft Clayey sand, (sc), 70% sand, fine to medium, subrounded, very soft hardness; 20% fines, low plasticity, low toughness; 10% gravel, fine to medium, subangular, flat and elongated, soft hardness; maximum grain size = 0.01 inches, moderate brown (5YR 4/4) and pale yellowish brown (10YR 6/2), moist, no HCl reaction, loose, homogeneous	sc		
769.0	3.0		S-3	5-50/4 0%						
768.0	4.0						3.0-3.83 ft No sample recovered			
							3.83-4.5 ft Interval not sampled			
767.0	5.0		S-4	32-41-50 (91) 73%			4.5-6.0 ft Poorly graded gravel with silt, (gp-gm), 80% gravel, fine to medium, subrounded, soft hardness; 10% sand, fine to coarse; 10% fines, low plasticity, low toughness; maximum grain size = 0.1 inches, light gray (N7), dry, no HCl reaction, medium dense, homogeneous, all derived from shale	gp-gm		
766.0	6.0		S-5	50-50 100%			6.0-7.0 ft Poorly graded gravel with silt, (gp-gm), 80% gravel, fine to medium, subrounded, soft hardness; 10% sand, fine to coarse; 10% fines, low plasticity, low toughness; maximum grain size = 0.1 inches, light gray (N7), dry, no HCl reaction, medium dense, homogeneous, all derived from shale	gp-gm		
765.0	7.0									
764.0	8.0		S-6	23-42-50 (92) 67%			7.0-7.5 ft Interval not sampled			
763.0	9.0						7.5-9.0 ft Poorly graded gravel with silt, (gp-gm), 80% gravel, fine to medium, subrounded, soft hardness; 10% sand, fine to coarse; 10% fines, low plasticity, low toughness; maximum grain size = 0.5 inches, light gray (N7), dry, no HCl reaction, medium dense, homogeneous, all derived from shale	gp-gm		
762.0	10.0		R-1	95% (0%)	FD6		9.0-11.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), moderately fractured, iron oxide staining, 10° bedding plane.	12.3 - 12.7 ft., SC-1, 13:20, 5/18/10		
761.0	11.0					9-12.3 ft Joint, R.D. = 88°, moderately spaced; filling: not healed, intensely weathered; surface: slightly rough, intensely weathered; iron oxide staining in the fractures. Fracture set #F-1.				
760.0	12.0		R-2	100% (0%)		11.0-14.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), moderately fractured, iron oxide staining, 10° bedding plane.				
759.0	13.0					12.3-14 ft Bedding plane separation, R.D. = 14°, closely spaced; filling: not healed; surface: slightly rough, planar; iron oxide staining in the fractures. Fracture set #F-2.				
758.0	14.0									
757.0	15.0					14.0-19.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), closely to moderately fractured, iron oxide staining, 10° bedding plane.				
756.0	16.0		R-3	96% (8%)		14-24 ft Joint, R.D. = 13-88°, closely to moderately spaced; filling: not healed, moderately thin clay, moderately weathered, very soft; surface: slightly rough, moderately weathered; iron oxide staining in the fractures as well as clay. Fracture set #F-3.				
755.0	17.0									
754.0	18.0									
753.0	19.0		R-4	100% (36%)						
DATE STARTED: 4/28/10 DATE FINISHED: 5/19/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione							DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez							DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-413

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 340208.12 ft E. 2405283.00 ft GROUND SURFACE ELEVATION: 772.20 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
752.0		R-4	100% (36%)	FD6		19.0-24.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining in the fractures.	
751.0	21.0						
750.0	22.0						
749.0	23.0						
748.0	24.0	R-5	100% (60%)		24.0-29.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), moderately fractured, no reaction to HCl, iron oxide staining in the fractures.		
747.0	25.0						
746.0	26.0						
745.0	27.0						
744.0	28.0	R-6	100% (0%)	FD5	29.0-34.0 ft SHALE, horizontal, moderately soft, slightly weathered, dark gray (N3), very closely to moderately fractured, no reaction to HCl, iron oxide staining in the fractures.		
743.0	29.0						
742.0	30.0						
741.0	31.0						
740.0	32.0	R-7	100% (12%)		29-34 ft Joint, R.D. = 20°, very closely to moderately spaced; filling: not healed, very thin clay, moderately weathered, very soft; surface: slightly rough, planar, moderately weathered; iron oxidation staining in the fractures as well as clay. Fracture set #F-5.		
739.0	33.0						
738.0	34.0						
737.0	35.0						
736.0	36.0	R-8	100% (60%)		34.0-39.0 ft SHALE, horizontal, moderately soft, slightly weathered, dark gray (N3), very closely to moderately fractured, no reaction to HCl, iron oxide staining in the fractures.		
735.0	37.0						
734.0	38.0						
733.0	39.0						
DATE STARTED: 4/28/10 DATE FINISHED: 5/19/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665

REV 1 Final Boring B-413

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 340208.12 ft E. 2405283.00 ft GROUND SURFACE ELEVATION: 772.20 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
732.0		R-8	100% (60%)	FD5		39.9-44 ft Joint, R.D. = 11-45°, closely spaced; filling: not healed; surface: slightly rough, planar; iron oxidation in the fractures. Fracture set #F-7. 39.0-44.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), closely fractured, no reaction to HCl, 10° bedding plane.		
731.0	41.0							
730.0	42.0							
729.0	43.0							
728.0	44.0	R-9	100% (38%)			44.0-49.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), closely fractured, no reaction to HCl, 10° bedding plane. 44-49 ft Joint, R.D. = 10-25°, closely spaced; filling: not healed; surface: slightly rough, planar; iron oxidation staining in the fractures. Fracture set #F-8.		
727.0	45.0							
726.0	46.0							
725.0	47.0							
724.0	48.0	R-10	100% (56%)	FD5		49.0-54.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), no odor, closely fractured, no reaction to HCl, 10° bedding plane. 49-54 ft Joint, R.D. = 10-30°, closely spaced; filling: not healed, very thin clay, moderately weathered, very soft; surface: slightly rough, moderately weathered; iron oxidation staining in the fractures with the clay. Fracture set #F-9.		
723.0	49.0							
722.0	50.0							
721.0	51.0							
720.0	52.0	R-11	94% (70%)			54.0-59.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), no odor, closely to moderately fractured, no reaction to HCl, 10° bedding plane.		
719.0	53.0							
718.0	54.0							
717.0	55.0							
716.0	56.0	R-12	90% (34%)			59.0-64.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), no odor, closely fractured, no reaction to HCl, 10° bedding plane.		
715.0	57.0							
714.0	58.0							
713.0	59.0							
DATE STARTED: 4/28/10 DATE FINISHED: 5/19/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665

REV 1 Final Boring B-413

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 772.20 ft						DESCRIPTION	
DESCRIPTION							
712.0		R-12	90% (34%)	FD5		59-64 ft Joint, R.D. = 15°, closely spaced; filling: not healed; surface: slightly rough; iron oxidation staining in the fractures. Fracture set #F-10.	
711.0	61.0					59.0-64.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), no odor, closely fractured, no reaction to HCl, 10° bedding plane.	
710.0	62.0					60-64 ft Joint, R.D. = 12°, closely to widely spaced; filling: not healed, moderately thin clay, slightly weathered, very soft; surface: slightly rough, planar, slightly weathered. Fracture set #F-12.	
709.0	63.0					61.4-62.7 ft Joint, R.D. = 35°, closely to moderately spaced; filling: not healed, very thin quartz, moderately weathered, moderately soft; surface: slightly rough, planar, moderately weathered. Fracture set #F-11.	
708.0	64.0						
707.0	65.0	R-13	98% (32%)			64.0-69.0 ft SHALE, horizontal, moderately hard to moderately soft, slightly to intensely weathered, dark gray (N3) and pale yellowish brown (10YR 6/2), no odor, closely fractured, no reaction to HCl, iron oxide staining, 10° bedding plane.	
706.0	66.0					64-69 ft Joint, R.D. = 10-45°, closely spaced; filling: not healed, clay, fresh, very soft; surface: slightly rough, planar, fresh; iron oxidation staining in the fracture. Fracture set #F-13.	
705.0	67.0						
704.0	68.0						
703.0	69.0						
702.0	70.0	R-14	92% (44%)	FD5		69.0-74.0 ft SHALE, horizontal, moderately soft to moderately hard, slightly to intensely weathered, dark gray (N3) and pale yellowish brown (10YR 6/2), closely to moderately fractured, no reaction to HCl, 10° bedding plane, quartz crystals present in the fractures at the begining of the run	
701.0	71.0					69-74 ft Joint, R.D. = 11-25°, closely spaced; filling: not healed, moderately thin quartz crysrals, slightly weathered, moderately hard; surface: slightly rough, planar, slightly weathered. Fracture set #F-14.	
700.0	72.0						
699.0	73.0						
698.0	74.0						
697.0	75.0	R-15	100% (80%)			74.0-79.0 ft SHALE, horizontal, moderately hard, slightly to moderately weathered, dark gray (N3) and pale yellowish brown (10YR 6/2), closely to widely fractured, no reaction to HCl, 10° bedding plane.	
696.0	76.0					74-79 ft Joint, R.D. = 88°, closely to widely spaced; filling: not healed, thin quartz, moderately weathered, moderately hard; surface: slightly rough, moderately weathered. Fracture set #F-15.	
695.0	77.0						
694.0	78.0						
693.0	79.0						
		R-16	44% (0%)				
DATE STARTED: 4/28/10 DATE FINISHED: 5/19/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665

REV 1 Final Boring B-413

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 340208.12 ft E. 2405283.00 ft GROUND SURFACE ELEVATION: 772.20 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
692.0		R-16	44% (0%)	FD5		79.0-84.0 ft SHALE, horizontal, soft to moderately hard, intensely weathered, pale yellowish brown (10YR 6/2) and dark gray (N3), no reaction to HCl, iron oxide staining, mechanically broken.		
691.0	81.0							
690.0	82.0							
689.0	83.0							
688.0	84.0	R-17	100% (68%)			84.0-89.0 ft SHALE, horizontal, moderately hard to moderately soft, slightly to intensely weathered, dark gray (N3) and pale yellowish brown (10YR 6/2), closely to widely fractured, no reaction to HCl, iron oxide staining, 10° bedding pane, quartz crystals fill the fractures.		
687.0	85.0							
686.0	86.0							
685.0	87.0							
684.0	88.0	R-18	100% (50%)	FD6		89.0-94.0 ft SHALE, horizontal, moderately hard to moderately soft, slightly to intensely weathered, dark gray (N3) and pale yellowish brown (10YR 6/2), closely to moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding plane, quartz crystals fill the fractured zones.		
683.0	89.0							
682.0	90.0							
681.0	91.0							
680.0	92.0	R-19	56% (14%)			94.0-99.0 ft SHALE, horizontal, moderately hard to moderately soft, slightly to intensely weathered, dark gray (N3) and pale yellowish brown (10YR 6/2), closely to moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding plane, quartz crystals fill the fractured zones.		
679.0	93.0							
678.0	94.0							
677.0	95.0							
676.0	96.0	R-20	100% (0%)					
675.0	97.0							
674.0	98.0							
673.0	99.0							
DATE STARTED: 4/28/10 DATE FINISHED: 5/19/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benítez						DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665

REV 1 Final Boring B-413

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 340208.12 ft E. 2405283.00 ft GROUND SURFACE ELEVATION: 772.20 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
672.0		R-20	100% (0%)			99.0-104.0 ft SHALE, horizontal, moderately hard, intensely weathered, dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining, 10° bedding plane.	
671.0	101.0						
670.0	102.0						
669.0	103.0						
668.0	104.0	R-21	88% (48%)	FD6		104.0-109.0 ft SHALE, horizontal, moderately hard, slightly to moderately weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding plane 104-109 ft R.D. = 19°, closely to moderately spaced; filling: not healed, intensely weathered; surface: slightly rough, planar, intensely weathered; iron oxidarion staining in the fractures. Fracture set #F-17. 105.9-109.3 ft Joint, R.D. = 87°, moderately spaced; filling: not healed, moderately thin quartz, moderately weathered, moderately hard; surface: slightly rough, moderately weathered. Fracture set #F-18.	
667.0	105.0						
666.0	106.0						
665.0	107.0						
664.0	108.0	R-22	100% (76%)			109.0-114.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), very closely to moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding plane. 109.3-112 ft Joint, R.D. = 20°, closely spaced; filling: not healed; surface: slightly rough, planar; iron oxidation staining in the fractures, 110.2-111.0 ft. quartz veins in the run. Fracture set #F-19.	
663.0	109.0						
662.0	110.0						
661.0	111.0						
660.0	112.0	R-23	100% (100%)	FD2		112.8-113.5 ft Joint, R.D. = 35°; filling: totally healed, quartz, fresh, moderately hard; surface: fresh; thickness varies from thin to moderately thick. Fracture set #F-20. 114.0-119.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), no reaction to HCl, 10° bedding plane.	
659.0	113.0						
658.0	114.0						
657.0	115.0						
656.0	116.0						
655.0	117.0						
654.0	118.0						
	119.0					----	
DATE STARTED: 4/28/10 DATE FINISHED: 5/19/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665

REV 1 Final Boring B-414

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339887.65 ft E. 2404983.51 ft GROUND SURFACE ELEVATION: 730.32 ft		
						DESCRIPTION		
730.0	1.0	S-1	2-6-8 (14) 87%			0.0-1.5 ft Poorly graded sand with silt, (sp-sm), 85% sand, fine to coarse; 10% fines, medium plasticity, low toughness; 5% gravel, fine, subrounded, hard hardness; maximum grain size = 0.25 inches, grayish orange (10YR 7/4) and dark yellowish orange (10YR 6/6), dry, no HCl reaction, medium dense	sp-sm	
729.0	2.0					1.5-2.5 ft Interval not sampled		
728.0	3.0	S-2	50 100%			2.5-3.0 ft Poorly graded sand with silt, (sp-sm), 80% sand, fine to coarse; 10% gravel, fine to medium; 10% fines, medium plasticity, low toughness; maximum grain size = 0.2 inches, dark yellowish orange (10YR 6/6) and grayish pink (5R 8/2), dry, no HCl reaction, very loose, sampling through boulder	sp-sm	
727.0	4.0					3.0-5.0 ft Interval not sampled		
726.0	5.0							
725.0	6.0	S-3	14-12-10 (22) 100%			5.0-6.5 ft Clayey sand, (sc), 70% sand, fine to medium; 25% fines, high plasticity, medium toughness; 5% gravel, fine, subangular; maximum grain size = 0.1 inches, light brown (5YR 5/6) and pale yellowish orange (10YR 8/6), moist, no HCl reaction, medium dense, trace pieces of shale (N3)	sc	
724.0	7.0					6.5-7.5 ft Interval not sampled		
723.0	8.0	S-4	7-9-7 (16) 100%			7.5-9.0 ft Clayey sand, (sc), 50% sand, fine to medium; 40% fines, high plasticity, medium toughness; 10% gravel, fine, subangular, medium hardness; maximum grain size = 0.2 inches, light brown (5YR 5/6) and grayish yellow (5Y 8/4), moist, no HCl reaction, medium dense	sc	
722.0	9.0					9.0-10.0 ft Interval not sampled		
721.0	10.0							
720.0	11.0	S-5	2-7-10 (17) 100%			10.0-11.5 ft Clayey sand with gravel, (sc), 50% sand, fine to medium; 30% gravel, fine to medium, subangular, medium hardness; 20% fines, medium plasticity, low toughness; maximum grain size = 0.25 inches, yellowish gray (5Y 7/2) with dark gray (N3), dry, no HCl reaction, medium dense	sc	Decomposed shale starting at 10.7 ft.
719.0	12.0					11.5-12.5 ft Interval not sampled		Switch to casing advancer
718.0	13.0	S-6	12-14-14 (28) 97%			12.5-14.0 ft Clayey sand with gravel, (sc), 50% sand, fine to coarse; 30% gravel, fine to medium, subangular, medium hardness; 20% fines, medium plasticity, low toughness; maximum grain size = 0.5 inches, yellowish gray (5Y 7/2) and light brown (5YR 5/6), moist, no HCl reaction, medium dense, few fragments of weathered shale (N3)	sc	
717.0	14.0					14.0-15.0 ft Interval not sampled		
716.0	15.0							
715.0	16.0	S-7	19-32-50 (82) 100%			15.0-16.5 ft Poorly graded sand with clay and gravel, (sp-sc), 50% sand, fine to coarse; 40% gravel, fine to medium, subangular, flat, medium hardness; 10% fines, medium plasticity, low toughness; maximum grain size = 0.1 inches, yellowish gray (5Y 7/2) and dark gray (N3), dry, no HCl reaction, very dense	sp-sc	
714.0	17.0							
713.0	18.0	R-1	100% (0%)	FD8		16.5-19.25 ft SHALE, moderately soft to moderately hard, moderately to intensely weathered, yellowish gray (5Y 7/2) and dark gray (N3), very closely to closely fractured, no reaction to HCl, iron oxide staining		SC-1 18.3-18.65 ft. at 09:30, 5/22/10
712.0	19.0	R-2	100%	FD8				
711.0								
DATE STARTED: 5/21/10 DATE FINISHED: 5/23/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-414

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339887.65 ft E. 2404983.51 ft GROUND SURFACE ELEVATION: 730.32 ft DESCRIPTION		
710.0	21.0	R-2	(0%)	FD8		19.25-24.25 ft SHALE, moderately soft to moderately hard, moderately to intensely weathered, yellowish gray (5Y 7/2) and dark gray (N3), very closely to closely fractured, no reaction to HCl, iron oxide staining		
709.0	22.0		100% (0%)					
708.0	23.0							
707.0	24.0	R-3		FD7		24.25-29.25 ft SHALE, moderately soft to moderately hard, slightly to intensely weathered, dark gray (N3) with yellowish gray (5Y 7/2), very closely to closely fractured, no reaction to HCl, iron oxide staining		
706.0	25.0							
705.0	26.0							
704.0	27.0	R-4	100% (0%)	FD7		29.25-34.25 ft SHALE, moderately soft to moderately hard, slightly to intensely weathered, yellowish gray (5Y 7/2) and dark gray (N3), very closely to closely fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite		
703.0	28.0							
702.0	29.0							
701.0	30.0	R-5		FD6		34.25-39.25 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), massive, closely to widely fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite		
700.0	31.0		100% (57%)			34.25-35.4 ft R.D. = 80-90°, slightly open; surface: slightly rough, undulating, moderately hard. Fracture set #F-1.		
699.0	32.0					35.45-35.46 ft Joint, R.D. = 10°, slightly open; surface: slightly rough, planar, moderately hard. Fracture set #F-2.		
698.0	33.0	R-6		FD5		35.75-39.25 ft Joint, R.D. = 40°, closely spaced, moderately open; surface: moderately rough, undulating, moderately hard. Fracture set #F-3.		
697.0	34.0							
696.0	35.0							
695.0	36.0							
694.0	37.0							
693.0	38.0							
692.0	39.0							
691.0								
DATE STARTED: 5/21/10 DATE FINISHED: 5/23/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-414

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						<p>N. 339887.65 ft E. 2404983.51 ft</p> <p>GROUND SURFACE ELEVATION: 730.32 ft</p>		
690.0			(82%)			39.9-39.91 ft Joint, R.D. = 10°, slightly open; surface: smooth, planar, moderately hard. Fracture set #F-4.		
689.0	41.0	R-6	100% (82%)	FD5		39.25-44.25 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), massive, moderately to widely fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite		
688.0	42.0					42.6-45 ft Joint, R.D. = 45°, closely spaced, slightly open; surface: slightly rough, undulating, moderately hard; fracture goes to 80-90 ° 44.65-44.95 ft., and then back to 45 °. Fracture set #F-5.		
687.0	43.0							
686.0	44.0							
685.0	45.0					44.25-49.25 ft SHALE, moderately hard, fresh, dark gray (N3), massive, moderately to widely fractured, no reaction to HCl, trace fossils and pyrite		
684.0	46.0	R-7	100% (94%)	FD4				
683.0	47.0							
682.0	48.0							
681.0	49.0					48.65-68.2 ft R.D. = 0, 45°, moderately to widely spaced, slightly open; surface: slightly rough, undulating, moderately hard. Fracture set #F-6.		
680.0	50.0					49.25-54.25 ft SHALE, moderately hard, fresh, dark gray (N3), massive, widely to very widely fractured, no reaction to HCl, trace fossils and pyrite		
679.0	51.0	R-8	100% (95%)	FD3				
678.0	52.0							
677.0	53.0							
676.0	54.0							
675.0	55.0					54.25-59.25 ft SHALE, moderately hard, fresh, dark gray (N3), massive, widely fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite		
674.0	56.0	R-9	100% (94%)	FD3				
673.0	57.0							
672.0	58.0							
671.0	59.0	R-10	100%	FD0		59.25-64.25 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, trace fossils and pyrite		
DATE STARTED: 5/21/10 DATE FINISHED: 5/23/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-414

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339887.65 ft E. 2404983.51 ft GROUND SURFACE ELEVATION: 730.32 ft DESCRIPTION		
670.0			(100%)			59.25-64.25 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, trace fossils and pyrite		
669.0								
668.0		R-10	100% (100%)	FD0				
667.0								
666.0								
665.0						64.25-69.25 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, fossil bands 66.0-67.4 ft., trace fossils and pyrite throughout		
664.0								
663.0		R-11	100% (95%)	FD1				
662.0								
661.0								
660.0						69.25-74.25 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, fossil bands 69.6-70.1, 71.15-71.35, 72.3-72.6 ft., trace fossils and pyrite throughout sample.		
659.0						70.6-75.65 ft Joint, R.D. = 10°, very widely spaced, open; surface: smooth, undulating, moderately hard. Fracture set #F-7.		
658.0		R-12	100% (98%)	FD1				
657.0								
656.0								
655.0						74.25-79.25 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, trace fossils and pyrite		
654.0								
653.0		R-13	100% (99%)	FD1				
652.0								
651.0		R-14	98%	FD1				
DATE STARTED: 5/21/10 DATE FINISHED: 5/23/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-414

PROJECT NO. 10-4310


ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339887.65 ft E. 2404983.51 ft GROUND SURFACE ELEVATION: 730.32 ft DESCRIPTION		
650.0		R-14	(97%)	FD1		79.25-84.25 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, fossil bands at 80.3-80.75, 81.5-81.75, 83.4-83.5 ft., trace fossils and pyrite throughout		
649.0	81.0					81.1-81.15 ft R.D. = 20°, moderately open; surface: slightly rough, undulating, moderately hard. Fracture set #F-8.		
648.0	82.0		98% (97%)					
647.0	83.0							
646.0	84.0							
645.0	85.0	R-15	100% (78%)	FD3		84.25-89.25 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely to widely fractured, no reaction to HCl, iron oxide staining, increased fossils and pyrite 84.7-86.2 ft., intensely fractured 87.75-89.25 ft.		
644.0	86.0							
643.0	87.0							
642.0	88.0					87.75-96.25 ft Joint, R.D. = 10-45°, closely spaced, slightly open; surface: smooth, planar, moderately weathered, moderately soft to moderately hard. Fracture set #F-9.		
641.0	89.0							
640.0	90.0	R-16	100% (36%)	FD6		89.25-94.25 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), massive, closely to moderately fractured, no reaction to HCl, iron oxide staining, fewer trace fossils and pyrite		
639.0	91.0							
638.0	92.0							
637.0	93.0							
636.0	94.0							
635.0	95.0	R-17	100% (57%)	FD7		94.25-99.25 ft SHALE, moderately soft to moderately hard, fresh to intensely weathered, dark gray (N3), very closely to moderately fractured, no reaction to HCl, iron oxide staining, intensely weathered from 98.25 ft., weathered shale (5Y 7/2)		
634.0	96.0							
633.0	97.0							
632.0	98.0							
631.0	99.0							
		R-18	100%	FD7		99.25-102.05 ft Joint, R.D. = 45°, closely spaced, moderately open; filling: not healed, moderately thin calcite, moderately to intensely weathered; surface:		
DATE STARTED: 5/21/10 DATE FINISHED: 5/23/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

PROJECT NO. 10-4310

BORING NO. B-414 SHEET 6 OF 6

REV 1 Final Boring B-415

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES N. 339896.90 ft E. 2405085.97 ft GROUND SURFACE ELEVATION: 739.64 ft		USCS SYMBOL	REMARKS
							DESCRIPTION			
739.0	1.0	S-1	4-5-5 (10) 40%				0.0-1.5 ft Organic soil, (ol/oh), 95% fines, low plasticity, no dilatancy, no toughness; 5% sand, fine; maximum grain size = 1.0 inches, dark yellowish brown (10YR 4/2) to dusky yellowish brown (10YR 2/2), organic odor, moist, no HCl reaction, very soft, with roots, rock fragments, (Residual)		ol/oh	
738.0	2.0	S-2	3-23-24 (47) 93%				1.5-2.0 ft Poorly graded sand with silt, (sp-sm), 90% sand, fine; 10% fines, low plasticity, no dilatancy, no toughness; pale brown (5YR 5/2), no odor, moist, no HCl reaction, homogeneous, trace roots, (Alluvial)		sp-sm	
737.0	3.0	S-3	7-16-17 (33) 100%				2.0-3.0 ft Moderately soft, very intensely weathered, boulder sized particles			
736.0	4.0						3.0-4.5 ft SHALE, clayey, very soft to moderately hard, decomposed, clay to silt sized particles, dark yellowish orange (10YR 6/6) and dusky yellowish brown (10YR 2/2), thinly bedded, no odor, no reaction to HCl, moist, iron oxide staining			
735.0	5.0	S-4	11-15-15 (30) 87%				4.5-5.0 ft Interval not sampled			
734.0	6.0						5.0-9.5 ft SHALE, clayey, very soft to moderately hard, decomposed, clay to silt sized particles, dark yellowish orange (10YR 6/6) and dusky yellowish brown (10YR 2/2), thinly bedded, no odor, no reaction to HCl, moist, iron oxide staining, turns dusky yellow (5Y 6/4) at 11.0 ft			
733.0	7.0						S-5	5-11-11 (22) 87%		
732.0	8.0	S-6	5-6-8 (14) 100%							
731.0	9.0						S-7	6-11-18 (29) 93%	12.0-15.5 ft SHALE, fissile, soft to moderately hard, intensely weathered to decomposed, clay to silt sized particles, yellowish gray (5Y 7/2) to light olive gray (5Y 5/2), thinly bedded, moderate odor, no reaction to HCl, moist, iron oxide staining	
730.0	10.0	S-8	9-11-26 (37) 87%							
729.0	11.0			S-9	8-15-30 (45) 80%	15.5-34.8 ft SHALE, clayey, soft to very soft, moderately to very intensely weathered, clay sized particles, medium dark gray (N4) to dark gray (N3), no odor, very closely to moderately fractured, no reaction to HCl, iron oxide staining				
728.0	12.0	S-10	20-30-38 (68) 100%							
727.0	13.0			R-1	77% (6%)	FD7	15.5-30.5 ft Fracture zone, very closely to closely spaced, neither ends visible, slightly open; filling is damp but no free water present, filling: partly healed, very thin clay, very soft; surface: rough.			
726.0	14.0									
725.0	15.0									
724.0	16.0									
723.0	17.0									
722.0	18.0									
721.0	19.0									
720.0										
DATE STARTED: 4/23/10 DATE FINISHED: 4/26/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione							DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez							DRILLER: D. Westbrook HELPER(S): J. Parlett		DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-415

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339896.90 ft E. 2405085.97 ft GROUND SURFACE ELEVATION: 739.64 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
719.0	21.0	R-1				15.5-34.8 ft SHALE, clayey, soft to very soft, moderately to very intensely weathered, clay sized particles, medium dark gray (N4) to dark gray (N3), no odor, very closely to moderately fractured, no reaction to HCl, iron oxide staining	
718.0	22.0						
717.0	23.0	R-2	96% (8%)	FD7			
716.0	24.0						
715.0	25.0						
714.0	26.0						
713.0	27.0						
712.0	28.0	R-3	90% (14%)	FD6			
711.0	29.0						
710.0	30.0						
709.0	31.0						
708.0	32.0						
707.0	33.0	R-4	92% (24%)			34.8-40.5 ft SHALE, clayey, soft to moderately hard, slightly to moderately weathered, clay sized particles, dark gray (N3), no odor, moderately to widely fractured, no reaction to HCl, iron oxide staining 34.85-35.4 ft Bedding plane, R.D. = 5-8°, moderately spaced, neither ends visible, slightly open; dry, shows evidence of flow, filling: partly healed, very thin, slightly to moderately weathered; surface: slightly rough, planar, slightly weathered. 35.1- ft Random fracture, R.D. = 70°, widely spaced, neither ends visible, slightly open; filling: not healed, very thin, slightly weathered; surface: moderately rough, planar, slightly weathered. 37.2-38.3 ft Fracture zone, R.D. = 0-11°, closely to widely spaced; filling: moderately healed, very thin, slightly to moderately weathered; surface: slightly rough, planar, slightly to moderately weathered. 38.4- ft Joint, R.D. = 56°, neither ends visible, slightly open; filling: not healed, very thin, slightly weathered; surface: slightly rough, planar, slightly	26.95 - 27.5 ft. SC-1, 13:10, 4/23/10
706.0	34.0						
705.0	35.0						
704.0	36.0			FD5			
703.0	37.0						
702.0	38.0	R-5	95% (67%)				
701.0	39.0						
700.0							
DATE STARTED: 4/23/10 DATE FINISHED: 4/26/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925

REV 1 Final Boring B-415

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						<p>N. 339896.90 ft E. 2405085.97 ft</p> <p>GROUND SURFACE ELEVATION: 739.64 ft</p>		
699.0	41.0	R-5				<p>weathered. Fracture set #1, discontinuity # 2.</p> <p>38.9- ft Joint; filling: not healed. Fracture set #2, discontinuity # 4.</p> <p>39.1-41.25 ft R.D. = 60-69°, closely to widely spaced, neither ends visible, slightly open; filling: moderately healed, very thin, slightly weathered; surface: moderately rough, planar, slightly weathered.</p>		43.8 - 44.7 ft. SC-2, 13:50, 4/23/10
698.0	42.0					<p>40.5-79.0 ft SHALE, moderately hard, slightly weathered to fresh, clay sized particles, dark gray (N3), moderately bedded, no odor, moderately fractured, weak reaction to HCl</p>		
697.0	43.0	R-6	100% (31%)			<p>41.3-44 ft Fracture zone, R.D. = 0-11°, closely to widely spaced; filling: moderately healed, very thin, slightly to moderately weathered; surface: slightly rough, planar, slightly to moderately weathered.</p>		
696.0	44.0							
695.0	45.0							
694.0	46.0							
693.0	47.0							
692.0	48.0	R-7	100% (74%)			<p>48.25-51.2 ft Random fracture, moderately spaced, neither ends visible, slightly open; filling: not healed, very thin, slightly to moderately weathered; surface: slightly rough, slightly to moderately weathered; iron oxide staining.</p>		
691.0	49.0							
690.0	50.0			FD5				
689.0	51.0							
688.0	52.0							
687.0	53.0	R-8	96% (46%)			<p>54.8-56.2 ft R.D. = 37-39°, closely to widely spaced; filling: not healed, clean; surface: slightly rough.</p>		
686.0	54.0							
685.0	55.0							
684.0	56.0							
683.0	57.0							
682.0	58.0	R-9	100% (66%)			<p>59.4-59.5 ft R.D. = 19-22°, closely spaced, neither ends visible, slightly open;</p>		
681.0	59.0							
680.0								
<p>DATE STARTED: 4/23/10</p> <p>DATE FINISHED: 4/26/10</p> <p>FIELD GEOLOGIST: Adam Meyer</p> <p>CHECKED BY: Adrianna Semione</p>						<p>DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ</p> <p>DRILLING CO. Terracon</p>	NOTES:	
<p>APPROVED BY: Rolando Benitez</p>						<p>DRILLER: D. Westbrook</p> <p>HELPER(S): J. Parlett</p>	<p>DRILL RIG: CME-550 (Buggy)</p> <p>HAMMER ID: 925</p>	

REV 1 Final Boring B-415

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS		
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE				
GROUND SURFACE ELEVATION: 739.64 ft						DESCRIPTION			
DESCRIPTION									
679.0	61.0	R-9							
678.0	62.0								
677.0	63.0	R-10	100% (70%)						
676.0	64.0								
675.0	65.0			FD5					
674.0	66.0								
673.0	67.0								
672.0	68.0	R-11	100% (32%)						
671.0	69.0								
670.0	70.0								
669.0	71.0								
668.0	72.0								
667.0	73.0	R-12	100% (66%)						
666.0	74.0								
665.0	75.0			FD4					
664.0	76.0								
663.0	77.0								
662.0	78.0	R-13	100% (55%)						
661.0	79.0								
660.0									
DATE STARTED: 4/23/10 DATE FINISHED: 4/26/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione								DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez								DRILLER: D. Westbrook HELPER(S): J. Parlett	
								NOTES:	
								DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-415

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339896.90 ft E. 2405085.97 ft GROUND SURFACE ELEVATION: 739.64 ft		
						DESCRIPTION		
659.0	81.0	R-13				79.0-90.5 ft SHALE, moderately hard, slightly weathered to fresh, clay sized particles, dark gray (N3), thickly to moderately bedded, widely fractured, no reaction to HCl, with fossiliferous layers		
658.0	82.0							
657.0	83.0	R-14	100% (100%)					
656.0	84.0			FD4				
655.0	85.0							
654.0	86.0							
653.0	87.0							
652.0	88.0	R-15	82% (28%)			87.4-89.25 ft Fracture zone, R.D. = 40°, closely to very closely spaced, neither ends visible; filling: not healed, very thin iron oxide staining; surface: slightly rough.		
651.0	89.0							
650.0	90.0							
649.0	91.0							
648.0	92.0					90.5-90.8 ft Clayey sand, (sc), 60% sand, fine to medium, flat, medium hardness; 40% fines, medium plasticity; dark gray (N3), no odor, moist, no HCl reaction	SC	
647.0	93.0	R-16	82% (8%)			90.8-175.0 ft SHALE, moderately hard, slightly weathered to fresh, clay sized particles, dark gray (N3) to grayish black (N2), moderately to thinly bedded, no odor, very closely to very widely fractured, no reaction to HCl 91.2-94.6 ft Fracture zone, very closely to closely spaced, neither ends visible; filling: not healed, very thin iron oxide staining; surface: slightly rough; 93.7 to 94.6 ft. fractures are at 42°.		
646.0	94.0			FD7				
645.0	95.0							
644.0	96.0							
643.0	97.0					96.2-97.3 ft R.D. = 73-74°, closely to moderately spaced; filling: not healed, very thin iron oxide staining; surface: moderately rough, moderately weathered.		
642.0	98.0	R-17	100% (37%)			97.3-101.5 ft R.D. = 28-32°, closely to moderately spaced; filling: not healed, very thin iron oxide staining, fresh to moderately weathered; surface: moderately rough, fresh to moderately weathered.		
641.0	99.0					97.6- ft Bedding plane separation, R.D. = 30°; surface: slightly rough.		
640.0								
DATE STARTED: 4/23/10 DATE FINISHED: 4/26/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-415

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339896.90 ft E. 2405085.97 ft GROUND SURFACE ELEVATION: 739.64 ft DESCRIPTION		
639.0	101.0	R-17				90.8-175.0 ft SHALE, moderately hard, slightly weathered to fresh, clay sized particles, dark gray (N3) to grayish black (N2), moderately to thinly bedded, no odor, very closely to very widely fractured, no reaction to HCl		
638.0	102.0			FD7		101.6-101.9 ft Joint, R.D. = 56°; filling: not healed, thin iron oxide staining; surface: slightly rough.		
637.0	103.0	R-18	96% (55%)					
636.0	104.0					103.7-105.05 ft Fracture zone, very closely spaced, neither ends visible, slightly open; filling: partly healed, very thin iron oxide staining; surface: moderately rough, slightly weathered.		
635.0	105.0			FD5				
634.0	106.0							
633.0	107.0					106.8-114.1 ft R.D. = 0°, neither ends visible, slightly open; filling: not healed, very thin iron oxide staining; surface: rough, slightly weathered; very thin to moderately thin calcite.		
632.0	108.0	R-19	100% (41%)	FD9		107-107.65 ft Fracture zone, very closely spaced, neither ends visible, slightly open; filling: partly healed, very thin, slightly weathered; surface: rough, slightly weathered.		
631.0	109.0							
630.0	110.0					109.85-114.6 ft R.D. = 30-34°, closely to very widely spaced, neither ends visible, slightly open; filling: not healed, very thin calcite, fresh to slightly weathered; surface: moderately rough, fresh to slightly weathered.		
629.0	111.0					109.9-113.6 ft R.D. = 84-88°, widely spaced, both ends visible; filling: partly healed, very thin iron oxide; surface: moderately rough, slightly weathered; very thin calcite.		
628.0	112.0			FD5		110.9-111 ft Random fracture, R.D. = 55°, one end visible; filling: partly healed, thin quartz filling, moderately weathered, hard; surface: moderately rough, moderately weathered.		
627.0	113.0	R-20	100% (52%)			113.3-114.7 ft R.D. = 45-46°, moderately to widely spaced; filling: moderately healed, moderately thin calcite, fresh to slightly weathered; surface: moderately rough, fresh to slightly weathered.		
626.0	114.0					113.6-120.6 ft R.D. = 22-23°, very widely spaced, neither ends visible, slightly open; filling: moderately healed, thin calcite, slightly weathered; surface: moderately rough, slightly weathered.		
625.0	115.0					114.55-114.7 ft Joint, R.D. = 60°, one end visible; filling: very thin iron oxide; surface: slightly rough.		
624.0	116.0					114.8-116.85 ft R.D. = 72-76°, moderately spaced; filling: very thin iron oxide staining; surface: rough; 114.8-115.05 ft. very thin calcite.		
623.0	117.0					115.05-115.15 ft Fracture zone; filling: not healed, very thin feo stain, moderately weathered; surface: moderately weathered.		
622.0	118.0	R-21	100% (83%)					
621.0	119.0			FD3				
620.0								
DATE STARTED: 4/23/10 DATE FINISHED: 4/26/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-415

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS		
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE				
N. 339896.90 ft E. 2405085.97 ft GROUND SURFACE ELEVATION: 739.64 ft									
DESCRIPTION									
619.0	121.0	R-21		FD3		90.8-175.0 ft SHALE, moderately hard, slightly weathered to fresh, clay sized particles, dark gray (N3) to grayish black (N2), moderately to thinly bedded, no odor, very closely to very widely fractured, no reaction to HCl			
618.0	122.0								
617.0	123.0	R-22	100% (100%)						
616.0	124.0								
615.0	125.0								
614.0	126.0								
613.0	127.0								
612.0	128.0	R-23	100% (100%)						
611.0	129.0								
610.0	130.0			FD1					
609.0	131.0								
608.0	132.0								
607.0	133.0	R-24	100% (78%)						
606.0	134.0								
605.0	135.0								
604.0	136.0								
603.0	137.0								
602.0	138.0	R-25	96% (92%)						
601.0	139.0								
600.0									
DATE STARTED: 4/23/10 DATE FINISHED: 4/26/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione								DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez								DRILLER: D. Westbrook HELPER(S): J. Parlett	
								NOTES:	
								DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

PROJECT NO. 10-4310

BORING NO. B-415 SHEET 8 OF 11

REV 1 Final Boring B-415

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 339896.90 ft E. 2405085.97 ft GROUND SURFACE ELEVATION: 739.64 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
579.0	161.0	R-29				90.8-175.0 ft SHALE, moderately hard, slightly weathered to fresh, clay sized particles, dark gray (N3) to grayish black (N2), moderately to thinly bedded, no odor, very closely to very widely fractured, no reaction to HCl		
578.0	162.0							
577.0	163.0	R-30	100% (96%)					
576.0	164.0							
575.0	165.0							
574.0	166.0							
573.0	167.0							
572.0	168.0	R-31	100% (100%)	FD1				
571.0	169.0							
570.0	170.0							
569.0	171.0							
568.0	172.0							
567.0	173.0	R-32	99% (96%)			175.0-200.5 ft SHALE, moderately hard, fresh, dark gray (N3) and grayish black (N2), widely to extremely widely fractured, no reaction to HCl	175.0 ft. Driller reports a net loss of water of approx. 30% during entire hole	
566.0	174.0							
565.0	175.0							
564.0	176.0							
563.0	177.0							
562.0	178.0	R-33	98% (94%)	FD1				
561.0	179.0							
560.0								
DATE STARTED: 4/23/10 DATE FINISHED: 4/26/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett		DRILL RIG: CME-550 (Buggy) HAMMER ID: 925

REV 1 Final Boring B-415

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339896.90 ft E. 2405085.97 ft GROUND SURFACE ELEVATION: 739.64 ft		
						DESCRIPTION		
559.0	181.0	R-33				175.0-200.5 ft SHALE, moderately hard, fresh, dark gray (N3) and grayish black (N2), widely to extremely widely fractured, no reaction to HCl		
558.0	182.0							
557.0	183.0	R-34	98% (92%)	FD1		185.55- ft Bedding plane separation; filling: not healed, moderately thin clay, fresh; surface: moderately rough, fresh; Driller reports clay in run; clay traces found at 185.55 ft.		
556.0	184.0							
555.0	185.0							
554.0	186.0							
553.0	187.0							
552.0	188.0	R-35	99% (72%)	FD4				
551.0	189.0							
550.0	190.0							
549.0	191.0							
548.0	192.0							
547.0	193.0	R-36	100% (80%)					
546.0	194.0							
545.0	195.0							
544.0	196.0			FD2				
543.0	197.0							
542.0	198.0	R-37	100% (98%)					
541.0	199.0							
540.0								
DATE STARTED: 4/23/10 DATE FINISHED: 4/26/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	









REV 1 Final Boring B-415

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/Min & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES N. 339896.90 ft E. 2405085.97 ft GROUND SURFACE ELEVATION: 739.64 ft	USCS SYMBOL	REMARKS
						DESCRIPTION		
539.6		R-37		FD2		---- Bottom of Boring at 200.50 ft.----		
DATE STARTED: 4/23/10 DATE FINISHED: 4/26/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett		DRILL RIG: CME-550 (Buggy) HAMMER ID: 925

REV 1 Final Boring B-416

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR % REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339788.65 ft E. 2404992.39 ft GROUND SURFACE ELEVATION: 728.86 ft		
						DESCRIPTION		
728.0	1.0	S-1	1-4-6 (10) 63%			0.0-1.5 ft Silty sand, (sm), 70% sand, fine to coarse; 20% fines, low plasticity, low toughness; 10% gravel, fine, subangular, medium hardness; maximum grain size = 0.25 inches, moderate olive brown (5Y 4/4), moist, no HCl reaction, loose	sm	Drillers switch to casing advancer.
727.0	2.0					1.5-2.5 ft Interval not sampled		
726.0	3.0	S-2	23-50/2 119%			2.5-3.17 ft Silty sand with gravel, (sm), 60% sand, fine to coarse; 20% gravel, fine to medium, subangular, medium hardness; 20% fines, low plasticity, low toughness; maximum grain size = 0.5 inches, moderate brown (5YR 4/4) and yellowish gray (5Y 8/1), dry, no HCl reaction, very dense, sampling through cobble/boulder	sm	
725.0	4.0					3.17-5.0 ft Interval not sampled		
724.0	5.0							
723.0	6.0	S-3	24-40-46 (86) 93%			5.0-6.5 ft Silty sand with gravel, (sm), 60% sand, fine to coarse; 20% gravel, fine to medium, subangular, medium hardness; 20% fines, low plasticity, low toughness; maximum grain size = 0.25 inches, moderate brown (5YR 4/4), dry, no HCl reaction, very dense, sampling through cobble/boulder (5Y 8/1) near bottom of run	sm	
722.0	7.0					6.5-7.5 ft Interval not sampled		
721.0	8.0	S-4	50 100%			7.5-8.0 ft Silty sand with gravel, (sm), 60% sand, fine to coarse; 20% gravel, fine to medium, subangular; 20% fines, low plasticity, low toughness; maximum grain size = 0.33 inches, moderate brown (5YR 4/4) and pale brown (5YR 5/2), dry, no HCl reaction, very loose	sm	
720.0	9.0					8.0-10.0 ft Interval not sampled		
719.0	10.0							
718.0	11.0	S-5	20-20-23 (43) 80%			10.0-11.5 ft Well graded gravel with sand, (gw), 50% sand, fine to medium; 40% gravel, fine to coarse, medium hardness; 10% fines, medium plasticity, low toughness; maximum grain size = 1.0 inches, moderate brown (5YR 4/4) and grayish orange pink (10R 8/2), moist, no HCl reaction, dense, sampling through cobble/boulder grayish red (10R 4/2) and grayish orange pink (10R 8/2), some shale dark gray (N3) fragments in sample	gw	
717.0	12.0					11.5-12.5 ft Interval not sampled		
716.0	13.0	S-6	8-9-10 (19) 87%			12.5-14.0 ft Silty sand with gravel, (sm), 60% sand, fine to coarse; 20% gravel, fine to medium, medium hardness; 20% fines, medium plasticity, low toughness; maximum grain size = 0.25 inches, moderate brown (5YR 4/4) and dark gray (N3), wet, no HCl reaction, medium dense, few shale (N3) fragments	sm	
715.0	14.0					14.0-15.0 ft Interval not sampled		
714.0	15.0							
713.0	16.0	S-7	4-5-9 (14) 87%			15.0-16.5 ft Clayey sand, (sc), 70% sand, medium to coarse; 20% fines, medium plasticity, low toughness; 10% gravel, fine, subangular; maximum grain size = 0.1 inches, light brown (5YR 5/6) and pale yellowish orange (10YR 8/6), moist, no HCl reaction, medium dense, weathered shale	sc	
712.0	17.0					16.5-17.5 ft Interval not sampled		
711.0	18.0	S-8	8-8-10 (18) 87%			17.5-19.0 ft Clayey sand, (sc), 70% sand, fine to coarse; 20% fines, medium plasticity, low toughness; 10% gravel, fine to medium; maximum grain size = 1.0 inches, light brown (5YR 5/6) and yellowish gray (5Y 7/2), moist, no HCl reaction, medium dense	sc	
710.0	19.0					19.0-20.0 ft Interval not sampled		
709.0								
DATE STARTED: 5/12/10 DATE FINISHED: 5/18/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-416

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)		SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS	
								N. 339788.65 ft E. 2404992.39 ft				
								GROUND SURFACE ELEVATION: 728.86 ft				
								DESCRIPTION				
708.0	21.0	S-9	9-12-17 (29) 100%						20.0-21.5 ft Clayey sand, (sc), 70% sand, fine to coarse; 20% fines, medium plasticity, low toughness; 10% gravel, fine; maximum grain size = 0.1 inches, light brown (5YR 5/6) with yellowish gray (5Y 7/2), moist, no HCl reaction, medium dense	sc	SC-1 31.6-32.4 ft., at 11:00 on 5/18/10	
707.0	22.0								21.5-22.5 ft Interval not sampled			
706.0	23.0	S-10	23-50/5 98%						22.5-23.4 ft Clayey gravel, (gc), 70% gravel, fine to medium; 20% fines, low plasticity, low toughness; 10% sand, fine to medium; maximum grain size = 0.5 inches, yellowish gray (5Y 7/2) and dark gray (N3), moist, no HCl reaction, very dense, moderately to intensely weathered shale	gc		
705.0	24.0								23.4-25.0 ft Interval not sampled			
704.0	25.0											
703.0	26.0								25.0-30.0 ft SHALE, soft to moderately hard, moderately to intensely weathered, yellowish gray (5Y 7/2) and dark gray (N3), very closely to closely fractured, no reaction to HCl, iron oxide staining, shale weathering to clay (5YR 5/6)			
702.0	27.0											
701.0	28.0	R-1	96% (0%)	FD7								
700.0	29.0											
699.0	30.0								30.0-35.0 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite			
698.0	31.0								30-34 ft Joint, R.D. = 10°, closely spaced, slightly open; surface: slightly rough, planar, moderately hard. Fracture set #F-1.			
697.0	32.0	R-2	100% (67%)	FD6								
696.0	33.0											
695.0	34.0											
694.0	35.0								34.8-43.6 ft Joint, R.D. = 80°, moderately spaced, moderately open; surface: slightly rough, planar, moderately hard. Fracture set #F-2.			
693.0	36.0								35.0-40.0 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), moderately to widely fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite			
692.0	37.0											
691.0	38.0	R-3	100% (46%)	FD5								
690.0	39.0											
689.0												
DATE STARTED: 5/12/10 DATE FINISHED: 5/18/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione								DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:		
APPROVED BY: Rolando Benitez								DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931		

REV 1 Final Boring B-416

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339788.65 ft E. 2404992.39 ft GROUND SURFACE ELEVATION: 728.86 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
688.0	41.0	R-4	100% (54%)	FD5		40.0-45.0 ft SHALE, moderately hard, fresh, dark gray (N3), moderately to widely fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite	
687.0	42.0						
686.0	43.0						
685.0	44.0						
684.0	45.0	R-5	100% (100%)	FD3		43.8-45 ft Joint, R.D. = 45°, closely spaced, slightly open; surface: slightly rough, planar, moderately hard. Fracture set #F-3.	
683.0	46.0						
682.0	47.0						
681.0	48.0						
680.0	49.0	R-6	100% (84%)	FD5		48.4-49.5 ft Joint, R.D. = 40°, moderately spaced, slightly open; surface: slightly rough, planar, moderately hard. Fracture set #F-4.	
679.0	50.0						
678.0	51.0						
677.0	52.0						
676.0	53.0	R-7	100% (94%)	FD4		50.0-55.0 ft SHALE, interbedded, moderately hard, fresh, dark gray (N3), moderately to widely fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite	
675.0	54.0						
674.0	55.0						
673.0	56.0						
672.0	57.0					50.5-50.75 ft R.D. = 60°, slightly open; filling: not healed, clay, intensely weathered, very soft; surface: slightly rough, undulating, intensely weathered; iron oxide staining on fracture face with small amount of clay (5YR 5/6). Fracture set #F-5.	
671.0	58.0					52.65-54.9 ft Joint, R.D. = 30°, closely spaced, slightly open; surface: slightly rough, undulating, moderately hard. Fracture set #F-6.	
670.0	59.0					55.0-60.0 ft SHALE, moderately hard, fresh, dark gray (N3), moderately to widely fractured, no reaction to HCl, trace fossils and pyrite	
669.0						56.85-58.75 ft Joint, R.D. = 65°, moderately spaced, slightly open; surface: slightly rough, undulating, moderately hard. Fracture set #F-7.	
DATE STARTED: 5/12/10						NOTES:	
DATE FINISHED: 5/18/10							
FIELD GEOLOGIST: Jesse Merkel						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ	
CHECKED BY: Adrianna Semione						DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez						DRILL RIG: Diedrich D-120 (ATV)	
						HAMMER ID: 931	
DRILLER: J. Williams							
HELPER(S): R. Hinkle							

REV 1 Final Boring B-416

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 339788.65 ft E. 2404992.39 ft GROUND SURFACE ELEVATION: 728.86 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
668.0	61.0	R-8	100% (100%)	FD3		60.0-65.0 ft SHALE, moderately hard, fresh, dark gray (N3), moderately to widely fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite, moderately weathered 10° fracture at 63.3 ft., iron oxide staining on fracture faces, moderately open		
667.0	62.0					63.3-63.33 ft Joint, R.D. = 10°, moderately open; surface: slightly rough, planar, moderately hard; heavy iron oxide staining. Fracture set #F-8.		
666.0	63.0					64.3-66.95 ft Joint, R.D. = 45°, widely spaced, slightly open; surface: slightly rough, planar. Fracture set #F-9.		
665.0	64.0					65.0-70.0 ft SHALE, moderately hard, fresh, dark gray (N3), closely to widely fractured, no reaction to HCl, trace fossils and pyrite		
664.0	65.0	R-9	100% (94%)	FD4		68-78.15 ft Joint, R.D. = 10-20°, closely to widely spaced, slightly open; surface: slightly rough, undulating, moderately hard. Fracture set #F-10.		
663.0	66.0							
662.0	67.0							
661.0	68.0							
660.0	69.0	R-10	100% (100%)	FD2		70.0-75.0 ft SHALE, moderately hard, fresh, dark gray (N3), widely fractured, no reaction to HCl, increased fossil content, trace to few, trace pyrite		
659.0	70.0							
658.0	71.0							
657.0	72.0							
656.0	73.0	R-11	100% (76%)	FD3		75.0-80.0 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), widely fractured, no reaction to HCl, iron oxide staining, slightly weathered fracture 78.2-80.0 ft., trace fossils and pyrite throughout		
655.0	74.0							
654.0	75.0							
653.0	76.0							
652.0	77.0							
651.0	78.0							
650.0	79.0					78.9-80.6 ft R.D. = 80°, moderately open; surface: slightly rough, undulating, moderately weathered, moderately hard; iron oxide staining on fracture face, small (5mm) pits. Fracture set #F-11.		
649.0								
DATE STARTED: 5/12/10 DATE FINISHED: 5/18/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

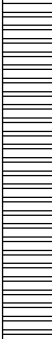
REV 1 Final Boring B-416

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 728.86 ft						DESCRIPTION	
648.0	81.0	R-12	100% (84%)	FD1		80.0-85.0 ft SHALE, moderately hard, fresh, dark gray (N3), widely fractured, no reaction to HCl, few fossils and pyrite	
647.0	82.0						
646.0	83.0						
645.0	84.0						
644.0	85.0						
643.0	86.0	R-13	100% (58%)	FD6		85.0-90.0 ft SHALE, moderately hard, fresh, dark gray (N3), closely to widely fractured, no reaction to HCl, trace fossils and pyrite	
642.0	87.0					85.9-88.85 ft Joint, R.D. = 10°, closely spaced, slightly open; surface: slightly rough, planar, moderately hard. Fracture set #F-12.	
641.0	88.0						
640.0	89.0					88.5-90 ft Joint, R.D. = 85°, slightly open; surface: slightly rough, planar. Fracture set #F-13.	
639.0	90.0						
638.0	91.0	R-14	94% (80%)	FD5		90.0-95.0 ft SHALE, moderately hard, fresh, dark gray (N3), moderately to widely fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite	
637.0	92.0					91.2-94.3 ft Joint, R.D. = 10°, moderately spaced, slightly open; surface: smooth, planar. Fracture set #F-14.	
636.0	93.0						
635.0	94.0						
634.0	95.0					94.3-95 ft Joint, R.D. = 10°, slightly open; filling: not healed, very thin quartz, moderately weathered, moderately hard; surface: slightly rough, planar, moderately weathered. Fracture set #F-15.	
633.0	96.0	R-15	94% (60%)	FD6		95.0-100.0 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite	
632.0	97.0					95.3-95.9 ft Joint, R.D. = 80°, moderately open; filling: moderately healed, thin quartz, slightly to moderately weathered, moderately hard; surface: slightly weathered. Fracture set #F-16.	
631.0	98.0					96.7-100 ft Joint, R.D. = 10-40°, closely spaced, slightly open; surface: slightly rough, planar, moderately hard. Fracture set #F-17.	
630.0	99.0						
629.0							
DATE STARTED: 5/12/10 DATE FINISHED: 5/18/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	
						NOTES:	
						DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-416

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
N. 339788.65 ft E. 2404992.39 ft GROUND SURFACE ELEVATION: 728.86 ft							
DESCRIPTION							
628.0	101.0	R-16	100% (90%)	FD2			100.0-105.0 ft SHALE, moderately hard, fresh, dark gray (N3), closely to moderately fractured, no reaction to HCl, transition from quartz-healed fractures to calcite-healed at 101.3 ft., trace fossils and pyrite throughout 100.1-101.2 ft Joint, R.D. = 25°, closely spaced; filling: moderately healed, moderately thick quartz, fresh to slightly weathered, moderately soft to moderately hard; surface: fresh. Fracture set #F-18. 101.3-105 ft Joint, R.D. = 70°, closely to moderately spaced; filling: totally healed, thin calcite, fresh, moderately hard; surface: slightly rough, planar, fresh; some jagged shale fragments within calcite fill at 101.75-102.25 ft. Fracture set #F-19.
627.0	102.0						
626.0	103.0						
625.0	104.0						
624.0	105.0						---- Bottom of Boring at 105.00 ft.----
DATE STARTED: 5/12/10 DATE FINISHED: 5/18/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez						DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	
DRILLER: J. Williams HELPER(S): R. Hinkle							

REV 1 Final Boring B-417

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339799.26 ft E. 2405095.47 ft GROUND SURFACE ELEVATION: 734.74 ft		
						DESCRIPTION		
734.0	1.0	S-1	2-3-5 (8) 80%			0.0-1.5 ft Silty sand, (sm), 80% sand, fine to medium; 15% fines, low plasticity, low toughness; 5% gravel, fine to medium, subangular, medium hardness; maximum grain size = 0.5 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, loose	sm	
733.0	2.0	S-2	11-21-21 (42) 93%			1.5-3.0 ft Silty sand, (sm), 70% sand, fine to coarse; 20% fines, low plasticity, low toughness; 10% gravel, fine, subangular, medium hardness; maximum grain size = 0.5 inches, moderate brown (5YR 4/4) and pale reddish brown (10R 5/4), moist, no HCl reaction, dense, trace fine gravel sized shale fragments (N3)	sm	
732.0	3.0							
731.0	4.0	S-3	8-21-30 (51) 93%			3.0-4.5 ft Silty sand, (sm), 70% sand, fine to coarse; 20% fines, medium plasticity, low toughness; 10% gravel, fine to medium, subangular, medium hardness; maximum grain size = 0.5 inches, moderate brown (5YR 4/4) and pale reddish brown (10R 5/4), dry, no HCl reaction, very dense, medium piece of gravel (10YR 8/2). 0.5 in.	sm	
730.0	5.0	S-4	18-31-31 (62) 100%			4.5-6.0 ft Silty sand, (sm), 70% sand, fine to coarse; 20% fines, medium plasticity, low toughness; 10% gravel, fine to medium; maximum grain size = 0.5 inches, moderate brown (5YR 4/4) with light brown (5YR 5/6), moist, no HCl reaction, very dense	sm	
729.0	6.0							
728.0	7.0	S-5	32-29-27 (56) 90%			6.0-7.5 ft Silty sand with gravel, (sm), 50% sand, fine to coarse; 30% gravel, fine to medium, subangular, hard hardness; 20% fines, low plasticity, low toughness; maximum grain size = 0.34 inches, moderate brown (5YR 4/4) with light olive gray (5Y 6/1), dry, no HCl reaction, very dense	sm	
727.0	8.0	S-6	27-50/4 100%			7.5-8.33 ft Silty sand with gravel, (sm), 60% sand, fine to coarse; 20% gravel, fine to medium, subangular, medium hardness; 20% fines, low plasticity, low toughness; maximum grain size = 0.5 inches, moderate brown (5YR 4/4) and grayish red (10R 4/2), moist, no HCl reaction, very dense	sm	
726.0	9.0							
725.0	10.0	S-7	15-19-16 (35) 100%			8.33-9.0 ft Interval not sampled	sp-sm	Drillers switch to casing advancer
724.0	11.0					9.0-10.5 ft Poorly graded sand with silt and gravel, (sp-sm), 70% sand, fine to coarse; 20% gravel, fine to medium, subangular, medium hardness; 10% fines, low plasticity, low toughness; maximum grain size = 0.5 inches, pale reddish brown (10R 5/4) and moderate brown (5YR 4/4), dry, no HCl reaction, dense, medium gravel sized broken pieces of a boulder (5R 6/2) and (5Y 5/2) in sample		10.5-12.0 ft., interval not sampled, recovered minimal mud/slush in sampler
723.0	12.0							
722.0	13.0	S-8	8-10-9 (19) 93%			10.5-12.0 ft Interval not sampled	sp-sm	
721.0	14.0	S-9	8-7-11 (18) 87%			12.0-13.5 ft Poorly graded sand with silt and gravel, (sp-sm), 65% sand, fine to coarse; 25% gravel, fine to medium, subangular, medium hardness; 10% fines, medium plasticity, low toughness; maximum grain size = 0.5 inches, light brown (5YR 5/6) and yellowish gray (5Y 7/2), moist, no HCl reaction, medium dense, Fine to medium gravel sized fragments of shale (N3).	sc	
720.0	15.0					13.5-15.0 ft Clayey sand, (sc), 70% sand, fine to medium; 20% fines, low plasticity, low toughness; 10% gravel, fine to medium, subangular, medium hardness; maximum grain size = 0.25 inches, light brown (5YR 5/6) and yellowish gray (5Y 7/2), moist, no HCl reaction, medium dense, few fine to medium gravel sized shale (N3) fragments	gc	Decomposed shale starts at 15.05 ft.
719.0	16.0	S-10	15-20-20 (40) 100%					
718.0	17.0	S-11	19-25-30 (55) 100%			15.0-16.5 ft Clayey gravel with sand, (gc), 50% gravel, fine to medium, subangular, flat and elongated, medium hardness; 30% sand, fine to medium; 20% fines, low plasticity, low toughness; maximum grain size = 1.0 inches, yellowish gray (5Y 7/2) and dark gray (N3), no HCl reaction, dense, moderately to intensely weathered shale, trace amounts of (5YR 5/6) clay.	gp-gm	
717.0	18.0							
716.0	19.0	S-12	36-50/4 100%			16.5-18.0 ft Poorly graded gravel with silt and sand, (gp-gm), 50% gravel, fine to medium, angular, flat, medium hardness; 40% sand, fine to coarse; 10% fines, low plasticity, low toughness; maximum grain size = 0.1 inches, yellowish gray (5Y 7/2) and pale greenish yellow (10Y 8/2), dry, no HCl	gp-gc	Refusal at 18.85 ft., advancing to 20.0 ft., begin coring.
715.0								
DATE STARTED: 5/19/10 DATE FINISHED: 5/20/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

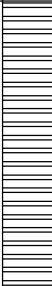
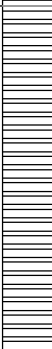
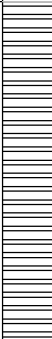


REV 1 Final Boring B-417

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES N. 339799.26 ft E. 2405095.47 ft GROUND SURFACE ELEVATION: 734.74 ft		USCS SYMBOL	REMARKS	
		DESCRIPTION									
714.0	21.0	R-1	100% (0%)	FD7			reaction, very dense, some moderately weathered shale (N3).				
713.0	22.0						18.0-18.83 ft Poorly graded gravel with clay and sand, (gp-gc), 50% gravel, fine to medium, medium hardness; 40% sand, fine and coarse; 10% fines, low plasticity, low toughness; maximum grain size = 0.25 inches, yellowish gray (5Y 7/2) with dark gray (N3), moist, no HCl reaction, very dense, moderately to intensely weathered shale				
712.0	23.0						18.83-20.0 ft Interval not sampled				
711.0	24.0	R-2	35% (0%)	FD8			20.0-24.2 ft SHALE, interbedded, soft to moderately soft, moderately to intensely weathered, yellowish gray (5Y 7/2) and dark gray (N3), very closely to closely fractured, no reaction to HCl, iron oxide staining				
710.0	25.0						24.2-29.2 ft SHALE, interbedded, soft to moderately soft, moderately to intensely weathered, yellowish gray (5Y 7/2) and dark gray (N3), very closely to closely fractured, no reaction to HCl, iron oxide staining				
709.0	26.0										
708.0	27.0	R-3	62% (0%)	FD7			29.2-34.2 ft SHALE, moderately soft to moderately hard, moderately to intensely weathered, yellowish gray (5Y 7/2) and dark gray (N3), very closely to closely fractured, no reaction to HCl, iron oxide staining			SC-1 30.4-30.7 ft., at 11:30 on 5/20/10	
707.0	28.0										
706.0	29.0										
705.0	30.0	R-4	94% (66%)	FD3			34.2-39.2 ft SHALE, moderately soft to moderately hard, fresh to intensely weathered, yellowish gray (5Y 7/2) to dark gray (N3), thickly to very thickly bedded, very closely to very widely fractured, no reaction to HCl, iron oxide staining, transition from moderately-intensely weathered shale to fresh at 35.6 ft., trace fossils and pyrite below transition				
704.0	31.0										
703.0	32.0										
702.0	33.0	R-5	100% (100%)	FD0			39.2-44.2 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, trace fossils and pyrite				
701.0	34.0										
700.0	35.0										
699.0	36.0										
698.0	37.0										
697.0	38.0										
696.0	39.0										
695.0											
DATE STARTED: 5/19/10 DATE FINISHED: 5/20/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione							DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon			NOTES:	
APPROVED BY: Rolando Benitez							DRILLER: J. Williams HELPER(S): R. Hinkle			DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

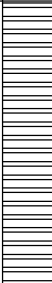
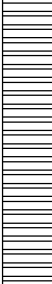
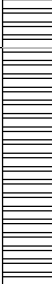
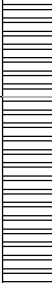
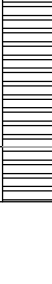
REV 1 Final Boring B-417

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339799.26 ft E. 2405095.47 ft GROUND SURFACE ELEVATION: 734.74 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
694.0	41.0	R-5	100% (100%)	FD0		39.2-44.2 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, trace fossils and pyrite	
693.0	42.0						
692.0	43.0						
691.0	44.0						
690.0	45.0	R-6	100% (100%)	FD0		44.2-49.2 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, trace fossils and pyrite	
689.0	46.0						
688.0	47.0						
687.0	48.0						
686.0	49.0	R-7	100% (70%)	FD1		49.2-54.2 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), massive, widely to very widely fractured, no reaction to HCl, iron oxide staining, near vertical fracture 52.7-54.2 ft., iron oxide staining on fracture surfaces, trace fossils and pyrite	
685.0	50.0						
684.0	51.0						
683.0	52.0						
682.0	53.0	R-8	100% (100%)	FD0		52.7-54.4 ft Joint, R.D. = 60-80°, slightly open; surface: slightly rough, undulating, moderately hard; iron oxide staining. Fracture set #F-1.	
681.0	54.0						
680.0	55.0						
679.0	56.0						
678.0	57.0	R-9	100% (100%)	FD0		54.2-59.2 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite	
677.0	58.0						
676.0	59.0						
675.0							
DATE STARTED: 5/19/10 DATE FINISHED: 5/20/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

REV 1 Final Boring B-417

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
						N. 339799.26 ft	E. 2405095.47 ft		
						GROUND SURFACE ELEVATION: 734.74 ft			
						DESCRIPTION			
674.0	61.0	R-9	100% (100%)	FD0		59.2-64.2 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, trace fossils and pyrite			
673.0	62.0								
672.0	63.0								
671.0	64.0								
670.0	65.0	R-10	100% (56%)	FD3		64.2-69.2 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), massive, moderately to widely fractured, no reaction to HCl, iron oxide staining, nea vertical fracture 67.0-69.2 ft., trace fossils and pyrite throughout sample			
669.0	66.0								
668.0	67.0					67-69.7 ft Joint, R.D. = 80°, slightly open; surface: slightly rough, undulating, moderately hard; iron oxide staining on fracture faces. Fracture set #F-2.			
667.0	68.0								
666.0	69.0	R-11	100% (54%)	FD4		69.2-74.2 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), massive, moderately to widely fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite, fossil bands 70.0-70.8 ft., pitted at 62.7-62.9 ft.			
665.0	70.0								
664.0	71.0								
663.0	72.0					71.9-72.65 ft Joint, R.D. = 70°, slightly open; surface: slightly rough, planar. Fracture set #F-3.			
662.0	73.0	R-12	100% (70%)	FD5		74.2-79.2 ft SHALE, moderately hard, fresh, dark gray (N3), massive, moderately to widely fractured, no reaction to HCl, iron oxide staining, slightly weathered at 77.4-77.6 ft, trace fossils and pyrite throughout			
661.0	74.0								
660.0	75.0								
659.0	76.0								
658.0	77.0	R-13	100% (100%)	FD0		76.5-78.2 ft Joint, R.D. = 80°, slightly open; surface: slightly rough, planar; iron oxide staining. Fracture set #F-4.			
657.0	78.0								
656.0	79.0								
655.0									
DATE STARTED: 5/19/10 DATE FINISHED: 5/20/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

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PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 339799.26 ft E. 2405095.47 ft GROUND SURFACE ELEVATION: 734.74 ft										
							DESCRIPTION			
654.0	81.0	R-13	100% (100%)	FD0			79.2-84.2 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, trace fossils and pyrite, fossil bands at 81.6-82.45, 83.55-83.95 ft.			
653.0	82.0									
652.0	83.0									
651.0	84.0									
650.0	85.0	R-14	100% (100%)	FD0			84.2-89.2 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, trace fossils and pyrite			
649.0	86.0									
648.0	87.0									
647.0	88.0									
646.0	89.0	R-15	100% (100%)	FD1			89.2-94.2 ft SHALE, moderately hard, fresh, dark gray (N3), massive, closely to widely fractured, no reaction to HCl, trace fossils and pyrite 89.47-89.61 ft R.D. = 10°, closely spaced; filling: totally healed, moderately thin calcite, fresh, moderately hard; surface: slightly rough, undulating, fresh. Fracture set #F-5.			
645.0	90.0									
644.0	91.0									
643.0	92.0									
642.0	93.0	R-16	100% (94%)	FD1			91.6-98.4 ft Joint, R.D. = 10°, very widely spaced, slightly open; surface: smooth, planar, moderately hard; iron oxide staining. Fracture set #F-6.			
641.0	94.0									
640.0	95.0									
639.0	96.0									
638.0	97.0	R-17	99% (91%)	FD1			94.2-99.2 ft SHALE, moderately hard, fresh, dark gray (N3), massive, moderately to widely fractured, no reaction to HCl, trace fossils and pyrite, thin, totally calcite healed, 10° fracture at 96.3 ft.			
637.0	98.0									
636.0	99.0									
635.0										
DATE STARTED: 5/19/10 DATE FINISHED: 5/20/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione							DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez							DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-417

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339799.26 ft E. 2405095.47 ft GROUND SURFACE ELEVATION: 734.74 ft		
						DESCRIPTION		
634.0	101.0	R-17	99% (91%)	FD1		99.2-104.2 ft SHALE, moderately hard, fresh, dark gray (N3), massive, moderately to widely fractured, no reaction to HCl, trace fossils and pyrite, totally calcite healed fractures with angular shale fragments included 101.8-104.2 ft.		
633.0	102.0							
632.0	103.0							
631.0	104.0					103.3-104.1 ft Joint, R.D. = 25°, closely spaced; surface: smooth, planar, moderately hard. Fracture set #F-7.		
						---- Bottom of Boring at 104.20 ft.----		
DATE STARTED: 5/19/10 DATE FINISHED: 5/20/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-418

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)		SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
								N. 339853.39 ft E. 2405203.43 ft			
									GROUND SURFACE ELEVATION: 744.02 ft		
									DESCRIPTION		
743.0	1.0	S-1	2-4-4 (8) 53%					0.0-1.5 ft Silty sand, (sm), 80% sand, fine to coarse; 15% fines, non plastic, no toughness; 5% gravel, fine, subangular, hard hardness; maximum grain size = 0.1 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, loose	sm	11.5 ft. Switch to casing advancer	
742.0	2.0							1.5-2.5 ft Interval not sampled			
741.0	3.0	S-2	4-12-20 (32) 93%					2.5-4.0 ft Silty sand with gravel, (sm), 60% sand, fine to coarse; 20% gravel, fine to medium, subangular, medium hardness; 20% fines, non plastic, no toughness; maximum grain size = 0.5 inches, moderate brown (5YR 4/4) and grayish orange pink (5YR 7/2), dry, no HCl reaction, dense	sm		
740.0	4.0							4.0-5.0 ft Interval not sampled			
739.0	5.0	S-3	50/3 100%					5.0-5.25 ft Silty sand with gravel, (sm), 70% sand, fine to coarse; 15% gravel, fine, subangular, medium hardness; 15% fines, non plastic, no toughness; maximum grain size = 0.1 inches, moderate yellowish brown (10YR 5/4) and light gray (N7), dry, no HCl reaction, very dense	sm		
738.0	6.0							5.25-7.5 ft Interval not sampled			
737.0	7.0										
736.0	8.0	S-4	13-31-14 (45) 100%					7.5-9.0 ft Silty sand, (sm), 70% sand, fine to coarse; 20% fines, non plastic, no toughness; 10% gravel, fine to medium, subangular, medium hardness; maximum grain size = 0.25 inches, moderate brown (5YR 4/4) and moderate orange pink (10R 7/4), moist, no HCl reaction, dense	sm		
735.0	9.0							9.0-10.0 ft Interval not sampled			
734.0	10.0										
733.0	11.0	S-5	13-12-16 (28) 100%					10.0-11.5 ft Silty sand, (sm), 60% sand, fine to medium; 30% fines, non plastic, no toughness; 10% gravel, fine to medium, subangular, medium hardness; maximum grain size = 0.5 inches, moderate brown (5YR 3/4) with light brown (5YR 5/6), moist, no HCl reaction, medium dense	sm		
732.0	12.0							11.5-12.5 ft Interval not sampled			
731.0	13.0	S-6	10-14-19 (33) 100%					12.5-14.0 ft Clayey sand, (sc), 70% sand; 20% fines, low plasticity, low toughness; 10% gravel, fine, subangular, medium hardness; maximum grain size = 0.1 inches, light brown (5YR 5/6) and yellowish gray (5Y 7/2), moist, no HCl reaction, dense, few fine gravel size shale (N3) fragments	sc		
730.0	14.0							14.0-15.0 ft Interval not sampled			
729.0	15.0										
728.0	16.0	S-7	13-16-20 (36) 100%					15.0-16.5 ft Poorly graded sand with clay and gravel, (sp-sc), 50% sand, fine to coarse; 40% gravel, fine to medium, subangular, medium hardness; 10% fines, low plasticity, low toughness; maximum grain size = 1.0 inches, light brown (5YR 5/6) and yellowish gray (5Y 7/2), dry, no HCl reaction, dense, few medium size gravel shale (N3) fragments	sp-sc		
727.0	17.0							16.5-17.5 ft Interval not sampled			
726.0	18.0	S-8	35-42-50 (92) 100%					17.5-19.0 ft Clayey sand with gravel, (sc), 40% gravel, fine to medium, medium hardness; 40% sand, fine to coarse; 20% fines, medium plasticity, low toughness; maximum grain size = 1.0 inches, dark gray (N3) with yellowish gray (5Y 7/2), moist, very dense	sc		
725.0	19.0							19.0-20.0 ft Interval not sampled			
DATE STARTED: 5/23/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione									DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez									DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931


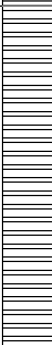
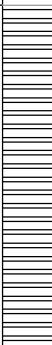
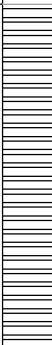

REV 1 Final Boring B-418

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS		
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE				
GROUND SURFACE ELEVATION: 744.02 ft						DESCRIPTION			
723.0	21.0	R-1	94% (0%)	FD7		20.0-24.5 ft SHALE, moderately soft to moderately hard, slightly to moderately weathered, yellowish gray (5Y 7/2) and dark gray (N3), very closely to closely fractured, no reaction to HCl, iron oxide staining	SC-1 25.8-26.2 ft., at 10:30, 5/24/10		
722.0	22.0					24.5-29.5 ft SHALE, moderately soft to moderately hard, slightly to intensely weathered, yellowish gray (5Y 7/2) and dark gray (N3), very closely to closely fractured, no reaction to HCl, iron oxide staining			
721.0	23.0								
720.0	24.0								
719.0	25.0	R-2	84% (0%)	FD8		29.5-34.5 ft SHALE, moderately soft to moderately hard, slightly to intensely weathered, yellowish gray (5Y 7/2) and dark gray (N3), very closely to closely fractured, no reaction to HCl, iron oxide staining			
718.0	26.0								
717.0	27.0								
716.0	28.0								
715.0	29.0	R-3	100% (0%)	FD7		34.5-39.5 ft SHALE, moderately soft to moderately hard, slightly to intensely weathered, yellowish gray (5Y 7/2) and dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining			
714.0	30.0								
713.0	31.0								
712.0	32.0								
711.0	33.0	R-4	100% (7%)	FD7					
710.0	34.0								
709.0	35.0								
708.0	36.0								
707.0	37.0	R-5		FD6					
706.0	38.0								
705.0	39.0								
DATE STARTED: 5/23/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	


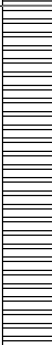
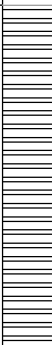
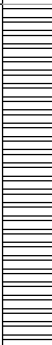

REV 1 Final Boring B-418

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 744.02 ft						DESCRIPTION		
703.0	41.0	R-5	94% (67%)	FD6		39.5-44.5 ft SHALE, moderately soft to moderately hard, fresh to moderately weathered, dark gray (N3) and yellowish gray (5Y 7/2), thinly, closely to moderately fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite 40.9-43 ft Joint, R.D. = 45°, moderately spaced, slightly open; surface: smooth, planar, moderately hard. Fracture set #F-1. 44.5-49.5 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, trace fossils and pyrite 49.5-54.5 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, trace fossils and pyrite 54.5-59.5 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, trace fossils and pyrite 54.5-56.7 ft Joint, R.D. = 70-90°, slightly open; surface: moderately rough, planar, moderately hard; long, linear, near vertical fracture, curves around sample at top. Fracture set #F-2.	SC-3 49.0-49.5 ft., at 13:50, 5/24/10	
702.0	42.0							
701.0	43.0							
700.0	44.0							
699.0	45.0	R-6	100% (100%)	FD0				54.5 ft. Reduced water circulation
698.0	46.0							
697.0	47.0							
696.0	48.0							
695.0	49.0	R-7	100% (100%)	FD0				
694.0	50.0							
693.0	51.0							
692.0	52.0							
691.0	53.0	R-8	100% (100%)	FD0				
690.0	54.0							
689.0	55.0							
688.0	56.0							
687.0	57.0	R-9		FD5				
686.0	58.0							
685.0	59.0							
DATE STARTED: 5/23/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

REV 1 Final Boring B-418

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 744.02 ft						DESCRIPTION	
683.0	61.0	R-9	100% (49%)	FD5		59.5-64.5 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), massive, moderately to widely fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite	
682.0	62.0						
681.0	63.0						
680.0	64.0						
679.0	65.0	R-10	100% (100%)	FD0		64.5-69.5 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, trace fossils and pyrite	
678.0	66.0						
677.0	67.0						
676.0	68.0						
675.0	69.0	R-11	100% (95%)	FD1		69.5-74.5 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, trace fossils and pyrite 69.75-85.5 ft Joint, R.D. = 0-10°, very widely spaced, moderately open; filling: totally healed, very thin calcite, fresh to slightly weathered, moderately hard; surface: smooth, planar, fresh, moderately hard. Fracture set #F-3.	
674.0	70.0						
673.0	71.0						
672.0	72.0						
671.0	73.0	R-12	100% (100%)	FD0		74.5-79.5 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, fossil bands 74.6-74.6, 77.0-77.4 ft., trace fossils and pyrite throughout sample, very thin, totally calcite healed fracture, horizontal, at 77.6 ft.	
670.0	74.0						
669.0	75.0						
668.0	76.0						
667.0	77.0	R-13		FD0			
666.0	78.0						
665.0	79.0						
DATE STARTED: 5/23/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	
						NOTES:	
						DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-418

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 744.02 ft						DESCRIPTION		
DESCRIPTION								
663.0	81.0	R-13	100% (99%)	FD1		79.5-84.5 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, fossil band 84.5-85.0 ft., trace fossils and pyrite throughout sample		
662.0	82.0							
661.0	83.0							
660.0	84.0							
659.0	85.0	R-14	100% (100%)	FD0		84.5-89.5 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, trace fossils and pyrite		
658.0	86.0							
657.0	87.0							
656.0	88.0							
655.0	89.0	R-15	100% (96%)	FD1		89.5-94.5 ft SHALE, moderately hard, fresh, dark gray (N3), massive, widely to moderately fractured, no reaction to HCl, trace fossils and pyrite, mechanically broken in parts		
654.0	90.0							
653.0	91.0							
652.0	92.0							
651.0	93.0	R-16	100% (45%)	FD6		92.2-95.3 ft Joint, R.D. = 70°, moderately spaced, moderately open; surface: slightly rough, planar, moderately hard. Fracture set #F-4.		
650.0	94.0							
649.0	95.0							
648.0	96.0							
647.0	97.0	R-17		FD6		94.5-99.5 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), massive, closely to moderately fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite, moderately weathered 98.2-98.6 ft. 95.5-96.5 ft Joint, R.D. = 80-96°, slightly open; surface: stepped, planar, moderately hard. Fracture set #F-5.		
646.0	98.0							
645.0	99.0							
DATE STARTED: 5/23/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		
						DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931		

REV 1 Final Boring B-418

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
						N. 339853.39 ft	E. 2405203.43 ft		
						GROUND SURFACE ELEVATION: 744.02 ft			
						DESCRIPTION			
643.0	101.0	R-17	100% (44%)	FD6		99.5-104.5 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), massive, closely to moderately fractured, no reaction to HCl, iron oxide staining, thick fossil band 102.3-103.3 ft., trace fossils and pyrite throughout sample			
642.0	102.0					100.5-101.7 ft Joint, R.D. = 10°, moderately spaced, slightly open; surface: smooth, planar, moderately hard. Fracture set #F-7.			
641.0	103.0								
640.0	104.0								
639.0	105.0	R-18	100% (80%)	FD6		104.2-104.3 ft Joint, R.D. = 20°; filling: totally healed, moderately thin calcite, fresh, moderately hard; surface: smooth, planar, fresh. Fracture set #F-8.			
638.0	106.0					104.5-109.5 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), massive, closely to widely fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite			
637.0	107.0					105.1-109.5 ft R.D. = 0-10°, closely to moderately spaced, slightly open; surface: smooth, planar, moderately hard. Fracture set #F-9.			
636.0	108.0								
635.0	109.0	R-19	100% (86%)	FD5		109.5-114.5 ft SHALE, moderately hard, fresh, dark gray (N3), massive, moderately to widely fractured, no reaction to HCl, iron oxide staining, few fossils, trace pyrite			
634.0	110.0								
633.0	111.0					111.6-125.1 ft Joint, R.D. = 45°, closely to widely spaced, moderately open; surface: stepped, planar, moderately hard. Fracture set #F-10.			
632.0	112.0								
631.0	113.0	R-20	100% (95%)	FD2		114.5-119.5 ft SHALE, moderately hard, fresh, dark gray (N3), massive, moderately to widely fractured, no reaction to HCl, iron oxide staining, abundant fossils at 114.5-116.5, 118.5-119.5 ft, trace fossils and pyrite			
630.0	114.0								
629.0	115.0								
628.0	116.0								
627.0	117.0	R-21		FD3					
626.0	118.0								
625.0	119.0								
DATE STARTED: 5/23/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-418

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 339853.39 ft E. 2405203.43 ft								
GROUND SURFACE ELEVATION: 744.02 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
623.0	121.0	R-21	100% (85%)	FD3		119.5-124.5 ft SHALE, moderately hard, fresh, dark gray (N3), massive, moderately to widely fractured, no reaction to HCl, iron oxide staining, abundant fossils 119.5-122.0 ft., trace fossils and pyrite throughout sample		
622.0	122.0					124.5-129.5 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very closely to moderately fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite		
621.0	123.0							
620.0	124.0							
619.0	125.0	R-22	100% (99%)	FD1		126-134.5 ft Joint, R.D. = 45°, moderately spaced; filling: totally healed, moderately thin calcite, fresh, moderately hard; surface: slightly rough, planar, fresh; vertical, thin, totally healed with calcite fracture bisects this fracture set, vertical fracture is stepped in appearance 127.4-128.2 ft. Fracture set #F-11.		
618.0	126.0							
617.0	127.0							
616.0	128.0							
615.0	129.0	R-23	100% (100%)	FD0		129.5-134.5 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very closely to widely fractured, no reaction to HCl, trace fossils and pyrite		
614.0	130.0							
613.0	131.0							
612.0	132.0							
611.0	133.0	R-24	100% (92%)	FD1		134.5-139.5 ft SHALE, moderately hard, fresh, dark gray (N3), very closely to moderately fractured, no reaction to HCl, trace fossils and pyrite, randomly oriented totally calcite healed fracture zone with angular shale inclusions		
610.0	134.0							
609.0	135.0							
608.0	136.0							
607.0	137.0	R-25		FD0		134.5-140.5 ft Fracture zone, R.D. = 20-70°, closely to moderately spaced; filling: totally healed, moderately thin calcite, fresh, moderately hard; surface: slightly rough, planar, fresh; fracture zone of multiple dip orientations and ranging in thicknes from discontinuous/clean to moderately thin healed fractures, abundant angular shale fragments within gouge. Fracture set #F-12.		
606.0	138.0							
605.0	139.0							
DATE STARTED: 5/23/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

REV 1 Final Boring B-418

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 744.02 ft						DESCRIPTION		
DESCRIPTION								
603.0	141.0	R-25	100% (100%)	FD0		139.5-144.5 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very closely to widely fractured, no reaction to HCl, trace fossils and pyrite		
602.0	142.0							
601.0	143.0							
600.0	144.0							
599.0	145.0	R-26	100% (100%)	FD0		144.5-149.5 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely fractured, no reaction to HCl, trace fossils and pyrite		
598.0	146.0							
597.0	147.0							
596.0	148.0							
595.0	149.0	R-27	100% (100%)	FD0		149.2-153.85 ft Joint, R.D. = 20°, very widely spaced; filling: totally healed, moderately thin calcite, fresh, moderately hard; surface: smooth, undulating, fresh; two 40 degree fractures, very closely spaced, clean to very thin, totally calcite healed at 153.3-153.75 ft.. Fracture set #F-13.		
594.0	150.0							
593.0	151.0							
592.0	152.0							
591.0	153.0	R-28	100% (100%)	FD0		149.5-220.6 ft SHALE, moderately hard, fresh, dark gray (N3), massive, extremely widely fractured, no reaction to HCl, trace fossils and pyrite		
590.0	154.0							
589.0	155.0							
588.0	156.0							
587.0	157.0	R-29	100% (100%)	FD0		157.15-158 ft Joint, R.D. = 40°, very closely spaced; filling: totally healed, clean calcite, fresh, moderately hard; surface: smooth, planar, fresh; 10 degree, clean to thin, totally calcite healed fracture at 157.95-158.0. Fracture set #F-14.		
586.0	158.0							
585.0	159.0							
DATE STARTED: 5/23/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

REV 1 Final Boring B-418

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 339853.39 ft E. 2405203.43 ft GROUND SURFACE ELEVATION: 744.02 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
583.0	161.0	R-29	100% (100%)	FD0		149.5-220.6 ft SHALE, moderately hard, fresh, dark gray (N3), massive, extremely widely fractured, no reaction to HCl, trace fossils and pyrite		
582.0	162.0							
581.0	163.0							
580.0	164.0							
579.0	165.0	R-30	100% (100%)	FD0		164.6-164.65 ft Joint, R.D. = 15°; filling: totally healed, very thin calcite, fresh, moderately hard; surface: slightly rough, undulating, fresh. Fracture set #F-15.		
578.0	166.0							
577.0	167.0							
576.0	168.0							
575.0	169.0	R-31	100% (100%)	FD0				
574.0	170.0							
573.0	171.0							
572.0	172.0							
571.0	173.0	R-32	100% (100%)	FD0				
570.0	174.0							
569.0	175.0							
568.0	176.0							
567.0	177.0	R-33		FD0				
566.0	178.0							
565.0	179.0							
DATE STARTED: 5/23/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		
						DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931		

REV 1 Final Boring B-418

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS		
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE				
GROUND SURFACE ELEVATION: 744.02 ft						DESCRIPTION			
149.5-220.6 ft SHALE, moderately hard, fresh, dark gray (N3), massive, extremely widely fractured, no reaction to HCl, trace fossils and pyrite									
563.0	181.0	R-33	100% (100%)	FD0					
562.0	182.0								
561.0	183.0								
560.0	184.0								
559.0	185.0	R-34	100% (100%)	FD0					
558.0	186.0								
557.0	187.0								
556.0	188.0								
555.0	189.0	R-35	100% (100%)	FD0					
554.0	190.0								
553.0	191.0								
552.0	192.0								
551.0	193.0	R-36	100% (100%)	FD0					
550.0	194.0								
549.0	195.0								
548.0	196.0								
547.0	197.0	R-37		FD0					
546.0	198.0								
545.0	199.0								
DATE STARTED: 5/23/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione				DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon				NOTES:	
APPROVED BY: Rolando Benitez				DRILLER: J. Williams HELPER(S): R. Hinkle				DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-418

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339853.39 ft E. 2405203.43 ft GROUND SURFACE ELEVATION: 744.02 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
543.0	201.0	R-37	100% (100%)	FD0		149.5-220.6 ft SHALE, moderately hard, fresh, dark gray (N3), massive, extremely widely fractured, no reaction to HCl, trace fossils and pyrite	
542.0	202.0						
541.0	203.0						
540.0	204.0						
539.0	205.0	R-38	100% (100%)	FD0			
538.0	206.0						
537.0	207.0						
536.0	208.0						
535.0	209.0	R-39	100% (100%)	FD0			
534.0	210.0						
533.0	211.0						
532.0	212.0						
531.0	213.0	R-40	100% (100%)	FD0			
530.0	214.0						
529.0	215.0						
528.0	216.0						
527.0	217.0	R-41		FD0			
526.0	218.0						
525.0	219.0						
DATE STARTED: 5/23/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione				DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez				DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-418							PROJECT NO. 10-4310	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339853.39 ft E. 2405203.43 ft GROUND SURFACE ELEVATION: 744.02 ft		
		R-41	100% (100%)	FD0		DESCRIPTION		
						---- Bottom of Boring at 220.60 ft.----		
DATE STARTED: 5/23/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-419

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW(SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339860.44 ft E. 2405278.15 ft GROUND SURFACE ELEVATION: 748.14 ft		
						DESCRIPTION		
748.0		S-1	2-2-5 (7) 80%			0.0-0.25 ft Silt with gravel, (ml), 95% fines, non plastic, low dry strength, no dilatancy, no toughness; 5% gravel, fine to medium, subrounded, hard hardness; maximum grain size = 0.5 inches, dusky yellowish brown (10YR 2/2), organic odor, moist, no HCl reaction, with roots	ml	
747.0	1.0							
746.0	2.0	S-2	8-10-12 (22) 83%			0.25-5.1 ft Silt with gravel, (ml), 75% fines, non plastic, medium dry strength, no dilatancy, no toughness; 15% gravel; 10% sand, fine, subangular; maximum grain size = 1.5 inches, moderate brown (5YR 4/4), no odor, moist, no HCl reaction, some roots, with rock fragments, dense to very dense	ml	
745.0	3.0							
744.0	4.0	S-3	25-35-27 (62) 80%					
743.0	5.0	S-4	5-22-24 (46) 90%					
742.0	6.0	S-5	9-50/5 78%			5.1-6.9 ft Poorly graded sand with gravel, (sp), 80% sand, fine to medium, subrounded, hard hardness; 15% gravel, medium, subangular, flat and elongated, hard hardness; 5% fines, non plastic, no dry strength, no dilatancy, no toughness; maximum grain size = 1.0 inches, moderate brown (5YR 4/4) to moderate brown (5YR 3/4), no odor, moist, no HCl reaction, low plasticity, some rock fragments, little roots	sp	
741.0	7.0					6.9-7.5 ft Interval not sampled		
740.0	8.0	S-6	16-23-25 (48) 100%			7.5-9.5 ft Silty gravel with sand, (gm), 40% gravel, fine to coarse, angular, elongated, hard hardness; 40% fines, non plastic, no dry strength, no dilatancy, no toughness; 20% sand, fine to medium, subangular; moderate brown (5YR 4/4) to moderate brown (5YR 3/4), no odor, moist, no HCl reaction, with rock fragments, some coal	gm	
739.0	9.0							
738.0	10.0	S-7	13-9-20 (29) 100%			9.5-12.0 ft Sandy silt with gravel, (ml), 60% fines, non plastic, medium dry strength, no dilatancy, low toughness; 25% sand, fine, subangular, hard hardness; 15% gravel, fine to medium, angular, hard hardness; maximum grain size = 1.0 inches, moderate brown (5YR 4/4), no odor, moist, no HCl reaction, some rock fragments, some coal	ml	
737.0	11.0	S-8	11-13-13 (26) 80%					
736.0	12.0							
735.0	13.0	S-9	11-12-50/5 68%			12.0-13.4 ft Clayey sand with gravel, (sc), about 5% cobbles, subangular; 50% sand, fine to coarse, subangular; 30% gravel, fine to coarse, subangular, very hard hardness; 20% fines, high plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.5 inches	sc	
734.0	14.0	S-10	21-20-16 (36) 83%			13.4-13.5 ft Interval not sampled	sw	
733.0	15.0					13.5-14.3 ft Well graded sand, (sw), 85% sand, fine to medium, subangular, hard hardness; 10% gravel, medium, angular, flat, hard hardness; 5% fines, non plastic, no dry strength, no dilatancy; maximum grain size = 0.5 inches, dark yellowish brown (10YR 4/2), no odor, wet, no HCl reaction, lensed, some rock fragments	ml	
732.0	16.0	S-11	19-24-34 (58) 40%			14.3-16.5 ft Sandy silt with gravel, (ml), 50% fines, low plasticity, medium dry strength, no dilatancy, low toughness; 30% sand, fine to medium, angular, hard hardness; 20% gravel, fine, angular, hard hardness; moderate brown (5YR 4/4), no odor, moist, no HCl reaction	sm	
731.0	17.0	S-12	5-10-23 (33) 70%			16.5-18.0 ft Silty sand with gravel, (sm), 60% sand; 20% gravel; 20% fines; maximum grain size = 1.5 inches, dusky yellowish brown (10YR 2/2), sandstone boulders	sm	
730.0	18.0							
729.0	19.0	S-13	9-20-33 (53) 67%			18.0-19.8 ft Silty sand with gravel, (sm), 50% sand, fine to coarse, subangular, medium hard hardness; 30% fines, low plasticity, high dry strength, no dilatancy, low toughness; 20% gravel, fine to coarse, angular, elongated, hard hardness; maximum grain size = 1.5 inches, dark yellowish	sm	
		S-14						
DATE STARTED: 5/24/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): B. Terral	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-419

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 339860.44 ft E. 2405278.15 ft								
GROUND SURFACE ELEVATION: 748.14 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
728.0		S-14	20-23-35 (58) 93%			orange (10YR 6/6), no odor, moist, no HCl reaction, with rock fragments 19.8-23.25 ft SHALE, clayey, soft to very soft, very intensely weathered to decomposed, clay sized particles, dusky yellow (5Y 6/4) with light olive gray (5Y 5/2), no odor, no reaction to HCl, iron oxide staining		
727.0	21.0							
726.0	22.0	S-15	10-20-23 (43) 67%					
725.0	23.0	S-16	6-45-50/3 72%					
						23.25-23.75 ft Interval not sampled		
724.0	24.0					23.75-28.2 ft SHALE, clayey, moderately soft, very intensely weathered, light olive gray (5Y 5/2) and grayish olive green (5GY 3/2), moderately to thinly bedded, no odor, very closely to closely fractured, no reaction to HCl, no staining		
723.0	25.0	R-1	82% (0%)	FD7				
722.0	26.0					23.75-34.25 ft R.D. = 5- -85°, very closely to moderately spaced, neither ends visible, moderately open; filling: not healed, clean iron oxide staining, moderately to very intensely weathered; surface: moderately rough, moderately weathered; very thin to moderately thin clay, very soft.		
721.0	27.0			FD6				
720.0	28.0					28.2-33.2 ft SHALE, clayey, moderately soft to soft, moderately to intensely weathered, light olive (10Y 5/4) and dark gray (N3), thinly to moderately bedded, no odor, closely to moderately fractured, no reaction to HCl, no staining		
719.0	29.0	R-2	95% (13%)	FD5				
718.0	30.0							
717.0	31.0							
716.0	32.0					33.2-39.4 ft SHALE, clayey, soft to moderately soft, intensely to very intensely weathered, dusky yellow (5Y 6/4) with dark gray (N3), moderately bedded, no odor, closely fractured, no reaction to HCl, no staining		
715.0	33.0							
714.0	34.0	R-3	95% (0%)			34.4-43.75 ft R.D. = 6-81°, very closely to moderately spaced, neither ends visible, moderately open; filling: not healed, clean iron oxide staining, moderately to intensely weathered; surface: rough, moderately weathered; very thin clay, very soft.		
713.0	35.0							
712.0	36.0				FD6			
711.0	37.0							
710.0	38.0	R-4	93% (14%)					
709.0	39.0							
DATE STARTED: 5/24/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): B. Terral		
						DRILL RIG: CME-55 (Truck) HAMMER ID: 955		

REV 1 Final Boring B-419

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339860.44 ft E. 2405278.15 ft GROUND SURFACE ELEVATION: 748.14 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
708.0		R-4	93% (14%)	FD6		39.4-48.25 ft SHALE, clayey, soft to moderately hard, moderately to very intensely weathered, dusky yellow (5Y 6/4) and dark gray (N3), thinly bedded, no odor, closely fractured, no reaction to HCl, no staining	
707.0	41.0						
706.0	42.0	R-5	84% (22%)	FD6		45.4-74.4 ft R.D. = 5-88°, very closely to widely spaced, slightly open; filling: not healed, clean iron oxide, fresh to moderately weathered; surface: rough, fresh; very thin clay.	
705.0	43.0						
704.0	44.0	R-6	70% (7%)	FD5		48.25-53.4 ft SHALE, moderately hard, slightly weathered, medium dark gray (N4) to dark gray (N3), thinly to moderately bedded, no odor, closely fractured, no staining, with fossiliferous layers	
703.0	45.0						
702.0	46.0	R-7	98% (78%)	FD3		53.4-105.25 ft SHALE, moderately hard, fresh, dark gray (N3), thickly to massive bedded, no odor, widely fractured, no reaction to HCl, no staining, with fossiliferous zones	
701.0	47.0						
700.0	48.0	R-8	96% (94%)	FD3			
699.0	49.0						
698.0	50.0						
697.0	51.0						
696.0	52.0						
695.0	53.0						
694.0	54.0						
693.0	55.0						
692.0	56.0						
691.0	57.0						
690.0	58.0						
689.0	59.0						
DATE STARTED: 5/24/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): B. Terral	DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-419

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339860.44 ft E. 2405278.15 ft GROUND SURFACE ELEVATION: 748.14 ft		
						DESCRIPTION		
688.0		R-8	96% (94%)			53.4-105.25 ft SHALE, moderately hard, fresh, dark gray (N3), thickly to massive bedded, no odor, widely fractured, no reaction to HCl, no staining, with fossiliferous zones		
687.0	61.0							
686.0	62.0							
685.0	63.0							
684.0	64.0	R-9	100% (90%)					
683.0	65.0							
682.0	66.0							
681.0	67.0							
680.0	68.0							
679.0	69.0	R-10	98% (64%)					
678.0	70.0							
677.0	71.0							
676.0	72.0					75.5-96.35 ft R.D. = 12-58°, very closely to widely spaced, neither ends visible, moderately open; filling: not healed, clean iron oxide staining, fresh to slightly weathered; surface: smooth, fresh; very thin calcite, fresh, moderately hard.		
675.0	73.0							
674.0	74.0	R-11	100% (100%)					
673.0	75.0							
672.0	76.0							
671.0	77.0							
670.0	78.0	R-12	95% (91%)					
669.0	79.0							
DATE STARTED: 5/24/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): B. Terral	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-419

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339860.44 ft E. 2405278.15 ft GROUND SURFACE ELEVATION: 748.14 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
668.0		R-12	95% (91%)	FD3		53.4-105.25 ft SHALE, moderately hard, fresh, dark gray (N3), thickly to massive bedded, no odor, widely fractured, no reaction to HCl, no staining, with fossiliferous zones	
667.0	81.0						
666.0	82.0						
665.0	83.0						
664.0	84.0						
663.0	85.0						
662.0	86.0						
661.0	87.0						
660.0	88.0						
659.0	89.0						
658.0	90.0						
657.0	91.0						
656.0	92.0						
655.0	93.0						
654.0	94.0						
653.0	95.0						
652.0	96.0						
651.0	97.0						
650.0	98.0						
649.0	99.0						
99.4-100.2 ft Joint, R.D. = 42-44°, very closely spaced, neither ends visible,							
DATE STARTED: 5/24/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione						NOTES:	
APPROVED BY: Rolando Benitez						DRILL RIG: CME-55 (Truck) HAMMER ID: 955	
DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon							
DRILLER: C. VanVactor HELPER(S): B. Terral							

REV 1 Final Boring B-419

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						<p>N. 339860.44 ft E. 2405278.15 ft</p> <p>GROUND SURFACE ELEVATION: 748.14 ft</p>		
648.0		R-16	89% (48%)			<p>tight; dry and tight or filled, water flow not possible, filling: totally healed, clean, slightly weathered; surface: slightly rough, slightly weathered.</p> <p>Fracture set #3.</p> <p>53.4-105.25 ft SHALE, moderately hard, fresh, dark gray (N3), thickly to massive bedded, no odor, widely fractured, no reaction to HCl, no staining, with fossiliferous zones</p> <p>100.3-106.24 ft R.D. = 14-59°, very closely to widely spaced, neither ends visible; filling: not healed, iron oxide staining, slightly to moderately weathered; surface: rough, slightly weathered.</p>		
647.0	101.0			FD4				
646.0	102.0	R-17	76% (39%)					
645.0	103.0			FD6				
644.0	104.0	R-18	100% (91%)					
643.0	105.0			FD4				
642.0	106.0							
641.0	107.0							
640.0	108.0							
						<p>---- Bottom of Boring at 108.60 ft.----</p>		
<p>DATE STARTED: 5/24/10</p> <p>DATE FINISHED: 5/26/10</p> <p>FIELD GEOLOGIST: Adam Meyer</p> <p>CHECKED BY: Adrianna Semione</p>						<p>DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ</p> <p>DRILLING CO. Terracon</p>	NOTES:	
<p>APPROVED BY: Rolando Benitez</p>						<p>DRILLER: C. VanVactor</p> <p>HELPER(S): B. Terral</p>	<p>DRILL RIG: CME-55 (Truck)</p> <p>HAMMER ID: 955</p>	

REV 1 Final Boring B-420

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW(SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340403.18 ft E. 2405150.67 ft GROUND SURFACE ELEVATION: 778.81 ft		
						DESCRIPTION		
778.0	1.0	S-1	1-3-4 (7) 60%			0.0-1.5 ft Clayey sand, (sc), 80% sand, fine to medium, subrounded, soft hardness; 15% fines, low plasticity, low toughness; 5% gravel, medium, subangular, elongated, medium hardness; maximum grain size = 0.3 inches, moderate brown (5YR 4/4), moist, medium dense	sc	All particles derived from intensely weathered shale
777.0	2.0					1.5-2.5 ft Interval not sampled		
776.0	3.0	S-2	6-10-10 (20) 67%			2.5-4.0 ft Poorly graded sand with clay and gravel, (sp-sc), 50% sand, fine to medium, subrounded, soft hardness; 40% gravel, medium, subangular, flat and elongated, medium hardness; 10% fines, low plasticity, low toughness; maximum grain size = 0.5 inches, moderate brown (5YR 4/4), moist, medium dense	sp-sc	
775.0	4.0					4.0-5.0 ft Interval not sampled		
774.0	5.0							
773.0	6.0	S-3	4-4-5 (9) 93%			5.0-6.5 ft Poorly graded sand with clay and gravel, (sp-sc), 50% sand, fine to medium, subrounded, soft hardness; 40% gravel, medium, subangular, flat and elongated, medium hardness; 10% fines, low plasticity, low toughness; maximum grain size = 0.5 inches, moderate brown (5YR 4/4), moist, medium dense	sp-sc	
772.0	7.0					6.5-7.5 ft Interval not sampled		
771.0	8.0	S-4	3-5-10 (15) 67%			7.5-9.0 ft Silty gravel with sand, (gm), 50% gravel, fine to medium, subangular, soft hardness; 30% sand, fine, subangular, soft hardness; 20% fines, low plasticity, low toughness; maximum grain size = 1.0 inches, dusky brown (5YR 2/2), dry, medium dense	gm	
770.0	9.0					9.0-10.0 ft Interval not sampled		
769.0	10.0							
768.0	11.0	S-5	16-31-31 (62) 87%			10.0-11.5 ft Silty gravel with sand, (gm), 55% gravel, fine, subrounded, very soft hardness; 25% sand, fine to medium, very soft hardness; 20% fines, medium plasticity, low toughness; maximum grain size = 0.5 inches, pale yellowish brown (10YR 6/2), dry, loose	gm	
767.0	12.0					11.5-12.5 ft Interval not sampled		
766.0	13.0	S-6	14-18-50/4 100%			12.5-13.83 ft Silty gravel with sand, (gm), 55% gravel, fine, subrounded, very soft hardness; 25% sand, fine to medium, very soft hardness; 20% fines, medium plasticity, low toughness; maximum grain size = 0.5 inches, pale yellowish brown (10YR 6/2), dry, loose	gm	
765.0	14.0					13.83-15.0 ft Interval not sampled		
764.0	15.0	S-7	50 100%			15.0-15.5 ft Silty gravel with sand, (gm), 55% gravel, fine, subrounded, very soft hardness; 25% sand, fine to medium, very soft hardness; 20% fines, medium plasticity, low toughness; maximum grain size = 0.5 inches, pale yellowish brown (10YR 6/2), dry, loose	gm	
763.0	16.0					15.5-15.6 ft Interval not sampled		
762.0	17.0							
761.0	18.0	R-1	100% (15%)	FD6		15.6-19.6 ft SHALE, inclined, moderately soft, moderately weathered, dark gray (N3) and yellowish gray (5Y 7/2), closely to moderately fractured, no reaction to HCl		
760.0	19.0					15.6-19.6 ft Joint, R.D. = 30°, very closely to moderately spaced; filling: not healed, intensely weathered; surface: slightly rough, intensely weathered; iron oxide staining in the fractures. Fracture set #F-1.		
759.0		R-2				19.6-29.6 ft Joint, R.D. = 38°, closely to moderately spaced; filling: not		
DATE STARTED: 5/5/10 DATE FINISHED: 5/7/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-420

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 340403.18 ft E. 2405150.67 ft GROUND SURFACE ELEVATION: 778.81 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
758.0	21.0	R-2	84% (0%)			healed, intensely weathered; surface: slightly rough, intensely weathered; iron oxide staining in the fracture. Fracture set #F-2.		
757.0	22.0							
756.0	23.0							
755.0	24.0							
754.0	25.0	R-3	88% (24%)	FD6		19.6-24.6 ft SHALE, inclined, moderately soft, moderately weathered, dark gray (N3) and yellowish gray (5Y 7/2), closely to moderately fractured, no reaction to HCl		
753.0	26.0					24.6-29.6 ft SHALE, horizontal, moderately hard, moderately weathered, dark gray (N3) and yellowish gray (5Y 7/2), closely to moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding angle		
752.0	27.0							
751.0	28.0							
750.0	29.0	R-4	86% (0%)			29.6-34.6 ft SHALE, horizontal, moderately hard, moderately weathered, dark gray (N3) and yellowish gray (5Y 7/2), very closely to moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding angle		
749.0	30.0					29.6-34.6 ft Joint, R.D. = 29°, moderately spaced; filling: not healed, moderately thin clay, intensely weathered, very soft; surface: slightly rough, intensely weathered. Fracture set #F-3.		
748.0	31.0							
747.0	32.0							
746.0	33.0	R-5	92% (0%)	FD6		34.6-39.6 ft SHALE, horizontal, moderately hard, moderately weathered, dark gray (N3) and yellowish gray (5Y 7/2), very closely to moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding angle, quartz crystals in clay filled fracture at 35.5 ft		
745.0	34.0					34.6-39.6 ft Joint, R.D. = 40°, closely to widely spaced; filling: not healed, moderately thin clay, intensely weathered, very soft; surface: slightly rough, intensely weathered; fractures also contains quartz crystals. Fracture set #F-4.		
744.0	35.0					35.8-38.6 ft Joint, R.D. = 88°, very closely to closely spaced; filling: not healed, moderately thin clay, moderately weathered, very soft; surface: slightly rough, moderately weathered; quartz crystals in clay filled the fractures. Fracture set #F-5.		
743.0	36.0							
742.0	37.0	R-6				39.6-44.6 ft Joint, R.D. = 88°, very widely spaced; filling: very intensely		
741.0	38.0							
740.0	39.0							
739.0								
DATE STARTED: 5/5/10 DATE FINISHED: 5/7/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		
						DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931		

REV 1 Final Boring B-420

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW(SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS		
		N. 340403.18 ft E. 2405150.67 ft GROUND SURFACE ELEVATION: 778.81 ft										
						DESCRIPTION						
738.0	41.0	R-6	64% (0%)		FD6		weathered; surface: moderately rough, very intensely weathered; very intensely fractured and broken, iron oxide staining throughout. Fracture set #F-6.					
737.0	42.0											
736.0	43.0											
735.0	44.0											
734.0	45.0	R-7	92% (24%)		FD6		39.6-44.6 ft SHALE, horizontal, moderately hard, intensely weathered, dark gray (N3) and yellowish gray (5Y 7/2), very closely to closely fractured, no reaction to HCl, iron oxide staining, 10° bedding angle					
733.0	46.0						44.6-49.6 ft SHALE, horizontal, moderately hard, moderately weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding plane					
732.0	47.0						44.6-59.6 ft Joint, R.D. = 7°, very closely to moderately spaced; filling: not healed, very thin clay, intensely weathered, very soft; surface: slightly rough, intensely weathered; fracture filling has bedded quartz crystals. Fracture set #F-7.					
731.0	48.0						45.9-48.9 ft Joint, R.D. = 50°, closely spaced; filling: not healed, very thin clay, intensely weathered, very soft; surface: slightly rough, intensely weathered; quartz crystals inbedded in the filling. Fracture set #F-8.					
730.0	49.0	R-8	100% (24%)				49.6-54.6 ft SHALE, horizontal, moderately hard, moderately weathered, dark gray (N3) and pale yellowish brown (10YR 6/2), moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding plane					
729.0	50.0						49.6-54.6 ft Joint, R.D. = 7°, closely to moderately spaced; filling: not healed, very thin gypsum, slightly weathered, very soft; surface: slightly rough, slightly weathered. Fracture set #F-9.					
728.0	51.0						50.1-54.5 ft Joint, R.D. = 88°, closely to moderately spaced; filling: not healed, very thin clay, slightly weathered, very soft; surface: slightly rough, slightly weathered. Fracture set #F-9.					
727.0	52.0						54.6-64.6 ft SHALE, horizontal, moderately hard, moderately weathered, dark gray (N3) and pale yellowish brown (10YR 6/2), closely to moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding plane					
726.0	53.0	R-9	100% (23%)		FD5							
725.0	54.0											
724.0	55.0											
723.0	56.0											
722.0	57.0											
721.0	58.0											
720.0	59.0											
719.0												
DATE STARTED: 5/5/10 DATE FINISHED: 5/7/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon			NOTES:			
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle			DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931			

REV 1 Final Boring B-420

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS					
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE							
GROUND SURFACE ELEVATION: 778.81 ft						DESCRIPTION						
718.0	61.0	R-9	100% (23%)	FD5		54.6-64.6 ft SHALE, horizontal, moderately hard, moderately weathered, dark gray (N3) and pale yellowish brown (10YR 6/2), closely to moderately fractured, no reaction to HCl, iron oxide staining, 10° bedding plane	SC-1, 63.2-64.05 ft., 08:30, 05/07/10					
717.0	62.0											
716.0	63.0											
715.0	64.0											
714.0	65.0											
713.0	66.0	R-10	100% (77%)	FD3		64.6-74.6 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), closely to widely fractured, no reaction to HCl, iron oxide staining						
712.0	67.0											
711.0	68.0											
710.0	69.0											
709.0	70.0					68.8-70.1 ft Joint, R.D. = 7°; filling: totally healed, calcite, slightly weathered, moderately soft; surface: slightly weathered. Fracture set #F-11.						
708.0	71.0	R-11	100% (100%)	FD0		74.6-84.6 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), widely to extremely widely fractured, no reaction to HCl, fossilized shell fragments throughout, 10° bedding plane		75.6-84.6 ft. Rock becomes freshly weathered				
707.0	72.0											
706.0	73.0											
705.0	74.0											
704.0	75.0											
703.0	76.0					76.8-76.9 ft Joint, R.D. = 22°, moderately spaced; filling: not healed, intensely weathered; surface: smooth, planar, intensely weathered; fracture is intensely weathered with iron oxide staining. Fracture set #F-10.						
702.0	77.0											
701.0	78.0											
700.0	79.0											
699.0												
DATE STARTED: 5/5/10 DATE FINISHED: 5/7/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:					
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931					

REV 1 Final Boring B-420

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS			
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE					
GROUND SURFACE ELEVATION: 778.81 ft						DESCRIPTION				
698.0	81.0	R-11	100% (100%)			74.6-84.6 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), widely to extremely widely fractured, no reaction to HCl, fossilized shell fragments throughout, 10° bedding plane				
697.0	82.0									
696.0	83.0									
695.0	84.0									
694.0	85.0									
693.0	86.0			FDO	84.6-94.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, fossilized shell fragments, 10° bedding plane					
692.0	87.0									
691.0	88.0									
690.0	89.0									
689.0	90.0									
688.0	91.0	R-12	100% (100%)							
687.0	92.0									
686.0	93.0									
685.0	94.0									
684.0	95.0									
683.0	96.0			FDO		94.6-104.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, fossilized shell fragments throughout, 10° bedding plane				
682.0	97.0									
681.0	98.0									
680.0	99.0									
679.0										
DATE STARTED: 5/5/10 DATE FINISHED: 5/7/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky							DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon			NOTES:
APPROVED BY: Rolando Benitez							DRILLER: J. Williams HELPER(S): R. Hinkle			DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931




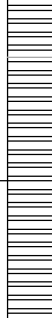
REV 1 Final Boring B-420

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 778.81 ft						DESCRIPTION		
DESCRIPTION								
678.0	101.0	R-13	100% (100%)	FD0		94.6-104.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, fossilized shell fragments throughout, 10° bedding plane		
677.0	102.0							
676.0	103.0							
675.0	104.0							
674.0	105.0							
673.0	106.0	R-14	100% (100%)	FD0		104.6-114.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, horizontal calcite laminae throughout, 10° bedding plane		
672.0	107.0							
671.0	108.0							
670.0	109.0							
669.0	110.0							
668.0	111.0	R-15	100% (100%)	FD0		114.6-124.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, fossilized shell fragments throughout, pyrite at 116.5ft., 10° bedding plane		
667.0	112.0							
666.0	113.0							
665.0	114.0							
664.0	115.0							
663.0	116.0							
662.0	117.0							
661.0	118.0							
660.0	119.0							
659.0								
DATE STARTED: 5/5/10 DATE FINISHED: 5/7/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

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PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 778.81 ft						DESCRIPTION	
DESCRIPTION							
658.0	121.0	R-15	100% (100%)	FD0		114.6-124.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, fossilized shell fragments throughout, pyrite at 116.5ft., 10° bedding plane	
657.0	122.0						
656.0	123.0						
655.0	124.0						
654.0	125.0						
653.0	126.0	R-16	100% (100%)	FD0		124.6-134.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, fossilized shell fragments throughout, 10 ° bedding plane	
652.0	127.0						
651.0	128.0						
650.0	129.0						
649.0	130.0						
648.0	131.0	R-17	100% (100%)	FD0			
647.0	132.0						
646.0	133.0						
645.0	134.0						
644.0	135.0						
643.0	136.0					134.6-144.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, 10 ° bedding plane	
642.0	137.0						
641.0	138.0						
640.0	139.0						
639.0							
DATE STARTED: 5/5/10 DATE FINISHED: 5/7/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

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PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 340403.18 ft E. 2405150.67 ft GROUND SURFACE ELEVATION: 778.81 ft										
DESCRIPTION										
638.0 141.0		R-17	100% (100%)	FD0	134.6-144.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, 10 ° bedding plane					
637.0 142.0										
636.0 143.0										
635.0 144.0										
634.0 145.0										
633.0 146.0		R-18	100% (100%)	FD0	144.6-154.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, 10° bedding plane, few fossilized shells at 145.1 ft					
632.0 147.0										
631.0 148.0										
630.0 149.0										
629.0 150.0										
628.0 151.0		R-19	100% (100%)	FD0	154.6-164.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, 10° bedding plane, fossilized shells throughout					
627.0 152.0										
626.0 153.0										
625.0 154.0										
624.0 155.0										
623.0 156.0										
622.0 157.0										
621.0 158.0										
620.0 159.0										
619.0										
DATE STARTED: 5/5/10 DATE FINISHED: 5/7/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky					DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon				NOTES:	
APPROVED BY: Rolando Benitez					DRILLER: J. Williams HELPER(S): R. Hinkle				DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-420

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 778.81 ft						DESCRIPTION	
DESCRIPTION							
618.0	161.0	R-19	100% (100%)	FD0		154.6-164.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, 10° bedding plane, fossilized shells throughout	
617.0	162.0						
616.0	163.0						
615.0	164.0						
614.0	165.0						
613.0	166.0		100% (100%)	FD0		164.6-174.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, 10° bedding plane, trace pyrite at 165.1 ft, and a nodule (0.5 inches) of calcite at 165.41 ft	
612.0	167.0						
611.0	168.0						
610.0	169.0						
609.0	170.0						
608.0	171.0	R-20					
607.0	172.0						
606.0	173.0						
605.0	174.0						
604.0	175.0						
603.0	176.0	R-21	100% (100%)				
602.0	177.0						
601.0	178.0						
600.0	179.0						
599.0							
DATE STARTED: 5/5/10 DATE FINISHED: 5/7/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	
						NOTES:	
						DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	


REV 1 Final Boring B-420

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 778.81 ft						DESCRIPTION	
DESCRIPTION							
598.0	181.0	R-21	100% (100%)			174.6-184.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, 10° bedding plane	SC-2. 186.1-186.85 ft.,13:50, 05/07/10
597.0	182.0						
596.0	183.0						
595.0	184.0						
594.0	185.0						
593.0	186.0			FD0		184.6-194.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, 10° bedding plane	
592.0	187.0						
591.0	188.0						
590.0	189.0						
589.0	190.0						
588.0	191.0	R-22	100% (100%)				
587.0	192.0						
586.0	193.0						
585.0	194.0						
584.0	195.0						
583.0	196.0					194.6-204.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, 10° bedding plane	
582.0	197.0						
581.0	198.0						
580.0	199.0						
579.0							
		R-23	100% (100%)	FD0		196.43-196.47 ft Joint, R.D. = 13°; filling: totally healed, moderately thick calcite, fresh, moderately soft; surface: fresh. Fracture set #F-12.	
DATE STARTED: 5/5/10 DATE FINISHED: 5/7/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

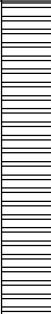
REV 1 Final Boring B-420

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 778.81 ft						DESCRIPTION	
DESCRIPTION							
578.0	201.0	R-23	100% (100%)	FD0		194.6-204.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, 10° bedding plane	
577.0	202.0						
576.0	203.0						
575.0	204.0						
574.0	205.0						
573.0	206.0	R-24	100% (100%)	FD0	202.99-203 ft Joint, R.D. = 13°; filling: totally healed, moderately thin calcite, fresh, moderately soft; surface: fresh. Fracture set #F-13.		
572.0	207.0						
571.0	208.0						
570.0	209.0						
569.0	210.0						
568.0	211.0	R-25	100% (100%)	FD0	204.6-214.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, 10° bedding plane		
567.0	212.0						
566.0	213.0						
565.0	214.0						
564.0	215.0						
563.0	216.0				214.6-224.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, 10° bedding plane		
562.0	217.0						
561.0	218.0						
560.0	219.0						
559.0							
DATE STARTED: 5/5/10 DATE FINISHED: 5/7/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	
						NOTES:	
						DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-420

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ftin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 778.81 ft						DESCRIPTION	
DESCRIPTION							
558.0 221.0		R-25	100% (100%)	FD0		214.6-224.6 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, 10° bedding plane	
557.0 222.0							
556.0 223.0							
555.0 224.0							
---- Bottom of Boring at 224.60 ft.----							
DATE STARTED: 5/5/10 DATE FINISHED: 5/7/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931






REV 1 Final Boring B-421

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 340410.50 ft E. 2405228.92 ft								
GROUND SURFACE ELEVATION: 783.85 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
783.0	1.0	S-1	1-4-6 (10) 93%			0.0-0.35 ft Well graded sand with clay, (sw-sc), 90% sand, fine to coarse, subangular, hard hardness; 10% fines, non plastic, no dry strength, no dilatancy, no toughness; 0% gravel; dark yellowish orange (10YR 6/6) and dark gray (N3), dry, no HCl reaction, medium stiff	sw-sc cl-mf gm	
782.0	2.0	S-2	6-11-17 (28) 73%			0.35-0.5 ft Lean clay with sand/silt with sand, (cl-ml), 80% fines, low plasticity, no dry strength, no dilatancy, low toughness; 10% gravel, fine to medium, subangular; 10% sand, fine; dark yellowish brown (10YR 4/2), dry, no HCl reaction, medium stiff, with organics	gm	
781.0	3.0	S-3	4-8-12 (20) 93%			0.5-1.5 ft Silty gravel, (gm), 50% gravel, fine to coarse, subangular, hard hardness; 40% fines, low plasticity, no dry strength, no dilatancy, low toughness; 10% sand, fine to coarse, subangular, hard hardness; moderate yellowish brown (10YR 5/4), moist, no HCl reaction, loose	gm	
780.0	4.0					1.5-3.0 ft Silty gravel, (gm), 50% fines, medium plasticity, no dry strength, no dilatancy, low toughness; 40% gravel, fine to coarse, subangular, hard hardness; 10% sand, fine to coarse, subangular, hard hardness; moderate yellowish brown (10YR 5/4), moist, no HCl reaction, medium dense	ml/mh	
779.0	5.0	S-4	11-13-10 (23) 7%			3.0-4.5 ft Silty gravel, (gm), 50% fines, high plasticity, low toughness; 40% gravel, fine to coarse, subangular, hard hardness; 10% sand, fine to coarse, subangular, hard hardness; moderate yellowish brown (10YR 5/4), moist, no HCl reaction, medium dense, trace roots		
778.0	6.0	S-5	6-6-5 (11) 47%			4.5-6.0 ft Silt with sand/elastic silt with sand, (ml/mh), 80% fines, high plasticity, low toughness; 10% gravel, fine, subangular, hard hardness; 10% sand, fine, subangular, hard hardness; moderate yellowish brown (10YR 5/4), moist, no HCl reaction, very stiff		
777.0	7.0					6.0-14.3 ft SHALE, very soft to hard, decomposed, moderate yellowish brown (10YR 5/4) with medium dark gray (N4), no reaction to HCl, dry to moist, iron oxide staining, thin layers of clay/silt with low toughness and low plasticity		
776.0	8.0	S-6	3-3-4 (7) 100%					
775.0	9.0	S-7	5-9-11 (20) 80%					
774.0	10.0							
773.0	11.0	S-8	7-8-17 (25) 67%					
772.0	12.0							
771.0	13.0	S-9	8-18-45 (63) 93%					
770.0	14.0	S-10	40-50/4 38%		14.3-15.0 ft Interval not sampled			
769.0	15.0	S-11	50/5		15.0-15.4 ft SHALE, very soft to hard, decomposed, moderate yellowish brown (10YR 5/4) with medium dark gray (N4), no reaction to HCl, dry to moist, iron oxide staining, thin layers of clay/silt with low toughness and low plasticity			
768.0	16.0				15.4-23.2 ft SHALE, soft to moderately hard, intensely weathered, dark yellowish brown (10YR 4/2) with medium dark gray (N4), very closely to moderately fractured, no reaction to HCl, iron oxide staining			
767.0	17.0	R-1	100% (25%)	FD6	15.6-23.7 ft R.D. = 31-36°, very closely to moderately spaced; surface: rough, planar, intensely weathered; iron oxide staining.			
766.0	18.0				16.6-23 ft R.D. = 52-56°, very closely to moderately spaced; surface: rough, planar, intensely weathered; iron oxide staining.			
765.0	19.0	R-2			19.1-19.6 ft R.D. = 62°, closely spaced; surface: rough, planar; iron oxide staining.			
764.0								
DATE STARTED: 5/4/10 DATE FINISHED: 5/5/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 3-7/8" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-421

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 783.85 ft						DESCRIPTION	
DESCRIPTION							
763.0	21.0	R - 2	100% (30%)	FD6		15.4-23.2 ft SHALE, soft to moderately hard, intensely weathered, dark yellowish brown (10YR 4/2) with medium dark gray (N4), very closely to moderately fractured, no reaction to HCl, iron oxide staining	SC-1, 19.8-20.35ft, 5/4/10 1300
762.0	22.0					22.1-22.75 ft R.D. = 10°, moderately spaced; surface: rough, planar, intensely weathered; iron oxide staining.	
761.0	23.0					23.2-31.6 ft SHALE, soft to moderately hard, moderately weathered, medium dark gray (N4) with dark yellowish brown (10YR 4/2), very closely to moderately fractured, no reaction to HCl, iron oxide staining	
760.0	24.0					23.8-31.7 ft R.D. = 52-56°, very closely to moderately spaced; surface: rough, planar; iron oxide staining.	
759.0	25.0	R - 3	92% (10%)	FD6			
758.0	26.0						
757.0	27.0						
756.0	28.0						
755.0	29.0	R - 4	83% (29%)	FD6		30.3-30.4 ft R.D. = 32°; surface: rough, planar.	
754.0	30.0						
753.0	31.0						
752.0	32.0					31.6-33.1 ft SHALE, soft to moderately hard, intensely weathered, dark yellowish brown (10YR 4/2) with medium dark gray (N4), very closely to moderately fractured, no reaction to HCl, iron oxide staining	
751.0	33.0	R - 5	88% (42%)	FD6		31.9-36.1 ft R.D. = 10°, moderately to widely spaced; surface: smooth, planar.	
750.0	34.0					33.1-43.7 ft SHALE, very soft to moderately hard, intensely to very intensely weathered, moderate brown (5YR 4/4) with medium gray (N5), very closely to closely fractured, no reaction to HCl, iron oxide staining	
749.0	35.0					34.4-34.8 ft R.D. = 75°; filling: very thin clay; surface: smooth, planar.	
748.0	36.0					34.8-44.4 ft R.D. = 52-56°, very closely to widely spaced; surface: rough, planar.	
747.0	37.0	R - 6		FD8		36.5-37.5 ft R.D. = 32-36°; surface: rough, planar; iron oxide staining.	
746.0	38.0						
745.0	39.0					37.85-38.25 ft R.D. = 70°; filling: moderately thin clay, slightly weathered; surface: slightly weathered; moderately thin quartz crystals.	
744.0						39.4-44.4 ft Bedding plane separation, R.D. = 10°, very closely to closely	
DATE STARTED: 5/4/10 DATE FINISHED: 5/5/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 3-7/8" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

REV 1 Final Boring B-421

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS		
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE				
GROUND SURFACE ELEVATION: 783.85 ft						DESCRIPTION			
DESCRIPTION									
743.0	41.0	R -6	96% (0%)	FD8		spaced; surface: rough, planar; iron oxide staining.			
742.0	42.0								
741.0	43.0								
740.0	44.0								
739.0	45.0	R -7	100% (18%)			33.1-43.7 ft SHALE, very soft to moderately hard, intensely to very intensely weathered, moderate brown (5YR 4/4) with medium gray (N5), very closely to closely fractured, no reaction to HCl, iron oxide staining			
738.0	46.0					43.7-49.2 ft SHALE, moderately hard, moderately to slightly weathered, medium dark gray (N4) with dark yellowish brown (10YR 4/2), very closely to moderately fractured, no reaction to HCl, iron oxide staining			
737.0	47.0					44.7-47.8 ft Bedding plane separation, R.D. = 10°, very closely to moderately spaced; surface: smooth, planar; trace clay along few bedding planes.			
736.0	48.0					45.2-46.1 ft R.D. = 36°, moderately spaced; filling: partly healed, moderately thin quartz, slightly weathered; surface: rough, planar, slightly weathered; only one of fractures in the interval contains quartz crystals.			
735.0	49.0	R -8	100% (44%)	FD6		47.8-49.2 ft R.D. = 82°, closely spaced; surface: rough, planar, slightly weathered.			
734.0	50.0					49.2-59.4 ft SHALE, moderately hard to hard, slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining			
733.0	51.0					49.2-59.1 ft Bedding plane separation, R.D. = 10°; surface: smooth, planar, slightly weathered; iron oxide staining.			
732.0	52.0					50.2-57.4 ft R.D. = 36°; surface: rough, planar, slightly weathered.			
731.0	53.0	R -9	100% (60%)						
730.0	54.0								
729.0	55.0								
728.0	56.0					55.4-58.4 ft R.D. = 56°, moderately to widely spaced; surface: rough, planar, slightly weathered; iron oxide staining.			
727.0	57.0	R -10		FD5					
726.0	58.0								
725.0	59.0								
724.0						59.5-70 ft Bedding plane separation, R.D. = 10°, very closely to widely			
DATE STARTED: 5/4/10 DATE FINISHED: 5/5/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 3-7/8" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle			
						DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931			

REV 1 Final Boring B-421


PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 783.85 ft						DESCRIPTION	
DESCRIPTION							
723.0	61.0	R -10	100% (54%)	FD5		spaced; filling: totally healed, calcite, slightly weathered; surface: smooth, planar, slightly to slightly weathered; most are defined by calcite laminae, few show no calcite with iron oxide staining.	
722.0	62.0						
721.0	63.0						
720.0	64.0						
719.0	65.0	R -11	100% (62%)	FD6			
718.0	66.0						
717.0	67.0						
716.0	68.0						
715.0	69.0	R -12	100% (74%)	FD4			
714.0	70.0						
713.0	71.0						
712.0	72.0						
711.0	73.0	R -13	100% (100%)	FD1			
710.0	74.0						
709.0	75.0						
708.0	76.0						
707.0	77.0	R -14		FD0			
706.0	78.0						
705.0	79.0						
704.0							
59.6-60.1 ft R.D. = 36°, moderately spaced; surface: rough, planar, slightly weathered; iron oxide staining.							
59.4-70.0 ft SHALE, moderately hard to hard, fresh to slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, zone from 68.1-70.0 ft. shows moderately to slightly weathered zones, presents quartz crystals							
62.3-65.8 ft R.D. = 85°, widely spaced; surface: rough, planar, slightly weathered; iron oxide staining.							
63.2-63.8 ft R.D. = 75°; surface: rough, planar, slightly weathered; iron oxide staining.							
65.2-74 ft R.D. = 56°, widely to very widely spaced; surface: rough, planar.							
70.0-74.4 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to very widely fractured, no reaction to HCl, trace calcite and pyrite replaced shells							
72.9-72.91 ft Bedding plane separation, R.D. = 10°; surface: smooth, planar.							
74.4-89.4 ft SHALE, moderately hard to hard, fresh, dark gray (N3), extremely widely to very widely fractured, weak reaction to HCl, increase in HCl reaction with depth, calcite replaced shell casts, pyrite replacing calcite (secondary)							
77.9-78.6 ft R.D. = 56°; surface: rough, planar.							
DATE STARTED: 5/4/10						NOTES:	
DATE FINISHED: 5/5/10							
FIELD GEOLOGIST: Adrianna Semione							
CHECKED BY: Jennifer Ostrowsky							
APPROVED BY: Rolando Benitez						DRILL RIG: Diedrich D-120 (ATV)	
DRILLER: J. Williams HELPER(S): R. Hinkle							
						HAMMER ID: 931	

REV 1 Final Boring B-421








PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 783.85 ft						DESCRIPTION	
703.0	81.0	R -14	100% (100%)			74.4-89.4 ft SHALE, moderately hard to hard, fresh, dark gray (N3), extremely widely to very widely fractured, weak reaction to HCl, increase in HCl reaction with depth, calcite replaced shell casts, pyrite replacing calcite (secondary)	
702.0	82.0						
701.0	83.0						
700.0	84.0						
699.0	85.0	R -15	100% (100%)	FD0			
698.0	86.0						
697.0	87.0						
696.0	88.0						
695.0	89.0	R -16	100% (100%)	FD1			
694.0	90.0						
693.0	91.0						
692.0	92.0						
691.0	93.0	R -17	100% (100%)	FD0			
690.0	94.0						
689.0	95.0						
688.0	96.0						
687.0	97.0	R -18	100% (100%)	FD0			
686.0	98.0						
685.0	99.0						
684.0							
DATE STARTED: 5/4/10 DATE FINISHED: 5/5/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 3-7/8" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	
						NOTES:	
						DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-421							PROJECT NO. 10-4310	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340410.50 ft E. 2405228.92 ft GROUND SURFACE ELEVATION: 783.85 ft		
DESCRIPTION								
683.6		R-18	100% (100%)	FD1		99.85-101.15 ft R.D. = 56°; surface: rough, planar.		
						---- Bottom of Boring at 100.70 ft.----		
DATE STARTED: 5/4/10 DATE FINISHED: 5/5/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 3-7/8" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

REV 1 Final Boring B-422

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339721.35 ft E. 2405472.52 ft GROUND SURFACE ELEVATION: 724.95 ft		
						DESCRIPTION		
724.0	1.0	S-1	2-4-4 (8) 60%			0.0-1.5 ft Silty sand, (sm), 60% sand, fine; 30% fines, medium plasticity, low toughness; 10% gravel, fine to medium, subangular, elongated, hard hardness; maximum grain size = 0.005 inches, moderate brown (5YR 4/4), dry, loose, homogeneous, fines are silty clay	sm	
723.0	2.0					1.5-2.5 ft Interval not sampled		
722.0	3.0	S-2	14-18-24 (42) 100%			2.5-4.0 ft Silty sand, (sm), 60% sand, fine to medium; 30% fines, medium plasticity, low toughness; 10% gravel, fine to coarse, subangular, flat and elongated, hard hardness; maximum grain size = 0.08 inches, pale brown (5YR 5/2), moist, dense, homogeneous, fines are silty clay, moderate brown (5 YR 4/4)	sm	
721.0	4.0					4.0-5.0 ft Interval not sampled		
720.0	5.0							
719.0	6.0	S-3	17-26-21 (47) 87%			5.0-6.5 ft Poorly graded sand with silt and gravel, (sp-sm), 50% sand, fine to coarse; 40% gravel, fine to medium, subangular, flat and elongated, hard hardness; 10% fines, medium plasticity, low toughness; maximum grain size = 0.5 inches, moderate brown (5YR 4/4) and pale red (10R 6/2), dry, dense	sp-sm	
718.0	7.0					6.5-7.5 ft Interval not sampled		
717.0	8.0	S-4	11-17-25 (42) 100%			7.5-9.0 ft SILTY, CLAYEY GRAVEL WITH SAND, (GC-GM), 49% gravel, fine to coarse, subangular, flat and elongated, hard hardness; 33% sand, fine to coarse; 18% fines, low plasticity, low toughness; maximum grain size = 1.0 inches, light brown (5YR 5/6) and yellowish gray (5Y 7/2), dry, dense	GC-GM	
716.0	9.0					9.0-10.0 ft Interval not sampled		
715.0	10.0							
714.0	11.0	ST-1	93%			10.0-11.5 ft ST-1		10.0-11.5 ft. ST-1, 5000 psi, sample too far down in sampler to describe
713.0	12.0	S-5	10-10-13 (23) 87%			11.5-13.0 ft SILTY, CLAYEY GRAVEL WITH SAND, (GC-GM), 49% gravel, fine to coarse, subangular, flat and elongated, hard hardness; 33% sand, fine to coarse; 18% fines, low plasticity, low toughness; maximum grain size = 1.0 inches, medium gray (N5), dry, dense	GC-GM	
712.0	13.0					13.0-15.0 ft Interval not sampled		Decomposed shale starts at 12.9 ft.
711.0	14.0							
710.0	15.0	S-6	50/5 100%			15.0-15.4 ft Well graded sand, (sw), 70% sand, fine to medium; 20% fines, medium plasticity, low toughness; 10% gravel, fine to medium, subangular, flat and elongated, hard hardness; maximum grain size = 0.08 inches, medium gray (N5) and light brown (5YR 5/6), dry, strong HCl reaction, fines are silty clay, moderate brown (5YR 4/4) and medium brown (5YR 5/6)	sw	
709.0	16.0					15.4-16.0 ft Interval not sampled		
708.0	17.0							
707.0	18.0	R-1	100% (90%)	FD3		16.0-20.5 ft SHALE, moderately hard, intensely weathered, grayish blue (5PB 5/2), moderately fractured, no reaction to HCl, dry, shell fossil at 18.5 ft 16.4-20.5 ft Fracture zone, R.D. = 70°, closely to moderately spaced, both ends visible, slightly open; dry, tight or filled, no flow, filling: not healed, very thin calcite, slightly weathered, moderately hard; surface: rough, slightly weathered. Fracture set #F-1.		
706.0	19.0							
DATE STARTED: 4/8/10 DATE FINISHED: 4/9/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 2-15/16" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-422

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 724.95 ft						DESCRIPTION		
DESCRIPTION								
704.0	21.0	R-1				20.5-30.5 ft SHALE, moderately hard, fresh, grayish blue (5PB 5/2), closely to moderately fractured, no reaction to HCl, iron oxide staining 20.5-20.7 ft Joint, R.D. = 70°, closely to moderately spaced, one end visible, slightly open; dry, filling: very thin, slightly weathered, moderately hard; surface: slightly rough, slightly weathered. Fracture set #F-2.		
703.0	22.0							
702.0	23.0	R-2	100% (88%)					
701.0	24.0			FD3				
700.0	25.0							
699.0	26.0							
698.0	27.0							
697.0	28.0	R-3	95% (87%)					
696.0	29.0							
695.0	30.0							
694.0	31.0							
693.0	32.0			FD3				
692.0	33.0	R-4	100% (86%)			30.5-35.5 ft SHALE, moderately hard, fresh, grayish black (N2), closely to widely fractured, no reaction to HCl, iron oxide staining		
691.0	34.0							
690.0	35.0							
689.0	36.0							
688.0	37.0							
687.0	38.0	R-5	99% (99%)					
686.0	39.0			FD1				
DATE STARTED: 4/8/10 DATE FINISHED: 4/9/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 2-15/16" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665

REV 1 Final Boring B-422

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 339721.35 ft E. 2405472.52 ft GROUND SURFACE ELEVATION: 724.95 ft		
684.0	41.0	R-5						
683.0	42.0			FD1		40.5-50.5 ft SHALE, moderately hard, fresh, grayish black (N2), very widely fractured, no reaction to HCl, iron oxide staining, trace fossils		
682.0	43.0	R-6	96% (96%)					
681.0	44.0							
680.0	45.0							
679.0	46.0							
678.0	47.0							
677.0	48.0	R-7	100% (95%)					
676.0	49.0							
675.0	50.0							
674.0	51.0			FD0		50.5-55.5 ft SHALE, moderately hard, fresh, grayish black (N2), very widely fractured, no reaction to HCl		
673.0	52.0							
672.0	53.0	R-8	100% (100%)					
671.0	54.0							
670.0	55.0							
669.0	56.0					55.5-65.5 ft SHALE, moderately hard, fresh, grayish black (N2), very widely fractured, no reaction to HCl, trace fossils		
668.0	57.0							
667.0	58.0	R-9	100% (100%)					
666.0	59.0							
DATE STARTED: 4/8/10 DATE FINISHED: 4/9/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 2-15/16" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-422

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339721.35 ft E. 2405472.52 ft GROUND SURFACE ELEVATION: 724.95 ft DESCRIPTION		
664.0	61.0	R-9				55.5-65.5 ft SHALE, moderately hard, fresh, grayish black (N2), very widely fractured, no reaction to HCl, trace fossils		
663.0	62.0							
662.0	63.0	R-10	100% (100%)	FD0				
661.0	64.0							
660.0	65.0							
659.0	66.0					65.5-70.5 ft SHALE, moderately hard, fresh, grayish black (N2), very widely fractured, no reaction to HCl, trace fossils, iron oxide in the fracture		
658.0	67.0					66.25-66.26 ft Joint, R.D. = 5°, moderately spaced, one end visible, moderately open; dry, filling: not healed, moderately thin, moderately weathered, moderately hard; surface: slightly rough, undulating, moderately weathered; iron oxide staining in fracture, pitted. Fracture set #F-5.		
657.0	68.0	R-11	98% (97%)	FD1				
656.0	69.0							
655.0	70.0							
654.0	71.0					70.5-75.5 ft SHALE, moderately hard, fresh, pitted, typical diameter: 0.01 in. max size: 0.02 in., grayish black (N2), very widely fractured, no reaction to HCl		
653.0	72.0							
652.0	73.0	R-12	100% (100%)					
651.0	74.0							
650.0	75.0			FD0				
649.0	76.0					75.5-90.5 ft SHALE, moderately hard, fresh, grayish black (N2), extremely widely fractured, no reaction to HCl		
648.0	77.0							
647.0	78.0	R-13	100% (100%)					
646.0	79.0							
DATE STARTED: 4/8/10 DATE FINISHED: 4/9/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 2-15/16" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-422

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS		
N. 339721.35 ft E. 2405472.52 ft GROUND SURFACE ELEVATION: 724.95 ft									
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION			
644.0	81.0	R-13				75.5-90.5 ft SHALE, moderately hard, fresh, grayish black (N2), extremely widely fractured, no reaction to HCl			
643.0	82.0								
642.0	83.0		R-14	100% (100%)					
641.0	84.0								
640.0	85.0				FD0				
639.0	86.0								
638.0	87.0								
637.0	88.0	R-15	100% (100%)						
636.0	89.0								
635.0	90.0								
634.0	91.0								
633.0	92.0				90.5-95.5 ft SHALE, moderately hard, fresh, grayish black (N2), widely to moderately fractured, no reaction to HCl				
632.0	93.0	R-16	98% (88%)	FD5			92.4-92.75 ft Joint, R.D. = 74°, widely spaced, slightly open; dry, filling: very thin, moderately weathered, moderately hard; surface: stepped, undulating, moderately weathered; iron oxide in fracture. Fracture set #F-6.		
631.0	94.0						92.9-93 ft Joint, R.D. = 60°, tight; dry, filling: totally healed, clean calcite, fresh, moderately soft; surface: fresh. Fracture set #F-7.		
630.0	95.0						94.2-94.85 ft Joint, R.D. = 60.0°, very closely spaced, tight; dry, filling: totally healed, clean, fresh, moderately soft; surface: fresh. Fracture set #F-8.		
629.0	96.0								
628.0	97.0						95.5-100.5 ft SHALE, moderately hard, fresh, medium light gray (N6) and grayish black (N2), very closely to widely fractured, no reaction to HCl		
627.0	98.0	R-17	100% (100%)	FD0			95.5- ft Fracture, R.D. = 75°, closely spaced; dry, filling: totally healed, calcite.		
626.0	99.0							97.6-100.5 ft Joint, R.D. = 70°, very closely spaced, tight; dry, filling: totally healed, very thin calcite, fresh, moderately soft; surface: fresh. Fracture set #F-9.	
DATE STARTED: 4/8/10 DATE FINISHED: 4/9/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione							DRILLING METHOD: 2-15/16" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez							DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-422

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339721.35 ft E. 2405472.52 ft GROUND SURFACE ELEVATION: 724.95 ft DESCRIPTION		
624.0	101.0	R-17		FD0		100.5-105.5 ft SHALE, moderately hard, fresh, grayish black (N2), very closely to widely fractured, iron oxide staining, mechanically broken calcite filled healed fracture at 102.3 ft.		
623.0	102.0							
622.0	103.0	R-18	94% (94%)			103.24-104.64 ft Joint, R.D. = 53°, widely spaced, slightly open; filling: clean, moderately weathered, moderately hard; surface: smooth, planar, moderately weathered; iron oxide staining. Fracture set #F-10.		
621.0	104.0							
620.0	105.0							
619.0	106.0			FD3		105.5-110.5 ft SHALE, moderately hard, fresh, grayish black (N2), closely to widely fractured, no reaction to HCl, iron oxide staining 105.9-106 ft Joint, R.D. = 30°, widely spaced, tight; filling: very thin, moderately weathered, moderately hard; surface: smooth, planar, moderately weathered. Fracture set #F-11.		
618.0	107.0					106.95-107.2 ft Joint, R.D. = 60°, closely spaced; filling: totally healed, moderately thin calcite, fresh; surface: smooth, planar, fresh. Fracture set #F-12.		
617.0	108.0	R-19	100% (100%)			107.4-109.8 ft Joint, R.D. = 0°, widely spaced; filling: moderately healed, moderately thin calcite, fresh, moderately soft; surface: slightly rough, undulating, fresh; healed fractures mechanically broken apart. Fracture set #F-13.		
616.0	109.0							
615.0	110.0							
614.0	111.0					110.5-115.5 ft SHALE, moderately hard, fresh, grayish black (N2), widely to extremely widely fractured, no reaction to HCl		
613.0	112.0							
612.0	113.0	R-20	100% (100%)					
611.0	114.0							
610.0	115.0			FD0		115.5-120.2 ft SHALE, moderately hard, fresh, grayish black (N2), closely to moderately fractured, no reaction to HCl, calcite infilling from 119.6 to 119.8 ft.		
609.0	116.0							
608.0	117.0							
607.0	118.0	R-21	100% (100%)			117.3-117.57 ft Joint, R.D. = 65°, closely spaced, slightly open; filling: moderately weathered; surface: smooth, planar, moderately weathered; iron oxide staining. Fracture set #F-14.		
606.0	119.0					118.07-118.29 ft Joint, R.D. = 7°, closely spaced; filling: totally healed, moderately thin calcite, fresh, moderately soft; surface: fresh. Fracture set #F-15.		
DATE STARTED: 4/8/10 DATE FINISHED: 4/9/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 2-15/16" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665	


REV 1 Final Boring B-422

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
						N. 339721.35 ft	E. 2405472.52 ft		
						GROUND SURFACE ELEVATION: 724.95 ft			
						DESCRIPTION			
604.0						----- Bottom of Boring at 120.20 ft.-----			
DATE STARTED: 4/8/10						DRILLING METHOD: 2-15/16" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon		NOTES:	
DATE FINISHED: 4/9/10									
FIELD GEOLOGIST: Jason Lucey						DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track)	
CHECKED BY: Adrianna Semione									
APPROVED BY: Rolando Benitez								HAMMER ID: 340665	

REV 1 Final Boring B-423

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 339727.11 ft E. 2405533.75 ft GROUND SURFACE ELEVATION: 724.06 ft										
							DESCRIPTION			
723.0	1.0	S-1	2-3-4 (7) 53%				0.0-0.1 ft Organic soil, (ol/oh), 95% fines, non plastic, no dry strength, no dilatancy, no toughness; 5% sand, fine; dusky yellowish brown (10YR 2/2), organic odor, moist, no HCl reaction, medium stiff, with roots, with organics	pl/oh/ ml	After S-2, switch to casing advancer	
722.0	2.0		S-2				16-30-32 (62) 100%	0.1-1.5 ft Silt, (ml), 95% fines, non plastic, no toughness; 5% sand, fine; dark yellowish brown (10YR 4/2) to dusky yellowish brown (10YR 2/2), moist, no HCl reaction, medium stiff, trace roots, trace clay		gm
721.0	3.0	S-3		2-6-24 (30) 27%	1.5-3.0 ft Silty gravel, (gm), 50% gravel, coarse, subangular, hard hardness; 50% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.0 inches, dusky yellowish brown (10YR 2/2) and, moist, no HCl reaction, very dense	ml				
720.0	4.0		S-4	17-31-30 (61) 67%	3.0-4.5 ft Gravelly silt, (ml), 70% fines, low plasticity, no dry strength, no dilatancy, low toughness; 30% gravel, fine to coarse, subangular, medium hardness; maximum grain size = 1.0 inches, blackish red (5R 2/2) and moderate brown (5YR 4/4), dry, weak HCl reaction, medium dense, trace clay, mottled with pinkish gray (5YR 8/2) and grayish black (N2), saprolite fragments of glacial derived cobbles	gm				
719.0	5.0	S-5		30-50/2 31%	4.5-6.0 ft Silty gravel, (gm), 70% gravel, medium to coarse, subangular, hard hardness; 30% fines, high plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.5 inches, grayish red (10R 4/2), moist, no HCl reaction, trace clay, mottled with grayish black (N2)	gw				
718.0	6.0		S-6	15-16-19 (35) 80%	6.0-6.65 ft Well graded gravel, (gw), 98% gravel, fine to coarse; 2% fines, non plastic, no dry strength, no dilatancy, no toughness; maximum grain size = 1.0 inches, medium dark gray (N4), dry, very dense	SC				
717.0	7.0	S-7		13-15-13 (28) 73%	6.65-7.0 ft Interval not sampled	SC				
716.0	8.0		S-8	5-10-39 (49) 87%	7.0-8.5 ft CLAYEY SAND WITH GRAVEL, (SC), 44% sand, fine to coarse; 35% gravel, fine to coarse, subangular, hard hardness; 21% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.0 inches, moderate brown (5YR 3/4), moist, no HCl reaction, hard	SC				
715.0	9.0	S-9		50/3 100%	8.5-10.0 ft CLAYEY SAND WITH GRAVEL, (SC), 44% sand, fine to coarse; 35% gravel, fine to coarse, subangular, hard hardness; 21% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.0 inches, dark yellowish brown (10YR 4/2) with pale brown (5YR 5/2), moist, no HCl reaction, very stiff	SC				
714.0	10.0		R-1	75% (27%)	FD5	10.0-11.5 ft CLAYEY SAND WITH GRAVEL, (SC), 44% sand, fine to coarse; 35% gravel, fine to coarse, subangular, hard hardness; 21% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.0 inches, dark yellowish brown (10YR 4/2) and pale brown (5YR 5/2), organic odor, moist, no HCl reaction, hard, trace fine sand pockets	Casing set at 13.2 ft.			
713.0	11.0	11.5-11.75 ft SHALE, moderately hard, medium dark gray (N4), no reaction to HCl, moist, weathered bedrock with pockets of silt from above								
712.0	12.0	11.75-13.2 ft Interval not sampled								
711.0	13.0	13.2-18.7 ft SHALE, moderately hard to hard, fresh to slightly weathered, medium dark gray (N4), moderately to closely fractured, weak reaction to HCl, iron oxide staining, fractures have iron oxide staining								
710.0	14.0	13.2-29 ft R.D. = 31-36°; filling: iron oxide staining, slightly weathered; surface: rough, planar, slightly weathered. Fracture set #1.								
709.0	15.0	R-2			15.3-33 ft R.D. = 61-65°; filling: fresh to slightly weathered; surface: rough, planar, fresh. Fracture set #2.					
708.0	16.0				18.7-19.6 ft Interval not sampled					
707.0	17.0									
706.0	18.0									
705.0	19.0									
DATE STARTED: 4/8/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione							DRILLING METHOD: 3-7/8" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	NOTES: 4-1.4" I.D. Hollow Stem Auger used from 0.0-3.0 ft.		
APPROVED BY: Rolando Benitez							DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931		

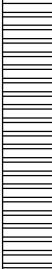
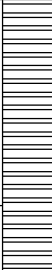
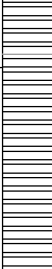
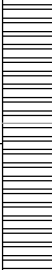

REV 1 Final Boring B-423

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 339727.11 ft E. 2405533.75 ft GROUND SURFACE ELEVATION: 724.06 ft		
703.0	21.0	R - 2	97% (37%)	FD5		19.7-24.0 ft SHALE, moderately hard to hard, fresh to slightly weathered, medium dark gray (N4) to dark gray (N3), closely to moderately fractured, weak reaction to HCl, iron oxide staining, fractures have iron oxide staining with trace material of from above, few show trace calcite filling on fracture face		
702.0	22.0							
701.0	23.0			FD5				
700.0	24.0							
699.0	25.0	R - 3	96% (21%)			24.0-29.0 ft SHALE, moderately hard to hard, fresh to slightly weathered, dark gray (N3), very closely to moderately fractured, weak reaction to HCl, iron oxide staining, fractures have iron oxide staining with trace material from above, trace pyrite, trace calcite replaced shell casts		
698.0	26.0			FD7				
697.0	27.0							
696.0	28.0							
695.0	29.0	R - 4	100% (84%)	FD5		29.0-34.0 ft SHALE, moderately hard to hard, fresh to slightly weathered, medium dark gray (N4), moderately to widely fractured, weak reaction to HCl, iron oxide staining, fractures have iron oxide staining with others showing calcite lining, trace pyrite, trace calcite replaced shell casts, HCl reaction very weak		Top of competent rock at 29.0 ft
694.0	30.0							
693.0	31.0							
692.0	32.0			FD3				
691.0	33.0	R - 5	100% (0%)			34.0-34.5 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very closely fractured, weak reaction to HCl, no staining, HCl reaction very weak compared to rock at start of coring, trace shell casts		
690.0	34.0							
689.0	35.0	R - 6	67% (0%)			34.5-35.2 ft No sample recovered		34.5-35.2 ft. no recovery due to issues with coring bit-inner barrel coupling
688.0	36.0					35.2-35.8 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very closely fractured, no reaction to HCl, no staining		35.8 ft. no water circulation
687.0	37.0	R - 7	84% (78%)			35.2- ft R.D. = 61°, open; filling: fresh; surface: rough, planar, fresh. Fracture set #1.		
686.0	38.0			FD3		35.8-39.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely fractured, no reaction to HCl, no staining, weak reaction to HCl from 36.7 to 39.0 ft., trace pyrite, calcite replaced shell casts, some calcite shells show replacement by pyrite, crinoid stem pieces		
685.0	39.0	R - 8	100% (96%)			35.8- ft R.D. = 56°, open; filling: fresh; surface: rough, undulating, fresh. Fracture set #2.		
DATE STARTED: 4/8/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 3-7/8" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	NOTES: 4-1.4" I.D. Hollow Stem Auger used from 0.0-3.0 ft.	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-423

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS	
N. 339727.11 ft E. 2405533.75 ft											
GROUND SURFACE ELEVATION: 724.06 ft		DESCRIPTION									
683.0	41.0	R -8	100% (96%)	FD3		39.0-44.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely fractured, weak reaction to HCl, iron oxide staining, trace pyrite increasing in percentage, calcite replaced shell casts, some calcite shells show secondary replacement by pyrite, 39.5-40.5 ft. crinoid stem pieces and fossil hash	47.0 ft. no water circulation				
682.0	42.0					40.5- ft R.D. = 37°; filling: iron oxide staining, slightly weathered; surface: rough, planar, slightly weathered. Fracture set #3.					
681.0	43.0										
680.0	44.0										
679.0	45.0	R -9	96% (69%)	FD1		44.0-48.8 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to closely fractured, weak reaction to HCl, iron oxide staining, trace oily sheen on rock surface, trace pyrite, calcite replaced shell casts, some calcite shells show secondary replacement by pyrite, crinoid stems, Turritella sp. casts, becomes slightly weathered at 47.2 ft					
678.0	46.0										
677.0	47.0			FD6		47.2- ft R.D. = 36°, very closely spaced, open; filling is damp but no free water present, filling: very thin iron oxide staining, slightly weathered; surface: rough, planar, slightly weathered.					
676.0	48.0					47.3- ft R.D. = 56°, very closely spaced; filling: very thin iron oxide staining, slightly weathered; surface: rough, planar, slightly weathered.					
675.0	49.0	R -10	97% (88%)	FD2		48.8-53.8 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely to widely fractured, weak reaction to HCl, no staining, trace oily sheen on rock surface, calcite replaced shell cast, crinoid stems, Turritella sp. casts, calcite along bedding at 10°					
674.0	50.0										
673.0	51.0										
672.0	52.0										
671.0	53.0	R -11	100% (92%)	FD0		53.8-59.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely fractured, weak reaction to HCl, no staining, calcite replaced shell cast, crinoid stems and other fossil shell hash					
670.0	54.0										
669.0	55.0										
668.0	56.0										
667.0	57.0	R -12	94% (84%)	FD4		59-64.5 ft R.D. = 56-58°, closely to moderately spaced, open; filling: fresh; surface: rough, planar, fresh.					
666.0	58.0										
665.0	59.0										
DATE STARTED: 4/8/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 3-7/8" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	NOTES: 4-1.4" I.D. Hollow Stem Auger used from 0.0-3.0 ft.				
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931				

REV 1 Final Boring B-423

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 724.06 ft						DESCRIPTION	
663.0	61.0	R -12	94% (84%)			59.0-69.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to very widely fractured, weak reaction to HCl, no staining, calcite replaced shell cast, crinoid stems, Turritella sp. and other shell hash, no reaction to HCl starting at 65.8 ft, trace pyrite starting at approximately 66 ft	64.55-65.8 ft. SC-1, 16:20, 4/10/10
662.0	62.0						
661.0	63.0						
660.0	64.0						
659.0	65.0	R -13	99% (90%)	FD4			
658.0	66.0						
657.0	67.0						
656.0	68.0						
655.0	69.0	R -14	100% (89%)		69.0-74.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3) and medium dark gray (N4), moderately to widely fractured, no reaction to HCl, no staining, trace calcite replaced shell cast, brachiopod shells show secondary recrystilization by pyrite, trace pyrite, sporadic zones show oily sheen when wet		
654.0	70.0						
653.0	71.0						
652.0	72.0						
651.0	73.0	R -15	100% (82%)	FD4			
650.0	74.0						
649.0	75.0						
648.0	76.0						
647.0	77.0	R -16	100% (100%)	FD0			
646.0	78.0						
645.0	79.0						
DATE STARTED: 4/8/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 3-7/8" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	
						NOTES: 4-1.4" I.D. Hollow Stem Auger used from 0.0-3.0 ft.	
						DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	






REV 1 Final Boring B-423

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 724.06 ft						DESCRIPTION		
643.0	81.0	R -16	100% (100%)	FD0		74.0-89.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely to closely fractured, no reaction to HCl, no staining, 74.0-84.0 ft. oily sheen present when wet		
642.0	82.0							
641.0	83.0							
640.0	84.0							
639.0	85.0	R -17	98% (94%)	FD0				
638.0	86.0							
637.0	87.0							
636.0	88.0							
635.0	89.0	R -18	100% (93%)	FD1		89.0-99.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely to moderately fractured, no reaction to HCl, no staining, 92.3 ft. trace fossils replaced by calcite with secondary replacement by pyrite		
634.0	90.0							
633.0	91.0							
632.0	92.0							
631.0	93.0	R -19	100% (98%)	FD1				
630.0	94.0							
629.0	95.0							
628.0	96.0							
627.0	97.0	R -20	100% (84%)	FD4		94.1-94.4 ft R.D. = 56°; surface: rough, planar; trace to moderate amounts of iron oxide staining.		
626.0	98.0							
625.0	99.0							
DATE STARTED: 4/8/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 3-7/8" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon		NOTES: 4-1.4" I.D. Hollow Stem Auger used from 0.0-3.0 ft.
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

REV 1 Final Boring B-423

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 724.06 ft						DESCRIPTION		
623.0	101.0	R -20	100% (84%)	FD4		99.0-104.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to widely fractured, no reaction to HCl, no staining, 99.35-94.0 ft., calcite laminae of 10° shows offset of less than 1/2 inch, calcite crystals present 100-104 ft R.D. = 56-58°, moderately spaced; surface: rough, planar; trace iron oxide staining on fracture face. 101.8-102.3 ft R.D. = 64°, tight; filling: totally healed, very thin calcite, moderately hard.	104.7 ft. iron oxide staining along bedding at ten °	
622.0	102.0							
621.0	103.0							
620.0	104.0							
619.0	105.0	R -21	99% (78%)	FD4		104.0-109.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), closely to widely fractured, no reaction to HCl, iron oxide staining, trace fossil hash replaced with calcite 104-109 ft R.D. = 54-56°, very closely to widely spaced; surface: rough, planar; moderate to heavy iron oxide staining.		
618.0	106.0							
617.0	107.0							
616.0	108.0							
615.0	109.0	R -22	100% (100%)	FD1		109.0-114.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl		
614.0	110.0							
613.0	111.0							
612.0	112.0							
611.0	113.0	R -23	100% (100%)	FD1		114.0-124.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3) and medium dark gray (N4), very widely to closely fractured, no reaction to HCl, trace sporadic calcite replaced fossil hash, trace pyrite, 123.7 ft bedding at 10° shows moderate iron oxide staining	117.45-118.0 ft., SC-2, 11:50, 4/11/10	
610.0	114.0							
609.0	115.0							
608.0	116.0							
607.0	117.0	R -24	96% (82%)	FD1				
606.0	118.0							
605.0	119.0							
DATE STARTED: 4/8/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 3-7/8" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon		NOTES: 4-1.4" I.D. Hollow Stem Auger used from 0.0-3.0 ft.
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931




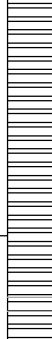

REV 1 Final Boring B-423

PROJECT NO. 10-4310

						COORDINATES		USCS SYMBOL	REMARKS
						N. 339727.11 ft E. 2405533.75 ft			
						GROUND SURFACE ELEVATION: 724.06 ft			
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION			
603.0	121.0	R -24	96% (82%)	FD1		114.0-124.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3) and medium dark gray (N4), very widely to closely fractured, no reaction to HCl, trace sporadic calcite replaced fossil hash, trace pyrite, 123.7 ft bedding at 10° shows moderate iron oxide staining			
602.0	122.0					122.5- ft R.D. = 56°; filling: not healed, clean, fresh; surface: rough, planar, fresh.			
601.0	123.0								
600.0	124.0	R -25	100% (18%)	FD5		124.0-129.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very closely to moderately fractured, no reaction to HCl, iron oxide staining, moderate amounts of pyrite on fracture faces and throughout, quartz filled fracture with pyrite, 125.45 ft bedding at 10° shows moderate iron oxide staining			
599.0	125.0					124.6-124.9 ft R.D. = 55-56°, very closely spaced, slightly open; surface: rough, planar; trace pyrite.			
598.0	126.0					125.45-128.2 ft R.D. = 60-64°, moderately wide; filling: totally healed, moderately thick quartz, fresh, hard; surface: rough, planar, fresh; well formed quartz crystal, thickness ranges from lamination up to 0.5 in, pyrite cubes.			
597.0	127.0								
596.0	128.0								
595.0	129.0	R -26	98% (50%)	FD4		129.0-134.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to moderately fractured, no reaction to HCl, pyrite on fracture faces and trace throughout, 129.9 ft bedding at 10 degrees shows iron oxide staining			
594.0	130.0				129-136 ft R.D. = 36°, very closely to widely spaced, slightly open; filling: moderately healed, thin calcite, fresh; surface: moderately rough, undulating, fresh; zone contains healed and non healed fractures.				
593.0	131.0				132-132.3 ft R.D. = 56°, very closely spaced, slightly open; filling: moderately healed, calcite; surface: rough, planar; fracture pair cut across bedding, pyrite and calcopyrite.				
592.0	132.0								
591.0	133.0								
590.0	134.0	R -27	100% (80%)			134.0-139.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to moderately fractured, no reaction to HCl			
589.0	135.0			134.4-134.95 ft R.D. = 56°, open; filling: partly healed, thin calcite, fresh; surface: rough, planar, fresh; fracture goes from being open to healed with calcite approximately 5 mm thick.					
588.0	136.0								
587.0	137.0								
586.0	138.0	R -28	100% (95%)						
585.0	139.0								
DATE STARTED: 4/8/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 3-7/8" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon		NOTES: 4-1.4" I.D. Hollow Stem Auger used from 0.0-3.0 ft.	
APPROVED BY: Rolando Benítez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

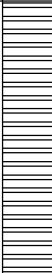
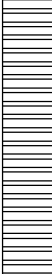
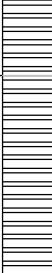

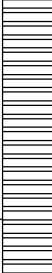
REV 1 Final Boring B-423

PROJECT NO. 10-4310

						COORDINATES		USCS SYMBOL	REMARKS					
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	N. 339727.11 ft E. 2405533.75 ft GROUND SURFACE ELEVATION: 724.06 ft								
						DESCRIPTION								
583.0	141.0	R -28	100% (95%)	FD4		139.0-144.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to moderately fractured, no reaction to HCl, trace pyrite replaced shell hash, calcite along bedding, also appears to run 36-90 degrees within the calcite zone which contains angular pieces of shale (breccia) (1-5mm), secondary replacement by pyrite								
582.0	142.0					142.5-159 ft R.D. = 31-36°, closely to widely spaced; filling: moderately healed, very thin calcite; surface: rough, planar; trace pyrite, healed and unhealed fractures all fresh.								
581.0	143.0													
580.0	144.0					144.0-149.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to moderately fractured, no reaction to HCl, trace pyrite, calcite along bedding, also runs a variety of other directions due to crystal growth, pits throughout with calcite crystals								
579.0	145.0	R -29	100% (91%)	FD4										
578.0	146.0													
577.0	147.0													
576.0	148.0													
575.0	149.0	R -30	100% (55%)	FD6		149.0-158.1 ft SHALE, moderately hard to hard, fresh, dark gray (N3), closely to widely fractured, no reaction to HCl, trace pyrite in fractures, calcite healed fractures, vertical and 31° fractures filled with quartz (fresh, white (N9)) brecciated rock in fractures								
574.0	150.0					149.4-150.1 ft R.D. = 90°; surface: rough, planar; trace pyrite.								
573.0	151.0													
572.0	152.0													
571.0	153.0	R -31	100% (86%)	FD4										
570.0	154.0													
569.0	155.0													
568.0	156.0													
567.0	157.0	R -32	100% (94%)	FD5		158.1-158.3 ft Decomposed shale seam containing clay, dark gray(N3), moist, soft								
566.0	158.0					158.3-169.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to widely fractured, no reaction to HCl, calcite healed fractures, calcite along cleavage plane, brecciated zone from calcite crystal growth								
565.0	159.0													
DATE STARTED: 4/8/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 3-7/8" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon		NOTES: 4-1.4" I.D. Hollow Stem Auger used from 0.0-3.0 ft.						
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931						




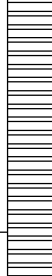

REV 1 Final Boring B-423

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ftin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 724.06 ft						DESCRIPTION		
563.0	161.0	R -32	100% (94%)	FD4		159-189 ft R.D. = 56-58°, moderately to widely spaced, tight; filling: totally healed, moderately thin calcite, fresh; surface: rough, planar, fresh; some of fractures not healed with calcite, trace pyrite. 158.3-169.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to widely fractured, no reaction to HCl, calcite healed fractures, calcite along cleavage plane, brecciated zone from calcite crystal growth		
562.0	162.0							
561.0	163.0							
560.0	164.0							
559.0	165.0	R -33	100% (96%)	FD4				
558.0	166.0							
557.0	167.0							
556.0	168.0							
555.0	169.0	R -34	95% (92%)	FD1		169.0-174.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, calcite healed fractures, calcite along cleavage plane, brecciated zone from calcite crystal growth along bedding and vertically 169-189 ft R.D. = 36°, closely to moderately spaced; filling: moderately healed, very thin calcite, fresh; surface: fresh; trace pyrite, some fresh not healed fractures.		
554.0	170.0							
553.0	171.0							
552.0	172.0							
551.0	173.0	R -35	100% (92%)	FD4		174.0-189.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to closely fractured, no reaction to HCl, calcite healed fractures, calcite along cleavage and bedding, calcite healed brecciated area from calcite crystal growth, fully formed crystals 174-184 ft R.D. = 90°, closely to widely spaced; filling: totally healed, very thin, fresh; surface: fresh; trace pyrite.		
550.0	174.0							
549.0	175.0							
548.0	176.0							
547.0	177.0	R -36	95% (52%)	FD6			SC-3, 178.1-179.0 ft., 08:45, 4/12/10	
546.0	178.0							
545.0	179.0							
DATE STARTED: 4/8/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 3-7/8" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon		NOTES: 4-1.4" I.D. Hollow Stem Auger used from 0.0-3.0 ft.
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

REV 1 Final Boring B-423

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 724.06 ft						DESCRIPTION		
DESCRIPTION								
543.0	181.0	R -36	95% (52%)	FD6		174.0-189.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to closely fractured, no reaction to HCl, calcite healed fractures, calcite along cleavage and bedding , calcite healed brecciated area from calcite crystal growth, fully formed crystals		
542.0	182.0							
541.0	183.0							
540.0	184.0							
539.0	185.0	R -37	100% (84%)	FD0				
538.0	186.0							
537.0	187.0							
536.0	188.0							
535.0	189.0	R -38	99% (98%)	FD1		189.0-199.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to closely fractured, no reaction to HCl, calcite and trace pyrite along bedding (10 degrees), trace pyrite,199.0ft calcite and trace pyrite along bedding shows displacement less than 1/8 in		
534.0	190.0							
533.0	191.0							
532.0	192.0							
531.0	193.0	R -39	100% (73%)	FD6		195.6-197 ft R.D. = 56°, closely spaced; filling: very thin pyrite; surface: rough, planar.		
530.0	194.0							
529.0	195.0							
528.0	196.0							
527.0	197.0	R -40	84% (81%)	FD2				
526.0	198.0							
525.0	199.0							
DATE STARTED: 4/8/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 3-7/8" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon		NOTES: 4-1.4" I.D. Hollow Stem Auger used from 0.0-3.0 ft.
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

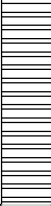
REV 1 Final Boring B-423

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 724.06 ft						DESCRIPTION		
DESCRIPTION								
523.0	201.0	R-40	84% (81%)	FD2		199.0-214.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to very closely fractured, no reaction to HCl, trace to moderate pyrite localized to fractures at 56 degrees 200.2-214 ft R.D. = 56°, very closely to closely spaced; filling: partly healed, very thin pyrite; surface: rough, planar; some contain pyrite while others not healed but tight.		
522.0	202.0							
521.0	203.0							
520.0	204.0	R-41	60% (11%)	FD6				
519.0	205.0							
518.0	206.0							
517.0	207.0	R-42	100% (60%)	FD4				211.4-212.3 ft R.D. = 75°, both ends visible; filling: totally healed, very thin calcite, fresh; surface: fresh.
516.0	208.0							
515.0	209.0							
514.0	210.0	R-43	100% (40%)	FD6				214.0-223.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to closely fractured, no reaction to HCl, trace pyrite 214-223 ft R.D. = 56°, very closely to widely spaced, slightly open; filling: partly healed, very thin calcite and pyrite, fresh; surface: rough, planar, fresh; some fractures open due to drilling methods, fracture faces contain pyrite (fresh) others show a combination of calcite or pyrite.
513.0	211.0							
512.0	212.0							
511.0	213.0	R-44	100% (84%)	FD3				
510.0	214.0							
509.0	215.0							
508.0	216.0	R-44	100% (84%)	FD3				
507.0	217.0							
506.0	218.0							
505.0	219.0						SC-4, 219.0-219.7 ft., 13:20, 4/12/10	
DATE STARTED: 4/8/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 3-7/8" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon		NOTES: 4-1.4" I.D. Hollow Stem Auger used from 0.0-3.0 ft.
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

REV 1 Final Boring B-423

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
						N. 339727.11 ft	E. 2405533.75 ft		
						GROUND SURFACE ELEVATION: 724.06 ft			
						DESCRIPTION			
503.0	221.0	R -44	100% (84%)	FD3		214.0-223.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to closely fractured, no reaction to HCl, trace pyrite			
502.0	222.0								
	223.0								
						---- Bottom of Boring at 223.00 ft.----			

REV 1 Final Boring B-424

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 339868.96 ft E. 2405458.50 ft GROUND SURFACE ELEVATION: 745.40 ft										
							DESCRIPTION			
745.0		1.0	S-1	3-5-2 (7) 77%			0.0-0.45 ft Organic soil, (ol/oh), 90% fines, non plastic, low dry strength, no dilatancy; 5% gravel, fine, subangular, flat, medium hardness; 5% sand, fine, subrounded; grayish brown (5YR 3/2), organic odor, moist, no HCl reaction, with roots, some rock fragments	ol/oh		
744.0		2.0					1.5-2.5 ft Interval not sampled			
743.0		3.0	S-2	3-4-16 (20) 73%			2.5-4.0 ft Sandy silt, (ml), 80% fines, low plasticity, high dry strength, no dilatancy, low toughness; 15% sand, fine, subrounded, hard hardness; 5% gravel, fine to medium, rounded, elongated, hard hardness; maximum grain size = 1.0 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, some roots, some rock fragments	ml		
742.0		4.0					4.0-5.0 ft Interval not sampled			
741.0		5.0								
740.0		6.0	S-3	7-8-15 (23) 100%			5.0-6.5 ft Sandy silt, (ml), 80% fines, low plasticity, high dry strength, no dilatancy, low toughness; 15% sand, fine, subrounded, hard hardness; 5% gravel, fine to medium, rounded, elongated, hard hardness; maximum grain size = 1.0 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, some roots, some rock fragments	ml		
739.0		7.0					6.5-7.5 ft Interval not sampled			
738.0		8.0	S-4	11-44-33 (77) 87%			7.5-9.0 ft Sandy silt, (ml), 80% fines, low plasticity, high dry strength, no dilatancy, low toughness; 15% sand, fine, subrounded, hard hardness; 5% gravel, fine to medium, rounded, elongated, hard hardness; maximum grain size = 1.0 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, some roots, some rock fragments	ml		
737.0		9.0					9.0-10.0 ft Interval not sampled			
736.0		10.0								
735.0		11.0	S-5	10-15-13 (28) 83%			10.0-11.5 ft Sandy silt with gravel, (ml), 50% fines, low plasticity, low dry strength, no dilatancy, low toughness; 35% sand, fine to medium, subrounded, elongated, hard hardness; 15% gravel, fine to coarse, subrounded, flat, hard hardness; maximum grain size = 0.5 inches, moderate brown (5YR 3/4), moist, no HCl reaction, strong cementation, some coal, some rock fragments, 10.0 - 10.15 ft. contains fragments of a cross-bedded sandstone boulder	ml		
734.0		12.0					11.5-12.5 ft Interval not sampled			
733.0		13.0	S-6	7-20-10 (30) 67%			12.5-14.0 ft Silty sand with gravel, (sm), 70% sand, fine, subrounded, hard hardness; 15% gravel, fine to coarse, subangular, flat, medium hardness; 15% fines, low plasticity, low dry strength, no dilatancy, low toughness; maximum grain size = 1.0 inches, grayish orange pink (5YR 7/2), moist, no HCl reaction, trace coal, some rock fragments	sm		
732.0		14.0					14.0-15.0 ft Interval not sampled			
731.0										
DATE STARTED: 5/21/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky							DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez							DRILLER: C. VanVactor HELPER(S): R. Terral		DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-424

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339868.96 ft E. 2405458.50 ft GROUND SURFACE ELEVATION: 745.40 ft		
						DESCRIPTION		
730.0	16.0	S-7	2-8-10 (18) 47%			15.0-16.5 ft Silty sand with gravel, (sm), 70% sand, fine, subrounded, hard hardness; 15% gravel, fine to coarse, subangular, flat, medium hardness; 15% fines, medium plasticity, low dry strength, no dilatancy, low toughness; maximum grain size = 1.0 inches, grayish orange pink (5YR 7/2), moist, no HCl reaction, trace coal, some rock fragments	sm	
729.0	17.0					16.5-17.5 ft Interval not sampled		
728.0	18.0	S-8	6-8-7 (15) 80%			17.5-18.0 ft Silty sand with gravel, (sm), 70% sand, fine, subrounded, hard hardness; 15% gravel, fine to coarse, subangular, flat, medium hardness; 15% fines, medium plasticity, low dry strength, no dilatancy, low toughness; maximum grain size = 1.0 inches, grayish orange pink (5YR 7/2), moist, no HCl reaction, trace coal, some rock fragments	sm	
727.0	19.0					18.0-19.0 ft SHALE, clayey, very soft to moderately soft, decomposed, clay sized particles, dark yellowish orange (10YR 6/6) and greenish black (5G 2/1), no reaction to HCl, iron oxide staining		
726.0	20.0					19.0-20.0 ft Interval not sampled		
725.0	21.0	S-9	8-9-8 (17) 90%			20.0-21.5 ft SHALE, clayey, very soft to moderately soft, decomposed, clay sized particles, dark yellowish orange (10YR 6/6) and greenish black (5G 2/1), no reaction to HCl, iron oxide staining		
724.0	22.0					21.5-22.5 ft Interval not sampled		
723.0	23.0	S-10	27-50/5 100%			22.5-23.4 ft SHALE, clayey, very soft to moderately soft, decomposed, clay sized particles, dark yellowish orange (10YR 6/6) and greenish black (5G 2/1), no reaction to HCl, iron oxide staining		
722.0	24.0					23.4-30.9 ft SHALE, clayey, moderately soft to soft, very intensely weathered to decomposed, dark yellowish orange (10YR 6/6) and medium dark gray (N4), thinly to moderately bedded, R.D. = 15°, closely to very closely fractured, no reaction to HCl, iron oxide staining		
721.0	25.0					23.4-44.7 ft R.D. = 9°-30°, very closely to moderately spaced; filling: not healed, very thin clay to iron oxidation staining; surface, slightly rough to rough, slightly to very intensely weathered. Fracture set #1.		
720.0	26.0							
719.0	27.0	R-1	70% (26%)	FD8				
718.0	28.0							
717.0	29.0					28.15-30.5 ft Joint, R.D. = 61°, very closely spaced, neither ends visible, tight; filling: not healed, very thin iron oxide; surface: rough.		
716.0		R-2						
DATE STARTED: 5/21/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): R. Terral	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-424

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339868.96 ft E. 2405458.50 ft GROUND SURFACE ELEVATION: 745.40 ft		
						DESCRIPTION		
715.0				FD8		30.9-44.7 ft SHALE, clayey, moderately soft to moderately hard, slightly to moderately weathered, clay sized particles, medium dark gray (N4), moderately bedded, closely to moderately fractured, no reaction to HCl, iron oxide staining 31.2- ft Joint, R.D. = 75°, moderately spaced, neither ends visible, moderately open; filling: not healed, very thin clay; surface: rough. 32.55- ft Joint, R.D. = 86°, moderately spaced, both ends visible, slightly open; filling: not healed, very thin iron oxide; surface: slightly rough. 33.7-34.5 ft Joint, R.D. = 84°, moderately spaced, neither ends visible, slightly open; filling: not healed, clean; surface: moderately rough.		
31.0								
714.0		R-2	95% (26%)	FD6				
32.0								
713.0								
33.0								
712.0								
34.0								
711.0								
35.0								
710.0								
36.0								
709.0								
37.0		R-3	100% (57%)	FD5				
708.0								
38.0								
707.0								
39.0								
706.0								
40.0								
705.0								
41.0								
704.0								
42.0		R-4	98% (45%)	FD6				
703.0								
43.0								
702.0								
44.0								
701.0		R-5		FD5				
DATE STARTED: 5/21/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): R. Terral	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-424

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339868.96 ft E. 2405458.50 ft GROUND SURFACE ELEVATION: 745.40 ft		
						DESCRIPTION		
700.0						44.7-84.7 ft SHALE, clayey, moderately soft to soft, slightly to intensely weathered, medium dark gray (N4) and dark greenish gray (5G 4/1), moderately to thickly bedded, very closely to moderately fractured, iron oxide staining 45-72.4 ft R.D. = 13°-89°, closely to moderately spaced; slightly to moderately open; filling: not healed, very thin iron oxidation staining, very thin clay, slightly weathered; surface: slightly to moderately rough, fresh to moderately weathered. Fracture set #2.		
46.0								
699.0								
47.0								
698.0								
48.0								
697.0								
49.0								
696.0		R-5	28% (11%)	FD6				
50.0								
695.0								
51.0								
694.0								
52.0								
693.0								
53.0								
692.0								
54.0								
691.0								
55.0								
690.0								
56.0								
689.0								
57.0		R-6	84% (35%)	FD5				
688.0								
58.0								
687.0								
59.0								
686.0		R-7						
DATE STARTED: 5/21/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): R. Terral	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-424

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339868.96 ft E. 2405458.50 ft GROUND SURFACE ELEVATION: 745.40 ft		
						DESCRIPTION		
685.0						44.7-84.7 ft SHALE, clayey, moderately soft to soft, slightly to intensely weathered, medium dark gray (N4) and dark greenish gray (5G 4/1), moderately to thickly bedded, very closely to moderately fractured, iron oxide staining		
61.0								
684.0								
62.0								
683.0		R-7	100% (42%)	FD5				
63.0								
682.0								
64.0								
681.0								
65.0								
680.0								
66.0								
679.0								
67.0		R-8	97% (15%)			72.95-90.7 ft R.D. = 13°-65°, very closely to moderately spaced, slightly open; filling: not healed to partly healed, clean, very thin iron oxide staining, very thin clay; surface: smooth to moderately rough, slightly weathered to moderately weathered. Fracture set #3.		
678.0								
68.0								
677.0								
69.0								
676.0				FD7				
70.0								
675.0								
71.0								
674.0								
72.0		R-9	98% (24%)					
673.0								
73.0								
672.0				FD5				
74.0								
671.0								
		R-10		FD7				
DATE STARTED: 5/21/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): R. Terral		DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-424

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339868.96 ft E. 2405458.50 ft GROUND SURFACE ELEVATION: 745.40 ft		
						DESCRIPTION		
670.0						44.7-84.7 ft SHALE, clayey, moderately soft to soft, slightly to intensely weathered, medium dark gray (N4) and dark greenish gray (5G 4/1), moderately to thickly bedded, very closely to moderately fractured, iron oxide staining		
76.0								
669.0								
77.0								
668.0	R-10		85% (0%)					
78.0								
667.0								
79.0								
666.0								
80.0								
665.0						84.7-104.7 ft SHALE, moderately hard to moderately soft, slightly weathered to fresh, medium dark gray (N4) and dark gray (N3), moderately to very thickly bedded, moderately to widely fractured, weak reaction to HCl, no staining		
81.0								
664.0								
82.0								
663.0	R-11		80% (7%)					
83.0								
662.0								
84.0								
661.0								
85.0								
660.0								
86.0								
659.0								
87.0								
658.0	R-12		99% (27%)					
88.0								
657.0								
89.0								
656.0								
	R-13							
DATE STARTED: 5/21/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): R. Terral		DRILL RIG: CME-55 (Truck) HAMMER ID: 955





REV 1 Final Boring B-424

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339868.96 ft E. 2405458.50 ft GROUND SURFACE ELEVATION: 745.40 ft		
						DESCRIPTION		
655.0						84.7-104.7 ft SHALE, moderately hard to moderately soft, slightly weathered to fresh, medium dark gray (N4) and dark gray (N3), moderately to very thickly bedded, moderately to widely fractured, weak reaction to HCl, no staining 91.7-108.4 ft R.D. = 45°-64°, moderately to widely spaced; slightly open; filling: not healed to partly healed, clean, very thin iron oxidation, very thin calcite, fresh to slightly weathered; surface: slightly rough to moderately rough, fresh to slightly weathered. Fracture set #4.		
91.0								
654.0				FD5				
92.0		R-13	100% (71%)					
653.0								
93.0								
652.0								
94.0								
651.0								
95.0								
650.0								
96.0								
649.0								
97.0		R-14	97% (75%)					
648.0								
98.0								
647.0								
99.0								
646.0				FD4				
100.0								
645.0								
101.0								
644.0								
102.0		R-15	100% (84%)					
643.0								
103.0								
642.0								
104.0								
641.0		R-16						
DATE STARTED: 5/21/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): R. Terral	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-424

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 339868.96 ft E. 2405458.50 ft GROUND SURFACE ELEVATION: 745.40 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
640.0		R-16	95% (50%)	FD4		104.7-110.55 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), thickly to massive bedded, moderately to widely fractured, no reaction to HCl, no staining, with fossiliferous intervals and a closely spaced zone		
106.0								
639.0								
107.0								
638.0		R-17	98% (77%)	FD7		109.7-123.4 ft R.D. = 12°-58°, closely to moderately spaced, neither ends visible; tight to slightly open; filling: not healed to moderately healed, clean, very thin to thin calcite, very thin and moderately thin clay, very thin iron oxide staining, fresh to slightly weathered; surface: rough to slightly rough, fresh to slightly weathered. Fracture set #5.		
108.0								
637.0								
109.0								
636.0		R-18	90% (46%)	FD5		110.55-110.75 ft Fat clay, (ch), 100% fines, medium plasticity, slow dilatancy; medium light gray (N6)		
110.0								
635.0								
111.0								
634.0		R-19		FD4		110.75-119.7 ft SHALE, moderately hard to moderately soft, fresh, dark gray (N3), very thickly to massive bedded, moderately fractured, no staining		
112.0								
633.0								
113.0								
632.0								
114.0								
631.0								
115.0								
630.0								
116.0								
629.0								
117.0								
628.0								
118.0								
627.0								
119.0								
626.0								
DATE STARTED: 5/21/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): R. Terral		DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-424

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 339868.96 ft E. 2405458.50 ft GROUND SURFACE ELEVATION: 745.40 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
625.0		R-19	100% (73%)	FD4		119.7-202.8 ft SHALE, moderately hard to moderately soft, fresh to slightly weathered, dark gray (N3) and medium dark gray (N4), thickly to massive bedded, moderately to widely fractured, no staining, with fossiliferous intervals		
121.0								
624.0								
122.0								
623.0								
123.0								
622.0								
124.0								
621.0				FD7		124.2-139.4 ft R.D. = 20°-67°, very closely to widely spaced, neither ends visible; tight to open; filling: not healed to moderately healed, very thin to moderately thin clay, clean, very thin to moderately thin calcite, very thin iron oxide staining, fresh to slightly weathered; moderately to slightly rough, fresh to slightly weathered. Fracture set #6.		
125.0		R-20	99% (97%)					
620.0								
126.0								
619.0								
127.0								
618.0								
128.0								
617.0								
129.0								
616.0								
130.0		R-21	100% (93%)	FD3				
615.0								
131.0								
614.0								
132.0								
613.0								
133.0								
612.0								
134.0								
611.0		R-22						
DATE STARTED: 5/21/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): R. Terral		
						DRILL RIG: CME-55 (Truck) HAMMER ID: 955		

REV 1 Final Boring B-424

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339868.96 ft E. 2405458.50 ft GROUND SURFACE ELEVATION: 745.40 ft		
						DESCRIPTION		
610.0						119.7-202.8 ft SHALE, moderately hard to moderately soft, fresh to slightly weathered, dark gray (N3) and medium dark gray (N4), thickly to massive bedded, moderately to widely fractured, no staining, with fossiliferous intervals		
136.0								
609.0								
137.0								
608.0		R-22	100% (60%)					
138.0								
607.0								
139.0								
606.0								
140.0								
605.0								
141.0								
604.0								
142.0		R-23	92% (89%)			141.4-154.9 ft R.D. = 10°-54°, very closely to widely spaced, neither ends visible; tight to slightly open; filling: not healed to moderately healed, clean, thin to moderately thin calcite, thin clay, fresh, moderately hard; surface: smooth to moderately rough, fresh. Fracture set #7.		
603.0								
143.0								
602.0								
144.0								
601.0								
145.0								
600.0								
146.0								
599.0								
147.0		R-24	98% (97%)					
598.0								
148.0								
597.0								
149.0								
596.0								
		R-25						
DATE STARTED: 5/21/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): R. Terral	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-424

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339868.96 ft E. 2405458.50 ft GROUND SURFACE ELEVATION: 745.40 ft		
						DESCRIPTION		
595.0						119.7-202.8 ft SHALE, moderately hard to moderately soft, fresh to slightly weathered, dark gray (N3) and medium dark gray (N4), thickly to massive bedded, moderately to widely fractured, no staining, with fossiliferous intervals 155.25-156.1 ft Joint, R.D. = 66°, neither ends visible, slightly open; filling: partly healed, thin calcite, fresh, moderately hard; surface: moderately rough, fresh. 156.1-170.1 ft R.D. = 11°-48°, very closely to widely spaced, neither ends visible; tight to slightly open; filling: not healed to moderately healed, clean, thin clay, moderately thin calcite, fresh, very soft to moderately hard; surface: smooth to rough, fresh. Fracture set #8.		
151.0								
594.0								
152.0								
593.0	R-25		100% (94%)	FD3				
153.0								
592.0								
154.0								
591.0								
155.0								
590.0				FD6				
156.0								
589.0								
157.0	R-26		68% (40%)					
588.0								
158.0								
587.0								
159.0								
586.0								
160.0								
585.0				FD3				
161.0								
584.0								
162.0	R-27		100% (98%)					
583.0								
163.0								
582.0								
164.0								
581.0								
	R-28							
DATE STARTED: 5/21/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): R. Terral	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

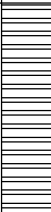

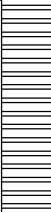

REV 1 Final Boring B-424

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339868.96 ft E. 2405458.50 ft GROUND SURFACE ELEVATION: 745.40 ft DESCRIPTION		
580.0						119.7-202.8 ft SHALE, moderately hard to moderately soft, fresh to slightly weathered, dark gray (N3) and medium dark gray (N4), thickly to massive bedded, moderately to widely fractured, no staining, with fossiliferous intervals		
166.0								
579.0								
167.0								
578.0		R-28	100% (98%)					
168.0								
577.0								
169.0						168.4-168.7 ft Joint, R.D. = 63°, neither ends visible, tight; filling: moderately healed, very thin calcite, fresh, moderately hard; surface: slightly rough, fresh.		
576.0								
170.0								
575.0								
171.0								
574.0								
172.0								
573.0		R-29	91% (49%)		FD3			
173.0								
572.0								
174.0								
571.0								
175.0								
570.0								
176.0								
569.0								
177.0						176.5-195.5 ft R.D. = 32°-66°, very closely to widely spaced, neither ends visible; tight to moderately open; filling: not healed to moderately healed, very thin iron oxide staining and clay, very thin pyrite, fresh; surface: smooth to moderately rough, fresh. Fracture set #9.		
568.0		R-30	47% (9%)					
178.0								
567.0								
179.0								
566.0								
		R-31			FD6			
DATE STARTED: 5/21/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): R. Terral	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-424

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339868.96 ft E. 2405458.50 ft GROUND SURFACE ELEVATION: 745.40 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
565.0		R-31	90% (70%)	FD6		119.7-202.8 ft SHALE, moderately hard to moderately soft, fresh to slightly weathered, dark gray (N3) and medium dark gray (N4), thickly to massive bedded, moderately to widely fractured, no staining, with fossiliferous intervals	
181.0							
564.0							
182.0							
563.0							
183.0							
562.0							
184.0							
561.0							
185.0							
560.0							
186.0							
559.0							
187.0							
558.0							
188.0							
557.0							
189.0							
556.0							
190.0							
555.0							
191.0							
554.0							
192.0							
553.0							
193.0							
552.0							
194.0							
551.0							
		R-32	100% (85%)	FD3			
		R-33	100% (87%)	FD5			
		R-34					
DATE STARTED: 5/21/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						NOTES:	
APPROVED BY: Rolando Benitez						DRILL RIG: CME-55 (Truck) HAMMER ID: 955	
DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon						DRILLER: C. VanVactor HELPER(S): R. Terral	















REV 1 Final Boring B-424

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW(S) & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339868.96 ft E. 2405458.50 ft GROUND SURFACE ELEVATION: 745.40 ft		
						DESCRIPTION		
550.0						119.7-202.8 ft SHALE, moderately hard to moderately soft, fresh to slightly weathered, dark gray (N3) and medium dark gray (N4), thickly to massive bedded, moderately to widely fractured, no staining, with fossiliferous intervals 196.1-199.55 ft R.D. = 42°-66°, closely to moderately spaced, neither ends visible; tight to moderately open; filling: not healed to moderately healed, clean, very thin calcite, fresh, moderately hard; surface: moderately rough to rough, fresh. Fracture set #10.		
196.0								
549.0								
197.0								
548.0		R-34	90% (81%)					
198.0								
547.0								
199.0								
546.0								
200.0								
545.0						--- Bottom of Boring at 202.80 ft. ---		
201.0								
544.0		R-35	81% (81%)					
202.0								
543.0								
DATE STARTED: 5/21/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): R. Terral		
						NOTES: DRILL RIG: CME-55 (Truck) HAMMER ID: 955		

REV 1 Final Boring B-425

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES N. 339874.33 ft E. 2405519.37 ft GROUND SURFACE ELEVATION: 744.91 ft		USCS SYMBOL	REMARKS
							DESCRIPTION			
744.0	1.0	S-1	2-1-2 (3) 53%				0.0-1.5 ft Organic soil, (ol/oh), 90% fines, low plasticity, no dry strength, no dilatancy, low toughness; 10% gravel, medium, angular, flat, medium hardness; dark yellowish brown (10YR 4/2), organic odor, moist, no HCl reaction, with roots, some rock fragments	ol/oh		
743.0	2.0	S-2	2-7-18 (25) 100%				1.5-3.0 ft Silt with gravel, (ml), 85% fines, low plasticity, no dilatancy, low toughness; 10% gravel, fine to medium, angular, elongated, medium hardness; 5% sand, fine, subangular; maximum grain size = 1 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, little roots, with rock fragments	ml		
742.0	3.0	S-3	13-19-21 (40) 100%				3.0-7.5 ft Sandy silt with gravel, (ml), 55% fines, medium plasticity, no dilatancy, low toughness; 30% sand, fine, subrounded; 15% gravel, fine to coarse, subangular, medium hardness; maximum grain size = 1/2 inches, moderate yellowish brown (10YR 5/4) to dark yellowish orange (10YR 6/6), moist, no HCl reaction, with rock fragments	ml		
741.0	4.0		10-19-20 (39) 93%							
740.0	5.0	S-4	6-15-15 (30) 97%							
739.0	6.0	S-5	10-12-13 (25) 100%				7.5-10.5 ft Poorly graded sand with gravel, (sp), 80% sand, fine to medium, subangular; 15% gravel, fine to medium, angular, elongated; 5% fines, low plasticity, no dilatancy, low toughness; maximum grain size = 0.05 inches, moderate brown (5YR 4/4), moist, no HCl reaction, with rock fragments	sp		
738.0	7.0		13-16-16 (32) 27%							
737.0	8.0	S-6	7-7-14 (21) 47%				10.5-21.75 ft Silt with gravel, (ml), 75% fines, low plasticity, medium dry strength, no dilatancy, medium toughness; 25% gravel, fine to medium, angular, elongated, hard hardness; maximum grain size = 1 inches, moderate yellowish brown (10YR 5/4) to light brown (5YR 5/6), moist, no HCl reaction, with rock fragments	ml		
736.0	9.0	S-7	9-10-10 (20) 87%							
735.0	10.0		5-6-7 (13) 90%							
734.0	11.0	S-8	5-5-6 (11) 83%							
733.0	12.0	S-9	6-8-10 (18) 73%							
732.0	13.0		13-10-19 (29) 93%							
731.0	14.0	S-10								
730.0	15.0	S-11								
729.0	16.0									
728.0	17.0	S-12								
727.0	18.0	S-13								
726.0	19.0									
		S-14								
DATE STARTED: 5/18/10 DATE FINISHED: 5/20/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione							DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez							DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-425

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 339874.33 ft E. 2405519.37 ft GROUND SURFACE ELEVATION: 744.91 ft		
724.0	21.0	S-14	11-13-18 (31) 100%				ml	
723.0	22.0	S-15	10-27-36 (63) 100%			21.75-23.9 ft SHALE, clayey, moderately soft, decomposed, medium dark gray (N4) and light brown (5YR 5/6), no reaction to HCl, iron oxide staining		
722.0	23.0	S-16	20-27-50/5 100%					
721.0	24.0					23.9-37.4 ft SHALE, clayey, moderately soft to soft, very intensely weathered, clay sized particles, pale yellowish brown (10YR 6/2) and dark yellowish orange (10YR 6/6), moderately to thinly bedded, closely fractured, no reaction to HCl		SC-1, 23.9-24.4 ft, 5/18/10, 1445
720.0	25.0	R-1	100% (19%)			24.15-44.9 ft R.D. = 5°-75°, very closely to moderately spaced, neither ends visible; tight to moderately open; filling: not healed, intensely to slightly weathered, very thin to moderately thin clay, iron oxide staining; surface: moderately rough to smooth, very intensely to slightly weathered. Fracture set #1.		
719.0	26.0							
718.0	27.0							
717.0	28.0							
716.0	29.0	R-2	68% (0%)					
715.0	30.0							
714.0	31.0			FD6				
713.0	32.0							
712.0	33.0							
711.0	34.0	R-3	60% (0%)					
710.0	35.0							
709.0	36.0							
708.0	37.0							
707.0	38.0	R-4	92% (24%)			37.4-52.8 ft SHALE, clayey, moderately hard, slightly weathered, medium dark gray (N4), moderately to thinly bedded, moderately fractured, no reaction to HCl, iron oxide staining		SC-2, 38.7-39.3 ft, 5/19/10, 0827
706.0	39.0			FD5				
DATE STARTED: 5/18/10 DATE FINISHED: 5/20/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-425

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339874.33 ft E. 2405519.37 ft GROUND SURFACE ELEVATION: 744.91 ft		
						DESCRIPTION		
704.0	41.0	R-5				37.4-52.8 ft SHALE, clayey, moderately hard, slightly weathered, medium dark gray (N4), moderately to thinly bedded, moderately fractured, no reaction to HCl, iron oxide staining		
703.0	42.0							
702.0	43.0	R-5	98% (63%)					
701.0	44.0			FD5				
700.0	45.0							
699.0	46.0							
698.0	47.0					46.5-64.9 ft R.D. = 16°-73°, very closely to widely spaced; tight to moderately open; filling: not healed, clean, iron oxide staining, very thin and moderately thin quartz, very thin clay, slightly weathered; surface: smooth to rough, fresh to intensely weathered. Fracture set #2.		
697.0	48.0	R-6	94% (54%)					
696.0	49.0			FD6				
695.0	50.0							
694.0	51.0			FD5				
693.0	52.0							
692.0	53.0	R-7	87% (38%)			52.8-54.3 ft SHALE, clayey, soft, intensely weathered to decomposed, medium dark gray (N4) and greenish gray (5GY 6/1), very closely fractured, no reaction to HCl, iron oxide staining		
691.0	54.0			FD7				
690.0	55.0					54.3-100.3 ft SHALE, moderately hard to moderately soft, slightly weathered to fresh, medium dark gray (N4), thinly to moderately bedded, closely to moderately fractured, no reaction to HCl		
689.0	56.0							
688.0	57.0			FD5				
687.0	58.0	R-8	100% (63%)					
686.0	59.0							
DATE STARTED: 5/18/10 DATE FINISHED: 5/20/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-425

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339874.33 ft E. 2405519.37 ft GROUND SURFACE ELEVATION: 744.91 ft		
						DESCRIPTION		
684.0	61.0	R-9		FD8		54.3-100.3 ft SHALE, moderately hard to moderately soft, slightly weathered to fresh, medium dark gray (N4), thinly to moderately bedded, closely to moderately fractured, no reaction to HCl		
683.0	62.0							
682.0	63.0	R-9	100% (37%)					
681.0	64.0							
680.0	65.0							
679.0	66.0			FD5		64.9-86.75 ft R.D. = 10°-63°, closely to widely spaced, neither ends visible; filling: not healed; moderately to slightly open; filling: clean, iron oxide staining, very thin clay; surface: slightly to moderately rough, slightly to moderately weathered. Fracture set #3.		
678.0	67.0							
677.0	68.0	R-10	70% (43%)					
676.0	69.0							
675.0	70.0							
674.0	71.0			FD6				
673.0	72.0							
672.0	73.0	R-11	98% (30%)	FD5				
671.0	74.0							
670.0	75.0							
669.0	76.0							
668.0	77.0							
667.0	78.0	R-12	74% (0%)	FD8				
666.0	79.0							
DATE STARTED: 5/18/10 DATE FINISHED: 5/20/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-425

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339874.33 ft E. 2405519.37 ft GROUND SURFACE ELEVATION: 744.91 ft		
						DESCRIPTION		
664.0	81.0	R-13				54.3-100.3 ft SHALE, moderately hard to moderately soft, slightly weathered to fresh, medium dark gray (N4), thinly to moderately bedded, closely to moderately fractured, no reaction to HCl		
663.0	82.0							
662.0	83.0	R-13	90% (7%)	FD6				
661.0	84.0							
660.0	85.0					85.0-100.3 ft Weak reaction to HCl		
659.0	86.0							
658.0	87.0							
657.0	88.0	R-14	95% (53%)			88.1-97.5 ft R.D. = 46°-58°, closely to widely spaced, neither ends visible; tight to slightly open; filling: not healed, clean, iron oxide staining; surface: stepped to slightly rough, fresh to moderately weathered. Fracture set #4.		
656.0	89.0							
655.0	90.0							
654.0	91.0							
653.0	92.0							
652.0	93.0	R-15	100% (72%)	FD5				
651.0	94.0							
650.0	95.0							
649.0	96.0							
648.0	97.0							
647.0	98.0	R-16	100% (78%)					
646.0	99.0							SC-3, 98.55-99.45 ft, 5/20/10, 1036
DATE STARTED: 5/18/10 DATE FINISHED: 5/20/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-425

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
						N. 339874.33 ft	E. 2405519.37 ft		
						GROUND SURFACE ELEVATION: 744.91 ft			
						DESCRIPTION			
						---- Bottom of Boring at 100.30 ft.----			

REV 1 Final Boring B-426

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340296.20 ft E. 2404892.65 ft GROUND SURFACE ELEVATION: 745.20 ft		
						DESCRIPTION		
745.0		S-1	2-3-4 (7) 47%			0.0-1.5 ft Organic soil, (ol/oh), 100% fines; dusky yellowish brown (10YR 2/2), organic odor, dry, no HCl reaction, medium stiff, with organics, contained large gravel of sandstone, fifty percent of leaves and roots, fifty percent silt	ol/oh	7.5 ft, Decomposed shale
744.0	1.0							
743.0	2.0	S-2	2-3-10 (13) 87%			1.5-3.0 ft Sandy lean clay/sandy silt, (cl-ml), 70% fines, low plasticity, low toughness; 30% sand, fine to medium, subangular; maximum grain size = 1 inches, moderate yellowish brown (10YR 5/4), dry, stiff, trace large to medium subangular gravel	cl-ml	
742.0	3.0							
741.0	4.0	S-3	4-10-10 (20) 87%			3.0-4.5 ft Sandy lean clay/sandy silt, (cl-ml), 75% fines, low plasticity, low toughness; 25% sand, medium, subangular; moderate yellowish brown (10YR 5/4), dry, very stiff	cl-ml	
740.0	5.0	S-4	4-9-8 (17) 100%			4.5-6.0 ft Sandy silt with gravel, (ml), 50% fines, low plasticity, low toughness; 30% gravel, fine to coarse, subangular, medium hardness; 20% sand, fine; maximum grain size = 1 inches, moderate yellowish brown (10YR 5/4), dry, very stiff	ml	
739.0	6.0							
738.0	7.0	S-5	8-12-22 (34) 87%			6.0-7.5 ft Silt with gravel, (ml), 50% fines, high plasticity, low toughness; 40% gravel, fine to coarse, subangular, medium hardness; 10% sand, fine to medium; maximum grain size = 1.5 inches, moderate yellowish brown (10YR 5/4) and dark yellowish orange (10YR 6/6), moist, hard	ml	
737.0	8.0	S-6	18-21-16 (37) 100%			7.5-12.0 ft WELL GRADED SAND WITH CLAY AND GRAVEL, (SW-SC), 50% sand, fine to coarse; 41% gravel, fine to coarse, subangular, soft hardness; 9% fines, low plasticity; maximum grain size = 1.25 inches, moderate orange pink (5YR 8/4) and dark yellowish orange (10YR 6/6) from 7.9-9.0 ft, light brown (5YR 5/6) and dusky yellow (5Y 6/4) from 9.0-10.5 ft, and grayish yellow (15Y 8/4) from 10.5-12.0 ft, moist, dense to very dense, weathered shale	SW-SC	
736.0	9.0							
735.0	10.0	S-7	5-15-18 (33)					
734.0	11.0	S-8	12-17-39 (56) 93%					
733.0	12.0							
732.0	13.0	S-9	17-13-14 (27) 100%			12.0-13.5 ft Silty gravel, (gm), 50% gravel, fine to coarse, subangular, soft hardness; 50% fines, low plasticity, high toughness; maximum grain size = 1 inches, light olive brown (5Y 5/6), dry, medium dense, weathered shale	gm	
731.0	14.0	S-10	45-45-30 (75) 100%			13.5-15.0 ft Well graded gravel with silt, (gw-gm), 90% gravel, fine to coarse, medium hardness; 10% fines, low plasticity, low toughness; maximum grain size = 1/2 inches, yellowish gray (5Y 7/2), dry, very dense, weathered shale	gw-gm	
730.0	15.0	S-11	20-50 100%			15.0-16.0 ft Clayey gravel, (gc), 70% gravel, fine to coarse, soft hardness; 30% fines, low plasticity, low toughness; maximum grain size = 1.5 inches, yellowish gray (5Y 7/2) and dark yellowish orange (10YR 6/6), dry, very dense, weathered shale	gc	
729.0	16.0							
728.0	17.0	S-12	32-32-16 (48) 87%			16.0-16.5 ft Interval not sampled		
727.0	18.0					16.5-18.0 ft Well graded gravel with silt, (gw-gm), 90% gravel, fine to coarse, medium hardness; 10% fines, low plasticity, low toughness; maximum grain size = 1.5 inches, yellowish gray (5Y 7/2) with dark yellowish orange (10YR 6/6), dry, dense, weathered shale	gw-gm	
726.0	19.0	S-13	21-25-47 (72) 93%			18.0-19.5 ft Well graded gravel with silt, (gw-gm), 90% gravel, fine to coarse, medium hardness; 10% fines, low plasticity, low toughness; maximum grain size = 1 inches, yellowish gray (5Y 7/2) with dusky yellowish brown (10YR 2/2), dry, very dense, weathered shale	gw-gm	
		S-14	50/4					
DATE STARTED: 4/13/10 DATE FINISHED: 4/13/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-426

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340296.20 ft E. 2404892.65 ft GROUND SURFACE ELEVATION: 745.20 ft DESCRIPTION		
725.0			100%			19.5-19.83 ft SHALE, decomposed, dark gray (N3), no reaction to HCl		Casing set at 20.0 ft; Lose water circulation coring run one, pumping approximately 15 gallons per minute
724.0	21.0					19.83-20.0 ft Interval not sampled due to casing installation		
723.0	22.0	R -1	70% (26%)	FD6		20.0-25.0 ft SHALE, moderately hard to moderately soft, moderately to very intensely weathered, medium dark gray (N4) and yellowish gray (5Y 7/2), no reaction to HCl, iron oxide staining, weathering increases with depth from 20.0 to 25.0		
722.0	23.0					20-25 ft R.D. = 70-75°; surface: rough, planar, very intensely weathered; as depth increases from 20-25 ft. fracture surface weathering increases.		
721.0	24.0							
720.0	25.0							
719.0	26.0					25.0-39.9 ft SHALE, moderately soft to very soft, intensely weathered to decomposed, yellowish gray (5Y 7/2), very closely to closely fractured, no reaction to HCl, iron oxide staining, weathering increases with depth, possible fracture show moderate to heavy iron oxide staining, clay thin layers starting at approximately at 33.0 ft		
718.0	27.0	R -2	89% (0%)					
717.0	28.0							
716.0	29.0							
715.0	30.0							
714.0	31.0							
713.0	32.0	R -3	81% (0%)	FD8				
712.0	33.0							
711.0	34.0							
710.0	35.0							
709.0	36.0							
708.0	37.0	R -4	42% (0%)					
707.0	38.0							
706.0	39.0							
DATE STARTED: 4/13/10 DATE FINISHED: 4/13/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-426

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340296.20 ft E. 2404892.65 ft GROUND SURFACE ELEVATION: 745.20 ft DESCRIPTION		
705.0		R-5				39.9-54.9 ft Bedding plane separation, R.D. = 10°, very closely to closely spaced; surface: rough, planar; moderate amounts of iron oxide staining.		Casing depth lowered to 39.9 ft due to weathered bedrock
704.0	41.0					39.9-49.9 ft SHALE, moderately soft to soft, moderately to intensely weathered, yellowish gray (5Y 7/2) and yellowish gray (5Y 7/2), very closely fractured, no reaction to HCl, iron oxide staining, quartz crystal growth along weathered fracture faces		
703.0	42.0	R-5	100% (0%)	FD8		40.1-49.9 ft Fracture zone, R.D. = 56°, moderately spaced; filling: not healed, quartz, slightly weathered; surface: rough, planar, slightly weathered.		
702.0	43.0							
701.0	44.0							
700.0	45.0							
699.0	46.0							
698.0	47.0	R-6	100% (8%)					
697.0	48.0							
696.0	49.0							
695.0	50.0					49.9-56.9 ft SHALE, moderately hard, moderately to intensely weathered, yellowish gray (5Y 7/2) and medium dark gray (N4), closely fractured, no reaction to HCl, iron oxide staining, weathering is contained to fracture zones, becomes less weathered as depth increases		
694.0	51.0					49.9-57.5 ft R.D. = 10°, moderately to closely spaced; surface: smooth, planar; moderate to heavy iron oxide staining.		
693.0	52.0	R-7	100% (9%)	FD5		50.7- ft R.D. = 56°, moderately spaced; surface: rough, planar; moderate to heavy iron oxide staining.		SC-2, 52.0-52.65 ft., 4/14/10
692.0	53.0							
691.0	54.0					53.5-54.5 ft R.D. = 90°; filling is damp but no free water present, filling: not healed, very thin quartz, fresh; surface: rough, planar, fresh; heavy iron oxide staining on fracture surface prior to quartz crystal formation.		
690.0	55.0							
689.0	56.0							
688.0	57.0	R-8	100% (44%)			56.35-57.85 ft Random fracture, R.D. = 71°; surface: rough, planar; moderate to heavy iron oxide staining on fracture, weathering increases close to fracture.		
687.0	58.0					56.9-64.9 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very thickly to laminated, very widely fractured, no reaction to HCl, calcite replaced shell casts, trace pyrite, pyrite replacing calcite shell casts at approximately 62.8 ft., bedding visible by 10° calcite laminae, weak reaction to HCl approximately 59.0 ft		SC-1, 58.8-59.9 ft., 09:00, 4/14/10
686.0	59.0							
DATE STARTED: 4/13/10 DATE FINISHED: 4/13/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-426

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 745.20 ft						DESCRIPTION	
DESCRIPTION							
685.0		R -9		FD5		56.9-64.9 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very thickly to laminated, very widely fractured, no reaction to HCl, calcite replaced shell casts, trace pyrite, pyrite replacing calcite shell casts at approximately 62.8 ft., bedding visible by 10° calcite laminae, weak reaction to HCl approximately 59.0 ft 	

REV 1 Final Boring B-426

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340296.20 ft E. 2404892.65 ft GROUND SURFACE ELEVATION: 745.20 ft DESCRIPTION		
665.0		R -13				74.9-84.9 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately, extremely widely fractured, weak reaction to HCl, trace calcite replaced shell casts, trace pyrite replacing calcite (secondary), bedding visible by 10° calcite laminae		
664.0	81.0							
663.0	82.0	R -13	99% (99%)					
662.0	83.0			FD0				
661.0	84.0							
660.0	85.0					84.9-99.9 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately, widely to very closely fractured, weak reaction to HCl, calcite replaced shell casts, pyrite replacing calcite (secondary), bedding visible by 10° calcite laminae		
659.0	86.0							
658.0	87.0	R -14	96% (86%)					
657.0	88.0			FD8		87.7-88.4 ft Bedding plane separation, R.D. = 10°, very closely to closely spaced; surface: smooth, planar; trace to moderate iron oxide staining.		
656.0	89.0							
655.0	90.0			FD4		90.1-92.9 ft R.D. = 56°, widely spaced; filling: not healed, very thin trace calcite & pyrite; surface: rough, planar.		
654.0	91.0							
653.0	92.0	R -15	100% (82%)					
652.0	93.0			FD5				
651.0	94.0					94-94.6 ft R.D. = 90°, moderately spaced; filling: very thin trace calcite & pyrite; surface: rough, planar.		
650.0	95.0							
649.0	96.0							
648.0	97.0	R -16	100% (100%)					
647.0	98.0			FD1		97.9- ft Bedding plane separation, R.D. = 10°; surface: moderately rough, planar.		
646.0	99.0							
DATE STARTED: 4/13/10 DATE FINISHED: 4/13/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-426

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 340296.20 ft E. 2404892.65 ft GROUND SURFACE ELEVATION: 745.20 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
645.0		R -17				99.9-109.9 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to very widely fractured, no reaction to HCl, trace pyrite and calcite	SC-3, 113.3-114.65 ft, 12:55, 4/14/10
644.0	101.0						
643.0	102.0	R -17	100% (100%)	FD1			
642.0	103.0						
641.0	104.0						
640.0	105.0						
639.0	106.0						
638.0	107.0	R -18	100% (92%)				
637.0	108.0						
636.0	109.0						
635.0	110.0			FD1			
634.0	111.0				109.9-129.9 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to extremely widely fractured, no reaction to HCl, trace pyrite, hard calcareous circular nodule at 117.35 ft. (0.35ft.) and 116.7 ft (0.15ft)(strong reaction to HCl)		
633.0	112.0				111-111.6 ft R.D. = 56°, moderately spaced; surface: rough, planar.		
632.0	113.0	R -19	100% (98%)				
631.0	114.0						
630.0	115.0						
629.0	116.0						
628.0	117.0						
627.0	118.0	R -20	100% (98%)	FD0			
626.0	119.0						
DATE STARTED: 4/13/10 DATE FINISHED: 4/13/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

REV 1 Final Boring B-426

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 340296.20 ft E. 2404892.65 ft GROUND SURFACE ELEVATION: 745.20 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
625.0 624.0 623.0 622.0 621.0 620.0 619.0 618.0 617.0 616.0 615.0 614.0 613.0 612.0 611.0 610.0 609.0 608.0 607.0 606.0	121.0 122.0 123.0 124.0 125.0 126.0 127.0 128.0 129.0 130.0 131.0 132.0 133.0 134.0 135.0 136.0 137.0 138.0 139.0	R -21 					

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PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
						N. 340296.20 ft	E. 2404892.65 ft		
						GROUND SURFACE ELEVATION: 745.20 ft			
						DESCRIPTION			
605.0						134.9-149.9 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to widely fractured, no reaction to HCl, trace pyrite (134.9-144.9 ft.), trace calcite replaced shells			
604.0									
603.0									
602.0									
601.0									
600.0									
599.0									
598.0									
597.0									
596.0									
595.0									
594.0									
593.0									
592.0									
591.0									
590.0									
589.0									
588.0									
587.0									
586.0									
DATE STARTED: 4/13/10 DATE FINISHED: 4/13/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

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PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340296.20 ft E. 2404892.65 ft GROUND SURFACE ELEVATION: 745.20 ft		
						DESCRIPTION		
585.0		R -28				159.9-174.9 ft SHALE, moderately hard to hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace pyrite replacing calcite in trace shell casts		
584.0	161.0							
583.0	162.0	R -28	98% (94%)					
582.0	163.0							
581.0	164.0							
580.0	165.0							
579.0	166.0							
578.0	167.0	R -29	100% (100%)					
577.0	168.0							
576.0	169.0							
575.0	170.0			FD0		174.9-184.9 ft SHALE, moderately hard to hard, fresh, dark gray (N3), extremely widely to very widely fractured, no reaction to HCl		
574.0	171.0							
573.0	172.0	R -30	100% (100%)					
572.0	173.0							
571.0	174.0							
570.0	175.0							
569.0	176.0							
568.0	177.0	R -31	90% (90%)					
567.0	178.0							
566.0	179.0							
						176.6-176.7 ft Bedding plane separation, R.D. = 10°, very closely spaced; filling: totally healed, moderately thick calcite, fresh; surface: smooth, planar, fresh; pyrite with in bedding, show displacement with in zone of 10 mm or less.		
						179.5-179.52 ft Bedding plane separation, R.D. = 10°, very closely spaced;		
DATE STARTED: 4/13/10 DATE FINISHED: 4/13/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

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PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340296.20 ft E. 2404892.65 ft GROUND SURFACE ELEVATION: 745.20 ft		
						DESCRIPTION		
565.0		R -32				filling: totally healed, moderately thin calcite, fresh; surface: rough, planar, fresh; shows displacement of 10-20 mm.		
564.0	181.0							
563.0	182.0	R -32	90% (90%)					
562.0	183.0							
561.0	184.0			FD0				
560.0	185.0							
559.0	186.0					174.9-184.9 ft SHALE, moderately hard to hard, fresh, dark gray (N3), extremely widely to very widely fractured, no reaction to HCl		
558.0	187.0	R -33	100% (95%)			183.6-183.85 ft R.D. = 10°, very closely to closely spaced; filling: totally healed, very thin calcite and pyrite, fresh; surface: rough, planar, fresh; displacement ranges from 0-10 mm.		
557.0	188.0					184.9-199.9 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to extremely widely fractured, no reaction to HCl, very trace pyrite and calcite replaced shell casts, increase in pyrite and calcite shell casts starting at 194.9ft		
556.0	189.0			FD1		185.7-185.72 ft Bedding plane separation, R.D. = 10°, very closely spaced; filling: totally healed, moderately thin calcite and pyrite, fresh; surface: rough, planar, fresh; shows displacement of less than 5 mm, galena.		
555.0	190.0					187.7-187.75 ft Bedding plane separation, R.D. = 10°, very closely spaced; filling: totally healed, moderately thick calcite and pyrite, fresh; surface: rough, planar, fresh; bedding shows displacement of less than 10 mm.		
554.0	191.0					188-188.7 ft Random fracture, R.D. = 75°; filling is damp but no free water present, filling: not healed, very thin calcite, fresh; surface: rough, planar, fresh.		
553.0	192.0	R -34	100% (100%)					
552.0	193.0							
551.0	194.0							
550.0	195.0			FD0				
549.0	196.0							
548.0	197.0	R -35	100% (100%)					
547.0	198.0							
546.0	199.0							
DATE STARTED: 4/13/10 DATE FINISHED: 4/13/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-426

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340296.20 ft E. 2404892.65 ft GROUND SURFACE ELEVATION: 745.20 ft DESCRIPTION		
545.0		R -36				199.9-214.9 ft SHALE, moderately hard to hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace pyrite and calcite starting at 209.9 ft.		
544.0	201.0							
543.0	202.0	R -36	100% (100%)					
542.0	203.0							
541.0	204.0							
540.0	205.0							
539.0	206.0							
538.0	207.0	R -37	100% (100%)					SC-5, 206.35-207.8 ft., 11:15, 4/15/10
537.0	208.0							
536.0	209.0							
535.0	210.0			FD0				
534.0	211.0							
533.0	212.0	R -38	90% (90%)					
532.0	213.0							
531.0	214.0							
530.0	215.0					214.9-223.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), extremely widely fractured, no reaction to HCl, trace pyrite and calcite, bedding visible between 216.75-217.1 ft. of very closely to closely spaced marked by laminae of calcite		
529.0	216.0							
528.0	217.0	R -39	100% (100%)					
527.0	218.0							
526.0	219.0							
DATE STARTED: 4/13/10 DATE FINISHED: 4/13/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

PROJECT NO. 10-4310

BORING NO. B-426 SHEET 12 OF 12

REV 1 Final Boring B-427

PROJECT NO. 10-4310

						COORDINATES		USCS SYMBOL	REMARKS
						N. 340301.39 ft E. 2404954.97 ft			
						GROUND SURFACE ELEVATION: 753.97 ft			
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW(SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION			
753.0	1.0	S-1	2-7-7 (14) 60%			0.0-0.15 ft Sandy organic soil, (ol/oh), 68% fines, low plasticity, no dry strength, no dilatancy, low toughness; 30% sand, fine to coarse, subangular; 2% gravel, fine to coarse, subangular; maximum grain size = 0.5 inches, dark yellowish brown (10YR 4/2), dry, no HCl reaction, Spongy	pl/oh sm		
752.0	2.0					0.15-0.75 ft Silty sand, (sm), about 5% cobbles; 50% sand, fine to coarse, subangular; 45% fines, low plasticity, no dry strength, no dilatancy, low toughness; 5% gravel, coarse, subangular, hard hardness; maximum grain size = 1.0 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, medium dense, some roots, trace rock fragments	sm		
751.0	3.0	S-2	9-11-8 (19) 77%			0.75-1.5 ft Silty sand, (sm), 55% sand, fine to coarse, subangular; 45% fines, low plasticity, no dry strength, no dilatancy, low toughness; 0% gravel; maximum grain size = 1.0 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, medium dense, some roots			
750.0	4.0					1.5-2.5 ft Interval not sampled			
749.0	5.0					2.5-2.65 ft Silty sand with gravel, (sm), about 5% cobbles, subangular; 40% sand, fine to coarse, subangular; 30% gravel, fine to coarse, subangular, medium hardness; 30% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.5 inches, moderate yellowish brown (10YR 5/4) and yellowish gray (5Y 7/2), moist, no HCl reaction, medium dense, trace roots			
748.0	6.0	S-3	5-7-7 (14) 100%			2.65-4.0 ft SHALE, moderately hard to moderately soft, decomposed, yellowish gray (5Y 7/2) and grayish orange (10YR 7/4), no reaction to HCl, dry, iron oxide staining, fissile			
747.0	7.0					4.0-5.0 ft Interval not sampled			
746.0	8.0	S-4	4-10-11 (21) 100%			5.0-5.9 ft SHALE, moderately hard to moderately soft, decomposed, yellowish gray (5Y 7/2) and grayish orange (10YR 7/4), no reaction to HCl, dry, iron oxide staining, fissile			
745.0	9.0					5.9-6.5 ft SHALE, moderately hard to moderately soft, decomposed, yellowish gray (5Y 7/2) and medium gray (N5), no reaction to HCl, dry to moist, iron oxide staining, pockets of silty sand; moderate yellowish brown (10YR 5/4), low toughness, low plasticity, no dry strength, no dilatancy. fissile			
744.0	10.0					6.5-7.5 ft Interval not sampled			
743.0	11.0	S-5	38-24-19 (43) 80%			7.5-7.9 ft SHALE, moderately hard to moderately soft, decomposed, medium gray (N5) and yellowish gray (5Y 7/2), no reaction to HCl, dry to moist, iron oxide staining, pockets of silty sand; moderate yellowish brown (10YR 5/4), fissile			
742.0	12.0					7.9-9.0 ft SHALE, moderately hard to moderately soft, decomposed, yellowish gray (5Y 7/2) and medium gray (N5), no reaction to HCl, dry, iron oxide staining, fissile			
741.0	13.0	S-6	50/2			9.0-10.0 ft Interval not sampled			
740.0	14.0	R-1	100%			10.0-11.0 ft SHALE, moderately hard to moderately soft, decomposed, medium gray (N5) and yellowish gray (5Y 7/2), no reaction to HCl, wet, iron oxide staining, fissile			
739.0	15.0		75% (0%)			11.0-11.5 ft SHALE, moderately hard to moderately soft, decomposed, yellowish gray (5Y 7/2) and grayish orange (10YR 7/4), no reaction to HCl, wet, iron oxide staining, fissile			
738.0	16.0	R-2	100% (74%)			11.5-12.5 ft Interval not sampled			
737.0	17.0					12.5-12.65 ft SHALE, moderately hard to moderately soft, decomposed, medium dark gray (N4) and yellowish gray (5Y 7/2), no reaction to HCl, wet, iron oxide staining, fissile			
736.0	18.0					12.65-12.7 ft Sample lost with casing advancer set			
735.0	19.0	R-3	72% (36%)			12.7-28.7 ft R.D. = 80-90°, very closely to moderately spaced; surface: rough,			
DATE STARTED: 6/7/10 DATE FINISHED: 6/7/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-427

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS			
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE					
GROUND SURFACE ELEVATION: 753.97 ft										
DESCRIPTION										
733.0	21.0	R -3	72% (36%)	FD6						
732.0	22.0							23.7-33.7 ft SHALE, moderately hard to hard, moderately weathered, medium dark gray (N4) with grayish orange (10YR 7/4), closely to moderately fractured, no reaction to HCl, iron oxide staining, core becomes very intensely weathered to decomposed, see notes for 32.7-33.7 ft		
731.0	23.0									
730.0	24.0									
729.0	25.0	R -4	100% (38%)							
728.0	26.0									
727.0	27.0									
726.0	28.0									
725.0	29.0	R -5	84% (47%)	FD6						
724.0	30.0							28.5-38.7 ft R.D. = 56°, widely to moderately spaced; surface: rough, planar; iron oxide staining. 29.2-38.7 ft R.D. = 36°, very closely to moderately spaced; surface: rough, planar, slightly weathered; iron oxide staining. 29.3-43.7 ft R.D. = 80-90°, moderately to widely spaced; surface: rough, undulating, slightly weathered; iron oxide staining, clay laminae on some fractures.		
723.0	31.0									
722.0	32.0									
721.0	33.0									
720.0	34.0	R -6	60% (28%)	FD8						
719.0	35.0							32.7-33.7 ft Possible void, clay zone, or decomposed, very fast drilling.		
718.0	36.0									
717.0	37.0									
716.0	38.0									
715.0	39.0	R -7	70% (0%)	FD7				33.7-38.7 ft SHALE, moderately hard to hard, intensely to moderately weathered, medium dark gray (N4) with grayish orange (10YR 7/4), very closely to moderately fractured, no reaction to HCl, iron oxide staining, decomposed intervals		
						38.7-43.7 ft SHALE, soft to moderately hard, intensely weathered, grayish orange (10YR 7/4) with yellowish gray (5Y 7/2), very closely to closely fractured, no reaction to HCl, iron oxide staining, decomposed zones				
DATE STARTED: 6/7/10 DATE FINISHED: 6/7/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: NQ DRILLING CO. Terracon		NOTES:		
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665		

REV 1 Final Boring B-427

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 753.97 ft						DESCRIPTION		
713.0	41.0	R -7	70% (0%)			38.7- ft Highly fractured zone, difficult to determine dip direction. 38.7-43.7 ft SHALE, soft to moderately hard, intensely weathered, grayish orange (10YR 7/4) with yellowish gray (5Y 7/2), very closely to closely fractured, no reaction to HCl, iron oxide staining, decomposed zones		
712.0	42.0							
711.0	43.0							
710.0	44.0							
709.0	45.0	R -8	82% (8%)		FD7	43.7-54.2 ft SHALE, moderately soft to moderately hard, intensely to moderately weathered, grayish orange (10YR 7/4) with medium gray (N5), very closely to moderately fractured, no reaction to HCl, iron oxide staining, decomposed zones 43.7-48.7 ft Fracture zone, very closely to closely spaced; surface: rough, planar, intensely weathered; fractures include 36, 56, 10° bedding planes, all have heavy iron oxide staining. few contain very thin quartz crystals filling.		
708.0	46.0							
707.0	47.0							
706.0	48.0							
705.0	49.0	R -9	76% (8%)			48.7-53.7 ft Fracture zone, very closely to closely spaced; surface: rough, planar; fractures include 36, 56, and 90°, bedding at 10°, all contain iron oxide staining with quartz crystals in some (predominately at 90°).		
704.0	50.0							
703.0	51.0							
702.0	52.0							
701.0	53.0	R -10	96% (60%)		FD5	54.2-60.8 ft SHALE, moderately hard to hard, fresh to slightly weathered, medium gray (N5), very closely to widely fractured, no reaction to HCl, trace iron oxide staining, very weak reaction in sporadic thin layers and laminae in core, 58.7 ft trace molds of shells with and without calcite fill 54.2-55.4 ft Bedding plane separation, R.D. = 10°, very closely to closely spaced; surface: smooth, planar; iron oxide staining, some bedding planes are fresh. 55-59.3 ft R.D. = 80-90°; surface: rough, undulating; iron oxide staining and copper color on fracture face. 55.9-56.1 ft R.D. = 56°, very closely spaced; surface: rough, planar; iron oxide staining.		
700.0	54.0							
699.0	55.0							
698.0	56.0							
697.0	57.0	R -11	100% (96%)					
696.0	58.0							
695.0	59.0							
DATE STARTED: 6/7/10 DATE FINISHED: 6/7/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		
						DRILL RIG: CME-55 (Track) HAMMER ID: 340665		


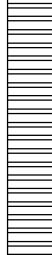



REV 1 Final Boring B-427

PROJECT NO. 10-4310

						COORDINATES		USCS SYMBOL	REMARKS
						N. 340301.39 ft E. 2404954.97 ft			
						GROUND SURFACE ELEVATION: 753.97 ft			
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION			
693.0	61.0	R -11	100% (96%)	FD5		59.9-60.85 ft Bedding plane separation, R.D. = 10°, moderately spaced; surface: moderately rough, planar, moderately weathered; moderately rough due to shell casts at bedding plane, moderate iron oxide staining.			
692.0	62.0				60.8-68.7 ft SHALE, moderately hard to hard, fresh, dark gray (N3) with medium dark gray (N4), laminated to thickly, very widely fractured, strong reaction to HCl, calcite and pyrite replaced shell casts, calcite replaced shells layers and calcite laminae along 10° bedding				
691.0	63.0								
690.0	64.0								
689.0	65.0	R -12	100% (99%)	FD1					
688.0	66.0								
687.0	67.0								
686.0	68.0								
685.0	69.0	R -13	99% (74%)	FD4		68.7-74.2 ft SHALE, moderately hard to hard, fresh, dark gray (N3), laminated to thickly, moderately fractured, strong reaction to HCl, zones of weak and no below 71.0 to 74.2 ft, few zones showing fresh to slightly weathered, calcite and pyrite replaced shell casts, calcite and fossiliferous intervals show bedding			
684.0	70.0				69.2-73.7 ft Bedding plane separation, R.D. = 10°, moderately to widely spaced; surface: slightly rough, planar, slightly weathered; iron oxide staining, moderately rough due to shell casts along bedding.				
683.0	71.0				71-74.2 ft R.D. = 70-72°, closely to widely spaced; surface: rough, planar, slightly weathered; iron oxide staining.				
682.0	72.0				72.4-73.4 ft R.D. = 80°; surface: rough, planar, slightly weathered; iron oxide staining.				
681.0	73.0	R -14	100% (96%)	FD5					
680.0	74.0				74.2-78.7 ft SHALE, moderately hard to hard, fresh, dark gray (N3), laminated to thickly, widely fractured, strong reaction to HCl, calcite and pyrite replaced shell casts, calcite and fossiliferous intervals show bedding				
679.0	75.0								
678.0	76.0								
677.0	77.0	R -15	98% (98%)	FD0					
676.0	78.0								
675.0	79.0								
DATE STARTED: 6/7/10 DATE FINISHED: 6/7/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benítez						DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-427

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 753.97 ft						DESCRIPTION		
673.0	81.0	R -15	98% (98%)	FD1		78.7-93.7 ft SHALE, moderately hard to hard, fresh, dark gray (N3), laminated to thickly, widely to very widely fractured, strong reaction to HCl, calcite and pyrite replaced shell casts, calcite shows bedding		
672.0	82.0							
671.0	83.0							
670.0	84.0							
669.0	85.0	R -16	94% (83%)	FD1		84.45-84.75 ft R.D. = 56°; surface: rough, planar.		
668.0	86.0							
667.0	87.0							
666.0	88.0							
665.0	89.0	R -17	100% (100%)	FD0				
664.0	90.0							
663.0	91.0							
662.0	92.0							
661.0	93.0	R -18	100% (86%)	FD7		93.7-98.5 ft SHALE, moderately hard to hard, fresh, dark gray (N3), laminated to moderately, widely to closely fractured, strong reaction to HCl, calcite and pyrite replaced shell casts, calcite shows bedding, HCl reaction weakens with depth		
660.0	94.0					95.1-95.15 ft R.D. = 36°; surface: rough, planar.		
659.0	95.0					95.35-95.85 ft Bedding plane separation, R.D. = 10°, closely to moderately spaced; surface: smooth, planar.		
658.0	96.0							
657.0	97.0	R -19	100% (100%)	FD0				
656.0	98.0							
655.0	99.0					98.5-101.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), laminated to moderately, widely fractured, no reaction to HCl, calcite and pyrite replaced shell casts, calcite shows bedding		
DATE STARTED: 6/7/10 DATE FINISHED: 6/7/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665

REV 1 Final Boring B-427							PROJECT NO. 10-4310	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340301.39 ft E. 2404954.97 ft GROUND SURFACE ELEVATION: 753.97 ft		
						DESCRIPTION		
653.0	101.0	R -19	100% (100%)	FD0		----		
						Bottom of Boring at 101.00 ft.----		
DATE STARTED: 6/7/10 DATE FINISHED: 6/7/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: NQ DRILLING CO. Terracon		NOTES: DRILL RIG: CME-55 (Track) HAMMER ID: 340665
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		

REV 1 Final Boring B-428

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW(SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340444.20 ft E. 2404878.07 ft GROUND SURFACE ELEVATION: 750.57 ft DESCRIPTION		
750.0	1.0	S-1	0-1-1 (2) 67%			0.0-1.5 ft Silty sand, (sm), 80% sand, fine to medium; 15% fines, low plasticity, low toughness; 5% gravel, fine; maximum grain size = 0.01 inches, moderate brown (5YR 4/4), moist, no HCl reaction, very loose	sm	
749.0	2.0	S-2	2-2-3 (5) 93%			1.5-4.5 ft CLAYEY SAND WITH GRAVEL, (SC), 52% sand, fine to coarse; 25% fines, low plasticity, low toughness; 23% gravel, fine to coarse, subrounded to subangular, flat and elongated, hard hardness; maximum grain size = 1.0 inches, moderate yellowish brown (10YR 5/4) and dark yellowish orange (10YR 6/6), moist, no HCl reaction, loose, coarse sand layer from 3.8-4.0 ft	SC	
748.0	3.0							
747.0	4.0	S-3	4-4-6 (10) 80%					
746.0	5.0	S-4	4-7-9 (16) 87%			4.5-6.0 ft Well graded sand with silt, (sw-sm), 80% sand, fine to medium; 10% gravel, fine to medium, subrounded, hard hardness; 10% fines, medium plasticity, low toughness; maximum grain size = 0.03 inches, grayish orange (10YR 7/4) and dark yellowish orange (10YR 6/6), dry, no HCl reaction, medium dense, coarse sand from 5.4 to 5.6 ft.	sw-sm	
745.0	6.0							
744.0	7.0	S-5	3-4-6 (10) 100%			6.0-9.0 ft CLAYEY SAND WITH GRAVEL, (SC), 48% sand, fine to coarse; 29% fines, medium plasticity, low toughness; 23% gravel, fine to medium, subrounded to subangular, hard hardness; maximum grain size = 0.9 inches, grayish orange (10YR 7/4) and dark yellowish orange (10YR 6/6), moist, no HCl reaction, loose to medium dense	SC	
743.0	8.0	S-6	4-9-7 (16) 100%					
742.0	9.0							
741.0	10.0	ST-1	80%			9.0-11.0 ft Shelby tube to be sampled (not for laboratory testing)		
740.0	11.0							
739.0	12.0	S-7	11-13-12 (25) 93%			11.0-12.5 ft Poorly graded sand with silt and gravel, (sp-sm), 70% sand, fine to medium; 20% gravel, fine to medium, subangular, flat and elongated, hard hardness; 10% fines, low plasticity, low toughness; maximum grain size = 0.03 inches, dusky yellow (5Y 6/4) and light brown (5YR 5/6), moist, no HCl reaction, medium dense	sp-sm	Decomposed shale starting at 12.5 ft.
738.0	13.0	S-8	13-47-50/5 86%			12.5-13.9 ft Poorly graded sand with silt and gravel, (sp-sm), 50% sand, fine to coarse; 40% gravel, fine to medium, subangular, flat and elongated, hard hardness; 10% fines, medium plasticity, low toughness; maximum grain size = 0.03 inches, very pale orange (10YR 8/2), moist, no HCl reaction, very dense	sp-sm	
737.0	14.0							
736.0	15.0	S-9	23-46-46 (92) 93%			14.0-15.5 ft Silty sand with gravel, (sm), 50% sand, fine to medium; 30% fines, medium plasticity, low toughness; 20% gravel, fine, angular, flat and elongated, soft hardness; maximum grain size = 0.01 inches, dusky yellow (5Y 6/4), moist, no HCl reaction, very dense	sm	
735.0	16.0	S-10	37-50/5 100%			15.5-16.42 ft Poorly graded gravel with silt and sand, (gp-gm), 70% gravel, fine to coarse, angular, flat and elongated, soft hardness; 20% sand, fine to medium; 10% fines, medium plasticity, low toughness; maximum grain size = 0.08 inches, light olive gray (5Y 5/2), moist, no HCl reaction, dense	gp-gm	
734.0	17.0							
733.0	18.0	S-11	16-37-50/2 100%			16.42-17.0 ft Interval not sampled	gp-gm	
732.0	19.0	R-1	72% (13%)	FD7		17.0-18.17 ft Poorly graded gravel with silt and sand, (gp-gm), 70% gravel, fine to coarse, angular, soft hardness; 20% sand, fine to medium; 10% fines, medium plasticity, low toughness; maximum grain size = 0.75 inches, medium light gray (N6) and moderate yellowish brown (10YR 5/4), moist, no HCl reaction, very dense		
731.0								
DATE STARTED: 4/10/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. Vanvactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-428

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						<p>N. 340444.20 ft E. 2404878.07 ft</p> <p>GROUND SURFACE ELEVATION: 750.57 ft</p>		
730.0	21.0	R-1		FD7		18.17-20.8 ft SHALE, moderately soft to moderately hard, slightly weathered, dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining		
729.0	22.0					20.8-25.8 ft SHALE, moderately hard, slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining		
728.0	23.0					21.3-21.9 ft R.D. = 80°; filling: slightly weathered; surface: slightly rough, undulating, slightly weathered. Fracture set #F-1.		
727.0	24.0	R-2	98% (12%)	FD7				
726.0	25.0							
725.0	26.0					25.8-30.8 ft SHALE, moderately hard, slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining, intensely broken (due to a combination of weathering and fracturing)		
724.0	27.0					25.8-26.6 ft Joint, R.D. = 75°; surface: smooth, planar. Fracture set #F-2.		
723.0	28.0	R-3	100% (8%)	FD7				
722.0	29.0							
721.0	30.0							
720.0	31.0					30.8-35.8 ft SHALE, moderately hard, slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining		
719.0	32.0					30.8-35.8 ft Joint, R.D. = 85°, open; filling: totally healed, iron oxide staining; surface: slightly rough, undulating. Fracture set #F-3.		
718.0	33.0	R-4	92% (20%)	FD7				
717.0	34.0							
716.0	35.0							
715.0	36.0					35.8-37.9 ft SHALE, moderately hard, slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining		
714.0	37.0							
713.0	38.0	R-5	92% (20%)	FD7		37.7-39.1 ft R.D. = 75°; surface: smooth, planar. Fracture set #F-4.		
712.0	39.0					37.9-38.0 ft Fat clay, (ch), medium gray (N5)	ch	
711.0						38.0-40.8 ft SHALE, moderately hard, slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining		
DATE STARTED: 4/10/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. Vanvector HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

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PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 340444.20 ft E. 2404878.07 ft GROUND SURFACE ELEVATION: 750.57 ft		
710.0	41.0	R-5		FD7		40.8-45.8 ft SHALE, moderately hard, slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining		
709.0	42.0					40.8-43.25 ft Joint, R.D. = 85°; surface: slightly rough, undulating. Fracture set #F-5.		
708.0	43.0	R-6	94% (12%)	FD7				
707.0	44.0							
706.0	45.0							
705.0	46.0					45.8-50.8 ft SHALE, moderately hard, slightly weathered, dark gray (N3), closely to widely fractured, no reaction to HCl, iron oxide staining		
704.0	47.0					45.8-46.2 ft Joint, R.D. = 90°; filling: partly healed, moderately thin quartz fill, moderately weathered; surface: rough, moderately weathered. Fracture set #F-6.		47.0 ft. Top of competant rock
703.0	48.0	R-7	98% (74%)	FD3				
702.0	49.0							
701.0	50.0							
700.0	51.0					50.8-55.8 ft SHALE, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, trace fossils throughout, trace pyrite at 54.15 ft		
699.0	52.0							
698.0	53.0	R-8	98% (98%)	FD0				
697.0	54.0							
696.0	55.0							
695.0	56.0					55.8-60.8 ft SHALE, moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, trace fossils throughout, trace pyrite throughout		
694.0	57.0							
693.0	58.0	R-9	100% (100%)	FD0				
692.0	59.0							
691.0								
DATE STARTED: 4/10/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. Vanvactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-428

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						<p>N. 340444.20 ft E. 2404878.07 ft</p> <p>GROUND SURFACE ELEVATION: 750.57 ft</p>		
690.0	61.0	R-9		FD0		60.8-90.8 ft SHALE, moderately hard, fresh, dark gray (N3), very widely to extremely widely fractured, no reaction to HCl, trace fossils throughout, trace pyrite throughout		
689.0	62.0							
688.0	63.0							
687.0	64.0	R-10	100% (100%)	FD0				
686.0	65.0							
685.0	66.0							
684.0	67.0							
683.0	68.0							
682.0	69.0	R-11	100% (100%)	FD0				
681.0	70.0							
680.0	71.0							
679.0	72.0							
678.0	73.0							
677.0	74.0	R-12	100% (100%)	FD0		77.7-78 ft Joint, R.D. = 15°; filling: slightly weathered; surface: smooth, planar, slightly weathered. Fracture set #F-7.		
676.0	75.0							
675.0	76.0							
674.0	77.0							
673.0	78.0	R-13	98% (92%)	FD1				
672.0	79.0							
671.0								
DATE STARTED: 4/10/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. Vanvector HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-428

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340444.20 ft E. 2404878.07 ft GROUND SURFACE ELEVATION: 750.57 ft DESCRIPTION		
670.0	81.0	R-13		FD1		60.8-90.8 ft SHALE, moderately hard, fresh, dark gray (N3), very widely to extremely widely fractured, no reaction to HCl, trace fossils throughout, trace pyrite throughout		
669.0	82.0							
668.0	83.0	R-14	100% (100%)	FD0				
667.0	84.0							
666.0	85.0							
665.0	86.0							
664.0	87.0							
663.0	88.0	R-15	92% (92%)	FD0				
662.0	89.0							
661.0	90.0							
660.0	91.0					90.8-105.8 ft SHALE, moderately hard, fresh, dark gray (N3), no reaction to HCl, less abundant fossils and pyrite throughout		
659.0	92.0							
658.0	93.0	R-16	100% (100%)	FD0				
657.0	94.0							
656.0	95.0							
655.0	96.0							
654.0	97.0							
653.0	98.0	R-17	100% (100%)	FD0				
652.0	99.0							
651.0								
DATE STARTED: 4/10/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: C. Vanvector HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955	

REV 1 Final Boring B-428

PROJECT NO. 10-4310









COORDINATES						USCS SYMBOL	REMARKS	
N. 340444.20 ft E. 2404878.07 ft GROUND SURFACE ELEVATION: 750.57 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
650.0		R-17		FD0		90.8-105.8 ft SHALE, moderately hard, fresh, dark gray (N3), no reaction to HCl, less abundant fossils and pyrite throughout		
101.0								
649.0								
102.0								
648.0								
103.0		R-18	100% (100%)	FD0				
647.0								
104.0								
646.0								
105.0								
645.0								
106.0								
644.0								
107.0								
643.0								
108.0		R-19	100% (100%)	FD0				
642.0								
109.0								
641.0								
110.0								
640.0								
111.0								
639.0								
112.0								
638.0								
113.0		R-20	100% (100%)	FD0				
637.0								
114.0								
636.0								
115.0								
635.0								
116.0								
634.0								
117.0								
633.0								
118.0		R-21	100% (100%)	FD0				
632.0								
119.0								
631.0								
DATE STARTED: 4/10/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Jennifer Ostrowsky						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. Vanvector HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 955

PROJECT NO. 10-4310

BORING NO. B-428 SHEET 7 OF 7

REV 1 Final Boring B-429

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340449.24 ft E. 2404939.62 ft GROUND SURFACE ELEVATION: 757.19 ft DESCRIPTION		
757.0	1.0	S-1	1-1-2 (3) 47%			0.0-1.5 ft Clayey sand, (sc), 80% sand, fine, rounded, very soft hardness; 20% fines, low plasticity, no dilatancy; moderate brown (5YR 4/4), moist, loose, homogeneous, weak cementation	sc	
756.0	2.0					1.5-2.5 ft Interval not sampled		
755.0	3.0	S-2	5-5-8 (13) 67%			2.5-4.0 ft CLAYEY SAND, (SC), 58% sand, fine to coarse, subrounded to rounded; 42% fines, low plasticity, no dilatancy, no toughness; moderate brown (5YR 4/4), moist, stiff	SC	
754.0	4.0					4.0-5.0 ft Interval not sampled		
753.0	5.0							
752.0	6.0	S-3	7-13-15 (28) 53%			5.0-6.5 ft CLAYEY SAND, (SC), 58% sand, fine to coarse, subrounded; 42% fines, low plasticity, no dilatancy, no toughness; moderate yellowish brown (10YR 5/4), moist, very stiff	SC	
751.0	7.0					6.5-7.5 ft Interval not sampled		
750.0	8.0	S-4	3-5-8 (13) 100%			7.5-9.0 ft CLAYEY SAND, (SC), 58% sand, fine to coarse, subrounded; 42% fines, low plasticity; dark yellowish orange (10YR 6/6), stiff	SC	
749.0	9.0					9.0-10.0 ft Interval not sampled		
748.0	10.0							
747.0	11.0	S-5	18-33-21 (54) 53%			10.0-11.5 ft Poorly graded sand with clay and gravel, (sp-sc), 60% sand, fine to medium, subrounded, soft hardness; 30% gravel, fine to medium, subangular, flat and elongated, medium hardness; 10% fines; maximum grain size = 0.5 inches, moderate yellowish brown (10YR 5/4), dense, homogeneous	sp-sc	
746.0	12.0					11.5-12.5 ft Interval not sampled		
745.0	13.0	S-6	13-15-15 (30) 100%			12.5-14.0 ft SILTY GRAVEL WITH SAND, (GM), 43.02% gravel, fine to medium, subangular, flat and elongated, hard hardness; 36.68% sand, fine, subrounded, soft hardness; 20.3% fines; moderate yellowish brown (10YR 5/4), moist, medium dense, homogeneous, Iron oxidation staining	GM	
744.0	14.0					14.0-15.0 ft Interval not sampled		
743.0	15.0							
742.0	16.0	S-7	19-28-39 (67) 100%			15.0-16.5 ft SILTY GRAVEL WITH SAND, (GM), 43.02% gravel, fine to medium, subangular, medium hardness; 36.68% sand, fine to medium, subrounded, soft hardness; 20.3% fines; maximum grain size = 0.7 inches, moderate yellowish brown (10YR 5/4) and light brown (5YR 5/6), very dense, homogeneous	GM	
741.0	17.0					16.5-17.5 ft Interval not sampled		
740.0	18.0	S-8	15-19-26 (45) 100%			17.5-19.0 ft Clayey sand with gravel, (sc), 70% sand, fine to medium, subrounded, soft hardness; 15% gravel, fine to medium, subangular, flat and elongated, medium hardness; 15% fines, low plasticity; maximum grain size = 0.4 inches, pale yellowish brown (10YR 6/2) and light brown (5YR 5/6), moist, dense, homogeneous	sc	
739.0	19.0					19.0-20.0 ft Interval not sampled		
738.0								
DATE STARTED: 4/10/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jesse Merkel						DRILLING METHOD: 2-15/16" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-429

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340449.24 ft E. 2404939.62 ft GROUND SURFACE ELEVATION: 757.19 ft DESCRIPTION		
737.0		S-9	50 5%			20.0-20.1 ft No representative sample recovered		
	21.0					20.1-21.0 ft Interval not sampled		
736.0						21.0-25.0 ft SHALE, moderately soft, moderately weathered, pitted, dark gray (N3), closely to moderately fractured, dry, iron oxide staining, intensely weathered thin layers of iron oxide stained shale, striated clay laminae		
735.0	22.0							
734.0	23.0	R-1	100% (33%)					
733.0	24.0							
732.0	25.0					25.0-30.0 ft SHALE, moderately hard, moderately weathered, dark gray (N3), moderately to closely fractured, no reaction to HCl, dry, iron oxide staining		
731.0	26.0					25.71-26.1 ft Joint, R.D. = 29°, closely spaced; filling: not healed; surface: smooth, planar; iron oxide staining on the fracture spaces. Fracture set #F1.		
730.0	27.0							
729.0	28.0	R-2	100% (44%)	FD5		28.3-28.5 ft Joint, R.D. = 70°, closely spaced, slightly open; dry, surface: stepped, planar. Fracture set #F2.		
728.0	29.0							
727.0	30.0					30.0-35.0 ft SHALE, moderately hard, moderately weathered, dark gray (N3), moderately fractured, no reaction to HCl, dry, iron oxide staining		
726.0	31.0					30.4-30.52 ft Joint, R.D. = 22°, very closely spaced, slightly open; surface: stepped, undulating. Fracture set #F3.		
725.0	32.0					30.95-31.45 ft Joint, R.D. = 75°, closely spaced; dry but shows evidence of flow, filling: not healed, intensely weathered; surface: slightly rough, intensely weathered; iron oxide on the fracture face. Fracture set #F4.		
724.0	33.0	R-3	100% (68%)			32.3-32.55 ft Joint, R.D. = 45°; Fracture set #F5.		
723.0	34.0					32.55-35 ft Joint, R.D. = 86°, very closely to closely spaced; dry, filling: partly healed, slightly weathered; surface: smooth, undulating, slightly weathered. Fracture set #F6.		
722.0	35.0							
721.0	36.0					35.0-40.0 ft SHALE, moderately hard, slightly weathered, grayish black (N2), moderately fractured, no reaction to HCl, dry, iron oxide staining		
720.0	37.0					35-40 ft Joint, R.D. = 79°, very closely to moderately spaced, slightly open; dry, filling: not healed; surface: slightly rough; fracture angles vary from horizontal to 80°. Fracture set #F6.		
719.0	38.0	R-4	100% (78%)	FD5				
718.0	39.0							
DATE STARTED: 4/10/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jesse Merkel						DRILLING METHOD: 2-15/16" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-429

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 757.19 ft						DESCRIPTION		
717.0	41.0	R-5	98% (60%)	FD5		40.0-45.0 ft SHALE, moderately hard, slightly weathered, dark gray (N3), moderately to closely fractured, no reaction to HCl, dry, iron oxide staining		
716.0	42.0					40-41.5 ft Joint, R.D. = 80°, very closely spaced; dry, filling: partly healed, very thin; surface: slightly rough. Fracture set #F7.		
715.0	43.0					41.9-45 ft Joint; surface: slightly rough; closely spaced fractures, multiple angle fractures. Fracture set #F8.		
714.0	44.0							
713.0	45.0							
712.0	46.0	R-6	94% (84%)	FD5		45.0-50.0 ft SHALE, moderately hard, slightly weathered, dark gray (N3), moderately to closely fractured, no reaction to HCl, dry, iron oxide staining		
711.0	47.0					46.8-46.9 ft Joint, R.D. = 20°, closely spaced; dry, surface: smooth. Fracture set #F9.		
710.0	48.0							
709.0	49.0							
708.0	50.0							
707.0	51.0	R-7	90% (58%)	FD1		50.0-55.0 ft SHALE, moderately hard, slightly weathered, dark gray (N3), moderately to widely fractured, dry, iron oxide staining, fossil casts, strong reaction to HCl		
706.0	52.0							
705.0	53.0					53.1-53.4 ft Joint, R.D. = 53°; filling: not healed; surface: slightly rough. Fracture set #F10.		
704.0	54.0							
703.0	55.0							
702.0	56.0	R-8	100% (100%)	FD1		55.0-60.0 ft SHALE, moderately hard, fresh, grayish black (N2), moderately to widely fractured, no reaction to HCl, dry, strong HCl reaction on the fossils, 10° bedding		
701.0	57.0							
700.0	58.0							
699.0	59.0							
698.0								
DATE STARTED: 4/10/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jesse Merkel						DRILLING METHOD: 2-15/16" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665

REV 1 Final Boring B-429

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340449.24 ft E. 2404939.62 ft GROUND SURFACE ELEVATION: 757.19 ft		
						DESCRIPTION		
697.0						60.0-70.0 ft SHALE, moderately hard, fresh, grayish black (N2), very widely fractured, dry, 10° bedding planes, strong HCl reaction on the fossil		
696.0	61.0							
695.0	62.0							
694.0	63.0							
693.0	64.0							
692.0	65.0							
691.0	66.0							
690.0	67.0							
689.0	68.0							
688.0	69.0							
687.0	70.0					70.0-75.0 ft SHALE, horizontal, moderately hard, fresh, grayish black (N2), very widely fractured, no reaction to HCl, dry, 10° bedding planes		
686.0	71.0							
685.0	72.0							
684.0	73.0							
683.0	74.0							
682.0	75.0							
681.0	76.0							
680.0	77.0							
679.0	78.0							
678.0	79.0							
						75.0-80.0 ft SHALE, horizontal, moderately hard, fresh, grayish black (N2), very widely fractured, no reaction to HCl, dry, 10° dip angle of the bedding plane, very small fossils, strong reaction to HCl at 76.1 ft		

DATE STARTED: 4/10/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jesse Merkel	DRILLING METHOD: 2-15/16" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez	DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665




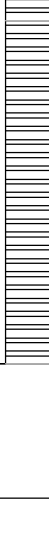
REV 1 Final Boring B-429

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 757.19 ft						DESCRIPTION	
DESCRIPTION							
677.0		R-13	96% (94%)			80.0-85.0 ft SHALE, horizontal, moderately hard, fresh, grayish black (N2), widely to closely fractured, no reaction to HCl, dry, 10° bedding planes	
676.0	81.0						
675.0	82.0						
674.0	83.0						
673.0	84.0						
672.0	85.0	R-14	100% (48%)	FD1		83.5-83.6 ft Joint, R.D. = 28°, closely spaced; dry but shows evidence of flow, filling: not healed, slightly weathered; surface: stepped, slightly weathered; iron oxide staining on the fracture. Fracture set #F11.	
671.0	86.0						
670.0	87.0						
669.0	88.0						
668.0	89.0						
667.0	90.0	R-15	100% (100%)			85.0-90.0 ft SHALE, horizontal, moderately hard, fresh, grayish black (N2), widely to moderately fractured, no reaction to HCl, dry, intensely mechanically broken, 10° bedding	
666.0	91.0						
665.0	92.0						
664.0	93.0						
663.0	94.0						
662.0	95.0	R-16	96% (90%)	FD0		90.0-100.0 ft SHALE, horizontal, moderately hard, fresh, grayish black (N2), very widely to extremely widely fractured, no reaction to HCl, dry, bedding is at a 10° angle	
661.0	96.0						
660.0	97.0						
659.0	98.0						
658.0	99.0						
DATE STARTED: 4/10/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jesse Merkel						DRILLING METHOD: 2-15/16" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665

REV 1 Final Boring B-429

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 757.19 ft						DESCRIPTION	
657.0		R-17	100% (84%)	FD0		100.0-105.0 ft SHALE, horizontal, moderately hard, fresh, grayish black (N2), very widely fractured, dry, 10° dip angle of the bedding plane	103.8-105.0 ft., SC-2, 11:00, 4/11/10
656.0	101.0					101.2-102.2 ft Joint, R.D. = 80°, closely spaced; filling: not healed, very thin calcite, fresh, soft; surface: slightly rough, fresh. Fracture set #F12.	
655.0	102.0						
654.0	103.0						
653.0	104.0						
652.0	105.0	R-18	98% (98%)	FD0		105.0-110.0 ft SHALE, horizontal, moderately hard, fresh, grayish black (N2), very widely fractured, dry, 10° dip angle of the bedding plane. very small fossil, strong reaction to HCl at 105.77 ft., small fleck of pyrite at 108.25 ft	
651.0	106.0						
650.0	107.0						
649.0	108.0						
648.0	109.0						
647.0	110.0	R-19	100% (100%)	FD0		110.0-115.0 ft SHALE, moderately hard, fresh, grayish black (N2), very widely fractured, dry, 10° bedding planes, small fossil nodules that have strong reaction to HCl	
646.0	111.0						
645.0	112.0						
644.0	113.0						
643.0	114.0						
642.0	115.0	R-20	100% (100%)	FD0		115.0-120.0 ft SHALE, moderately hard, fresh, grayish black (N2), very widely fractured, no reaction to HCl, dry, 10° bedding plane, small fossil nodules that have strong reaction to HCl, fleck of pyrite at 119.7 ft	
641.0	116.0						
640.0	117.0						
639.0	118.0						
638.0	119.0						
DATE STARTED: 4/10/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jesse Merkel						DRILLING METHOD: 2-15/16" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665

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PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 340449.24 ft E. 2404939.62 ft GROUND SURFACE ELEVATION: 757.19 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ftin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
637.0 636.0 635.0 634.0 633.0 632.0 631.0 630.0 629.0 628.0 627.0 626.0 625.0 624.0 623.0 622.0 621.0 620.0 619.0 618.0	121.0 122.0 123.0 124.0 125.0 126.0 127.0 128.0 129.0 130.0 131.0 132.0 133.0 134.0 135.0 136.0 137.0 138.0 139.0	R-21 <					

REV 1 Final Boring B-429

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 757.19 ft						DESCRIPTION	
DESCRIPTION							
617.0		R-25	100% (100%)			140.0-155.0 ft SHALE, horizontal, moderately hard, fresh, grayish black (N2), extremely widely fractured, no reaction to HCl, dry, 10° bedding planes	
616.0	141.0						
615.0	142.0						
614.0	143.0						
613.0	144.0						
612.0	145.0	R-26	100% (100%)				
611.0	146.0						
610.0	147.0						
609.0	148.0						
608.0	149.0						
607.0	150.0	R-27	96% (96%)	FD0			
606.0	151.0						
605.0	152.0						
604.0	153.0						
603.0	154.0						
602.0	155.0	R-28	100% (100%)				
601.0	156.0						
600.0	157.0						
599.0	158.0						
598.0	159.0						
DATE STARTED: 4/10/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jesse Merkel						NOTES:	
APPROVED BY: Rolando Benitez						DRILLING METHOD: 2-15/16" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	
						DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

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PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340449.24 ft E. 2404939.62 ft GROUND SURFACE ELEVATION: 757.19 ft		
						DESCRIPTION		
597.0						160.0-165.0 ft SHALE, horizontal, moderately hard, fresh, grayish black (N2), very widely fractured, no reaction to HCl, dry, 10° bedding planes		
596.0	161.0							
595.0	162.0	R-29	88% (88%)					
594.0	163.0							
593.0	164.0					163.43-164.44 ft Joint, R.D. = 2°, very closely spaced; dry, filling: totally healed, clean calcite, fresh, very soft; surface: stepped, fresh. Fracture set #F13.		
592.0	165.0			FD1		165.0-170.0 ft SHALE, horizontal, moderately hard, fresh, grayish black (N2), very widely fractured, no reaction to HCl, dry, 10° bedding planes, pyrite fleck at 168.41 ft		
591.0	166.0					165.11-165.13 ft Joint, R.D. = 4°; filling: totally healed, thin calcite, fresh, soft; surface: fresh; completely healed fracture. Fracture set #F13.		
590.0	167.0	R-36	98% (96%)					
589.0	168.0							
588.0	169.0							
587.0	170.0					170.0-185.0 ft SHALE, horizontal, moderately hard, fresh, grayish black (N2), extremely widely fractured, no reaction to HCl, dry, 10° bedding planes		
586.0	171.0							
585.0	172.0	R-31	100% (100%)					
584.0	173.0							
583.0	174.0							
582.0	175.0			FD0				
581.0	176.0							
580.0	177.0	R-32	100% (100%)					
579.0	178.0							
578.0	179.0							
DATE STARTED: 4/10/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jesse Merkel						DRILLING METHOD: 2-15/16" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-429

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340449.24 ft E. 2404939.62 ft GROUND SURFACE ELEVATION: 757.19 ft DESCRIPTION		
577.0						170.0-185.0 ft SHALE, horizontal, moderately hard, fresh, grayish black (N2), extremely widely fractured, no reaction to HCl, dry, 10° bedding planes		
576.0	181.0							
575.0	182.0	R-33	100% (100%)	FD0				
574.0	183.0							
573.0	184.0							
572.0	185.0					185.0-190.0 ft SHALE, moderately hard, fresh, grayish black (N2), very widely fractured, no reaction to HCl, dry, 10° bedding planes, fossils present		
571.0	186.0							
570.0	187.0	R-34	100% (100%)	FD1				
569.0	188.0							
568.0	189.0							
567.0	190.0					190.0-200.0 ft SHALE, moderately hard, fresh, grayish black (N2), very widely to widely fractured, no reaction to HCl, dry, 10° bedding planes, calcite bedding laminae		
566.0	191.0							
565.0	192.0	R-35	100% (100%)					
564.0	193.0							
563.0	194.0							
562.0	195.0			FD0				
561.0	196.0							
560.0	197.0							
559.0	198.0	R-36	100% (100%)					
558.0	199.0							
DATE STARTED: 4/10/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jesse Merkel						DRILLING METHOD: 2-15/16" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-429

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 757.19 ft						DESCRIPTION	
DESCRIPTION							
557.0		R-37	100% (100%)			200.0-220.3 ft SHALE, moderately hard, fresh, grayish black (N2), very widely to extremely widely fractured, no reaction to HCl, dry, 10° bedding planes	200.7 - 201.7 ft., SC-4, 12:00, 4/12/10
556.0	201.0						
555.0	202.0						
554.0	203.0						
553.0	204.0						
552.0	205.0						
551.0	206.0						
550.0	207.0						
549.0	208.0						
548.0	209.0						
547.0	210.0						
546.0	211.0						
545.0	212.0						
544.0	213.0						
543.0	214.0						
542.0	215.0						
541.0	216.0						
540.0	217.0						
539.0	218.0						
538.0	219.0						
DATE STARTED: 4/10/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jesse Merkel						DRILLING METHOD: 2-15/16" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665

REV 1 Final Boring B-429

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
						N. 340449.24 ft	E. 2404939.62 ft		
						GROUND SURFACE ELEVATION: 757.19 ft			
						DESCRIPTION			
537.0		R-40				---- Bottom of Boring at 220.30 ft.----			
DATE STARTED: 4/10/10						DRILLING METHOD: 2-15/16" O.D. Tri-cone Roller Bit, NQ DRILLING CO. Terracon		NOTES:	
DATE FINISHED: 4/12/10									
FIELD GEOLOGIST: Jason Lucey								DRILL RIG: CME-55 (Track)	
CHECKED BY: Jesse Merkel									
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		HAMMER ID: 340665	

REV 1 Final Boring B-430

PROJECT NO. 10-4310

						COORDINATES		USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	N. 340146.97 ft E. 2405389.90 ft GROUND SURFACE ELEVATION: 775.32 ft			
						DESCRIPTION			
775.0	1.0	S-1	4-6-12 (18) 60%			0.0-1.5 ft Organic soil, (ol/oh), 90% fines, non plastic, no dry strength, no dilatancy, no toughness; 10% gravel, fine to coarse, subangular; dark yellowish brown (10YR 4/2), moist, no HCl reaction, with roots		ml	Attempted Shelby Tube sample, no recovery due to presence of gravels
774.0	2.0					0.2-0.5 ft Silt with gravel, (ml), 80% fines, low plasticity, no dry strength, no dilatancy, low toughness; 10% gravel, fine, subangular, medium hardness; 10% sand, fine; maximum grain size = 1.0 inches, dark yellowish brown (10YR 4/2), moist, no HCl reaction, very stiff		ml ol/oh	
773.0	3.0					0.5-1.5 ft Silt with gravel, (ml), 65% fines, low plasticity, no dry strength, no dilatancy, low toughness; 30% gravel, fine to coarse, subangular, medium hardness; 5% sand, fine; maximum grain size = 1.0 inches, light brown (5YR 5/6), moist, no HCl reaction, very stiff		ml ml	
772.0	4.0	S-2	9-40-16 (56) 73%			1.5-2.5 ft Interval not sampled			
771.0	5.0					2.5-2.8 ft Gravelly silt, (ml), 60% fines, low plasticity, no dry strength, no dilatancy, low toughness; 20% gravel, fine to coarse, subangular, medium hardness; 10% sand, fine; maximum grain size = 1.0 inches, dark yellowish brown (10YR 4/2), moist, no HCl reaction, hard			
770.0	6.0	S-3	18-13-13 (26) 100%			2.8-3.15 ft Gravelly silt, (ml), 60% fines, low plasticity, no dry strength, no dilatancy, low toughness; 30% gravel, fine to medium, subangular, medium hardness; 10% sand, fine; maximum grain size = 1.0 inches, light brown (5YR 5/6), moist, no HCl reaction, hard		SC	
769.0	7.0					3.15-4.0 ft 100% gravel, medium; maximum grain size = 1.0 inches, light olive gray (5Y 5/2), no HCl reaction, very dense, sandstone boulder			
768.0	8.0	S-4	11-16-21 (37) 100%			4.0-5.0 ft Interval not sampled		SC	
767.0	9.0					5.0-5.4 ft 90% gravel, medium to coarse, subangular, very hard hardness; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.5 inches, light olive gray (5Y 5/2) and light olive brown (5Y 5/6), no HCl reaction, medium dense, sandstone boulders			
766.0	10.0					5.4-6.5 ft CLAYEY SAND WITH GRAVEL, (SC), 54% sand, fine to coarse; 26% gravel, fine to medium, subangular, very hard hardness; 20% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.8 inches, dark yellowish brown (10YR 4/2), moist, no HCl reaction, medium dense		ml/mh gm	
765.0	11.0	S-5	2-10-7 (17) 100%			6.5-7.5 ft Interval not sampled			12.5 ft. Top of decomposed shale
764.0	12.0					7.5-9.0 ft CLAYEY SAND WITH GRAVEL, (SC), 54% sand, fine to coarse; 26% gravel, fine to medium, subangular, hard hardness; 20% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.8 inches, moderate brown (5YR 3/4), moist, no HCl reaction, medium dense		ml ml	
763.0	13.0	S-6	16-18-30 (48) 100%			9.0-10.0 ft Interval not sampled			
762.0	14.0					10.0-10.4 ft Gravelly silt/gravelly elastic silt, (ml/mh), 55% fines, high plasticity, no dry strength, no dilatancy, low toughness; 40% gravel, fine to coarse, subangular, hard hardness; 5% sand, fine; maximum grain size = 1.5 inches, dark yellowish brown (10YR 4/2), moist, no HCl reaction, medium dense		cl-ml gc	
761.0	15.0	S-7	10-27-50 (77) 100%			10.4-11.5 ft Silty gravel, (gm), 70% gravel, fine to coarse, subangular, hard hardness; 30% fines, low plasticity, no dry strength, no dilatancy, low toughness; 0% sand; maximum grain size = 1.5 inches, light brown (5YR 5/6), moist, no HCl reaction, medium dense			
760.0	16.0					11.5-12.5 ft Interval not sampled			
759.0	17.0					12.5-13.6 ft Sandy silt, (ml), 50% fines, non plastic, no dry strength, no dilatancy, no toughness; 40% sand, fine; 10% gravel, fine to coarse, subangular, hard hardness; maximum grain size = 2.0 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, hard		gw-gc	
758.0	18.0	S-8	50/5 100%						
757.0	19.0								
756.0									
DATE STARTED: 4/23/10 DATE FINISHED: 4/24/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-430

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 340146.97 ft E. 2405389.90 ft GROUND SURFACE ELEVATION: 775.32 ft										
							DESCRIPTION			
755.0		21.0	S-9	50/3			13.6-14.0 ft Sandy silt with gravel, (ml), 50% fines, non plastic, no dry strength, no dilatancy, no toughness; 30% sand, fine; 20% gravel, fine to coarse, subangular, hard hardness; maximum grain size = 2.0 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, hard		gw	20.25 ft. Sample lost during casing installation, intensely weathered shale, casing set 21.8ft then lowered to 25.0 ft after first run
				100%			14.0-15.0 ft Interval not sampled			
754.0			R-1	100% (0%)		FD8	15.0-15.6 ft Lean clay/silt, (cl-ml), 90% fines, high plasticity, no dry strength, no dilatancy, medium toughness; 10% gravel, fine to coarse, subangular, hard hardness; maximum grain size = 1.5 inches, dark yellowish brown (10YR 4/2), moist, no HCl reaction, hard			
753.0							15.6-16.5 ft Clayey gravel, (gc), 80% gravel, fine to coarse, hard hardness; 20% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.5 inches, light olive gray (5Y 5/2), no HCl reaction, very dense			
752.0							16.5-17.5 ft Interval not sampled			
751.0							17.5-17.9 ft Well graded gravel with clay, (gw-gc), 90% gravel, fine to coarse, hard hardness; 10% fines, low plasticity, low toughness; maximum grain size = 1.0 inches, light olive gray (5Y 5/2), no HCl reaction, very dense			
750.0			R-2	100% (9%)		FD8	17.9-20.0 ft Interval not sampled			
749.0							20.0-20.25 ft Well graded gravel, (gw), 95% gravel, fine to coarse, hard hardness; 5% fines, low plasticity, low toughness; maximum grain size = 1.0 inches, light olive gray (5Y 5/2), no HCl reaction			
748.0							20.25-21.8 ft Sample not recovered			
747.0							21.8-29.7 ft SHALE, soft to moderately soft, intensely to very intensely weathered, moderate yellowish brown (10YR 5/4) with medium dark gray (N4), very closely to closely fractured, no reaction to HCl, iron oxide staining			
746.0		R-3	100% (68%)		FD5	21.8-39.3 ft Bedding plane separation, R.D. = 10°, very closely to moderately spaced; surface: smooth, planar; iron oxide staining.				
745.0						22.3-36 ft R.D. = 90°, closely to moderately spaced; filling: not healed; surface: rough, planar; iron oxide staining.				
744.0						22.8-39.7 ft R.D. = 56°, closely to moderately spaced; filling: not healed; surface: rough, planar; iron oxide staining.				
743.0						29.7-39.7 ft SHALE, moderately soft to moderately hard, intensely to moderately weathered, moderate yellowish brown (10YR 5/4) with medium dark gray (N4), closely to moderately fractured, no reaction to HCl, iron oxide staining				
742.0		R-4	100% (40%)		FD5					
741.0										
740.0										
739.0										
738.0		R-5								
737.0										
736.0										
DATE STARTED: 4/23/10 DATE FINISHED: 4/24/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione							DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez							DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-430

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340146.97 ft E. 2405389.90 ft GROUND SURFACE ELEVATION: 775.32 ft DESCRIPTION		
735.0	41.0	R-5	100% (34%)	FD6		39.7-54.7 ft R.D. = 56°, moderately to widely spaced; filling: not healed; surface: rough, planar; iron oxide staining.		
734.0	42.0					39.9-49.7 ft R.D. = 10°, closely to moderately spaced; filling: not healed; surface: smooth, planar, moderately weathered; iron oxide staining.		
733.0	43.0					39.7-49.7 ft SHALE, moderately soft to soft, intensely to moderately weathered, moderate yellowish brown (10YR 5/4) with medium dark gray (N4), very closely to moderately fractured, no reaction to HCl, iron oxide staining		
732.0	44.0							
731.0	45.0							
730.0	46.0	R-6	100% (22%)	FD6		49-49.5 ft R.D. = 36°, closely spaced; filling: not healed; surface: rough, undulating; iron oxide staining.		
729.0	47.0							
728.0	48.0							
727.0	49.0							
726.0	50.0							
725.0	51.0	R-7	100% (0%)			49.7-54.7 ft SHALE, moderately hard to moderately soft, fresh to moderately weathered, dark gray (N3) with moderate yellowish brown (10YR 5/4), closely to moderately fractured, no reaction to HCl, iron oxide staining		
724.0	52.0					49.8-64.7 ft Bedding plane separation, R.D. = 10°, moderately to closely spaced; filling: not healed; surface: smooth, planar, slightly weathered; some contain iron oxide staining while others are unaltered.		
723.0	53.0					52-62.1 ft R.D. = 36°, moderately to closely spaced; filling: not healed; surface: rough, planar, slightly weathered; iron oxide staining.		
722.0	54.0							
721.0	55.0							
720.0	56.0	R-8	100% (33%)	FD6		54.7-64.7 ft SHALE, moderately hard to hard, fresh to slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining		58.5 - 59.0 ft., SC-2, 14:00, 4/23/10
719.0	57.0					55.2-57.9 ft R.D. = 51-56°, very closely to widely spaced; filling: not healed; surface: rough, planar, slightly weathered; iron oxide staining.		
718.0	58.0							
717.0	59.0							
716.0								
		R-9				59.35-59.6 ft Random fracture, R.D. = 72°; filling: not healed; surface: rough,		
DATE STARTED: 4/23/10 DATE FINISHED: 4/24/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-430

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 340146.97 ft E. 2405389.90 ft GROUND SURFACE ELEVATION: 775.32 ft										
							DESCRIPTION			
715.0		R-9	97% (42%)	FD6		planar, slightly weathered; iron oxide staining. 54.7-64.7 ft SHALE, moderately hard to hard, fresh to slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining 60.6-63.5 ft R.D. = 36°, moderately spaced; filling: not healed; surface: rough, planar, slightly weathered; iron oxide staining. 60.8-62.9 ft R.D. = 84-86°, very closely spaced; filling: totally healed, thin calcite; surface: slightly weathered; Sporadic zones where calcite contains iron oxide staining. 63.4-66 ft R.D. = 90°; filling: not healed; surface: rough, planar; iron oxide staining.				
714.0	61.0									
713.0	62.0									
712.0	63.0									
711.0	64.0									
710.0	65.0	R-10	92% (11%)			64.7-74.7 ft SHALE, hard to soft, fresh to very intensely weathered, dark gray (N3) with moderate yellowish brown (10YR 5/4), closely to moderately fractured, no reaction to HCl, iron oxide staining, zones of intensely (66.6-66.8 ft, 68.9-69.7 ft) to very intensely (67.9-68.9 ft) weathered rock, moderately thick quartz layer at 73.15-73.45 ft 64.7-74.7 ft Bedding plane separation, R.D. = 10°, closely to moderately spaced; filling: not healed; surface: smooth, planar, slightly weathered; some contain iron oxide staining. 66.3-67.8 ft R.D. = 90°, closely spaced; filling: not healed, quartz, slightly to moderately weathered; surface: rough, planar, slightly to moderately weathered; iron oxide staining.				
709.0	66.0									
708.0	67.0									
707.0	68.0									
706.0	69.0									
705.0	70.0	R-11	100% (33%)	FD6		69.6-79.7 ft R.D. = 36°, closely to moderately spaced; filling: not healed; surface: rough, planar, slightly weathered; some contain iron oxide staining. 70.4-73.5 ft R.D. = 70-76°, widely spaced; filling: totally healed, quartz, slightly weathered; surface: rough, planar, slightly weathered.				
704.0	71.0									
703.0	72.0									
702.0	73.0									
701.0	74.0									
700.0	75.0	R-12	100% (45%)			74.7-84.7 ft SHALE, moderately soft to hard, fresh to moderately weathered, dark gray (N3), very closely to moderately fractured, no reaction to HCl, iron oxide staining 75.5-82.3 ft R.D. = 36°, closely to moderately spaced; filling: totally healed, very thin; surface: rough, planar, slightly weathered; iron oxide staining on non healed surfaces. 76.9-89.3 ft R.D. = 10°, closely to widely spaced; filling: not healed, clay; surface: smooth, planar.				
699.0	76.0									
698.0	77.0									
697.0	78.0									
696.0	79.0									
		R-13								
DATE STARTED: 4/23/10 DATE FINISHED: 4/24/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione							DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez							DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-430

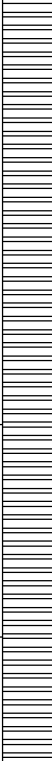

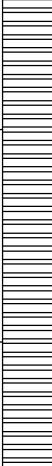
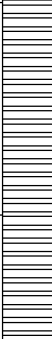
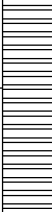

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 775.32 ft						DESCRIPTION		
DESCRIPTION								
695.0		R-13	100% (38%)	FD6		74.7-84.7 ft SHALE, moderately soft to hard, fresh to moderately weathered, dark gray (N3), very closely to moderately fractured, no reaction to HCl, iron oxide staining		Top of competent rock at 84.7 ft
81.0								
694.0								
82.0								
693.0					FD6			
83.0								
692.0								
84.0								
691.0								
85.0		R-14	100% (74%)					
690.0								
86.0								
689.0								
87.0								
688.0								
88.0								
687.0								
89.0								
686.0								
90.0		R-15	100% (68%)					
685.0								
91.0								
684.0								
92.0								
683.0			FD4					
93.0								
682.0								
94.0								
681.0								
95.0		R-16	100% (84%)					
680.0								
96.0								
679.0								
97.0								
678.0								
98.0								
677.0								
99.0								
676.0		R-17						
DATE STARTED: 4/23/10 DATE FINISHED: 4/24/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

PROJECT NO. 10-4310BORING NO. B-430 SHEET 6 OF 7








REV 1 Final Boring B-430

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 775.32 ft						DESCRIPTION	
DESCRIPTION							
655.0		R-21	100% (87%)	FD4		119.7-125.85 ft R.D. = 36°, closely to very widely spaced; surface: rough, planar; fracture at 119.7 ft only totally healed fracture, fresh, very thin quartz. 119.7-131.2 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to widely fractured, no reaction to HCl, trace pyrite and calcite 120.5-121.2 ft R.D. = 56°, closely spaced; filling: totally healed, very thin quartz, fresh; surface: fresh. 121.1-130.6 ft Bedding plane separation, R.D. = 10°, very widely to moderately spaced; filling: not healed; surface: smooth, planar. 121.95-122.6 ft R.D. = 80°; filling: not healed; surface: rough, planar.	
121.0							
654.0							
122.0							
653.0		R-22	100% (84%)	FD4			
123.0							
652.0							
124.0							
651.0		R-23	100% (100%)	FD3			
125.0							
650.0							
126.0							
649.0		R-23	100% (100%)	FD5			
127.0							
648.0							
128.0							
647.0		R-23	100% (100%)	FD5			
129.0							
646.0							
130.0							
645.0		R-23	100% (100%)	FD5			
131.0							
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
		R-23	100% (100%)	FD5			
	</						






REV 1 Final Boring B-431

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340160.61 ft E. 2405519.42 ft GROUND SURFACE ELEVATION: 783.22 ft		
						DESCRIPTION		
783.0		S-1	4-3-3 (6) 100%			0.0-1.5 ft SANDY LEAN CLAY, (CL), 56% fines, low plasticity, no dry strength, no dilatancy, low toughness; 38% sand, fine to coarse, subangular; 6% gravel, fine to medium, subangular; maximum grain size = 0.75 inches, moderate yellowish brown (10YR 5/4) to dark yellowish orange (10YR 6/6), moist, no HCl reaction, medium stiff, with roots	CL	
782.0	1.0							
781.0	2.0							
780.0	3.0	S-2	10-12-20 (32) 80%			2.5-3.5 ft SANDY LEAN CLAY, (CL), 56% fines, low plasticity, no dry strength, no dilatancy, low toughness; 38% sand, fine to coarse, subangular; 6% gravel, fine to medium, subangular, hard hardness; maximum grain size = 0.75 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, medium stiff, with roots	CL	
779.0	4.0					3.5-4.0 ft Well graded gravel, (gw), 100% gravel, fine to coarse, subangular; 0% sand; 0% fines; maximum grain size = 1.0 inches, medium gray (N5) to medium dark gray (N4), no HCl reaction, dense	gw	
778.0	5.0	ST-1	100%			4.0-5.0 ft Interval not sampled		
777.0	6.0							5.0-6.1 ft, ST-1, 400 psi of down pressure
776.0	7.0							
775.0	8.0	S-3	1-21-38 (59) 87%			5.0-6.1 ft Gravelly silt, (ml), 60% fines, low plasticity, medium toughness; 30% gravel, fine to coarse, subangular, very hard hardness; 10% sand, fine to coarse, subangular; maximum grain size = 1.5 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction	ml	
774.0	9.0					6.1-7.5 ft Interval not sampled		
						7.5-8.2 ft Gravelly lean clay/gravelly silt, (cl-ml), 60% fines, high plasticity, no dry strength, no dilatancy, low toughness; 30% gravel, fine to coarse, subangular, very hard hardness; 10% sand, fine to coarse, subangular; maximum grain size = 1.5 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, very dense	cl-ml	
						8.2-8.5 ft Well graded gravel, (gw), 100% gravel, fine to coarse, subangular, very hard hardness; maximum grain size = 1.5 inches, light gray (N7), no HCl reaction, very dense, granite boulder	gw	
						8.5-9.0 ft Sandy silt with gravel/sandy elastic silt with gravel, (ml/mh), 65% fines, low plasticity, no dry strength, no dilatancy, low toughness; 20% sand, fine to medium, subangular; 15% gravel, fine to coarse, subangular, hard hardness; maximum grain size = 1.5 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, very dense	ml/mh	
DATE STARTED: 4/24/10 DATE FINISHED: 4/26/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jesse Merkel						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-431

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 340160.61 ft E. 2405519.42 ft GROUND SURFACE ELEVATION: 783.22 ft										
							DESCRIPTION			
773.0			S-4	8-20-18 (38) 67%			9.0-10.0 ft Interval not sampled	gw		
							10.0-10.1 ft Well graded gravel, (gw), 100% gravel, fine to coarse, subangular; maximum grain size = 0.5 inches, grayish red (5R 4/2), strong HCl reaction, dense	ml/mh		
11.0							10.1-10.45 ft Silt with sand/elastic silt with sand, (ml/mh), 80% fines, medium plasticity, no dry strength, no dilatancy, low toughness; 10% gravel, fine to coarse, subangular; 10% sand, fine to medium; maximum grain size = 0.5 inches, moderate brown (5YR 3/4), moist, no HCl reaction, hard	ml/mh		
772.0						10.45-10.8 ft Gravelly silt/gravelly elastic silt, (ml/mh), 70% fines, medium plasticity, no dry strength, no dilatancy, low toughness; 20% gravel, fine to medium, subangular; 10% sand, fine to medium; maximum grain size = 0.5 inches, moderate brown (5YR 3/4), moist, no HCl reaction, hard				
12.0						10.8-11.5 ft Gravelly silt/gravelly elastic silt, (ml/mh), 60% fines, medium plasticity, no dry strength, no dilatancy, low toughness; 30% gravel, fine to medium, subangular; 10% sand, fine to coarse; maximum grain size = 0.5 inches, moderate brown (5YR 3/4), moist, no HCl reaction, hard	sm			
771.0						11.5-12.5 ft Interval not sampled	gw			
13.0			S-5	10-11-13 (24) 100%			12.5-12.75 ft Silty sand with gravel, (sm), 50% sand, fine to coarse, subangular; 30% fines, low plasticity, no dry strength, no dilatancy, no toughness; 20% gravel, fine to coarse, subangular, very hard hardness; maximum grain size = 0.5 inches, moderate brown (5YR 3/4), moist, weak HCl reaction, medium dense			
770.0							12.75-12.9 ft Well graded gravel, (gw), 100% gravel, fine to coarse, subangular, hard hardness; 0% sand; 0% fines; maximum grain size = 0.5 inches, moderate yellowish brown (10YR 5/4), no HCl reaction			
14.0							12.9-14.0 ft SHALE, soft, decomposed, yellowish gray (5Y 7/2), no reaction to HCl, iron oxide staining, contains pockets of silt/clay moderate brown (5YR 4/4)			
769.0			S-6	9-8-13 (21) 100%			14.0-15.0 ft Interval not sampled			
15.0							15.0-16.5 ft SHALE, soft, decomposed, yellowish gray (5Y 7/2), no reaction to HCl, iron oxide staining, contains pockets of silt/clay moderate brown (5YR 4/4)			
768.0							16.5-17.5 ft Interval not sampled			
16.0			S-7	40-50/5 100%			17.5-18.4 ft SHALE, soft, decomposed, yellowish gray (5Y 7/2), no reaction to HCl, iron oxide staining, contains pockets of silt/clay moderate brown (5YR 4/4)			
767.0							18.4-20.0 ft Interval not sampled			
17.0										
766.0										
18.0										
765.0										
19.0										
764.0										
DATE STARTED: 4/24/10 DATE FINISHED: 4/26/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jesse Merkel							DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez							DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-431

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340160.61 ft E. 2405519.42 ft GROUND SURFACE ELEVATION: 783.22 ft DESCRIPTION		
763.0		S-8	50/3 100%			20.0-20.25 ft SHALE, decomposed, yellowish gray (5Y 7/2), no reaction to HCl, iron oxide staining		Casing set at 24.2 for run 1, water circulation present
						20.3-30.7 ft SHALE, moderately soft, intensely to very intensely weathered, yellowish gray (5Y 7/2) with medium gray (N5), very closely to moderately fractured, no reaction to HCl, iron oxide staining		
21.0						20.5-38.3 ft R.D. = 56°, closely to moderately spaced; filling: not healed; surface: rough, planar; iron oxide staining.		
762.0						21-39.2 ft Bedding plane separation, R.D. = 10°, closely to widely spaced; filling: not healed; surface: smooth, planar, intensely weathered; iron oxide staining, very thin to thin clay fill.		
		R-1	100% (12%)	FD6		21.6-37.8 ft R.D. = 36°, closely to moderately spaced; filling: not healed; surface: rough, planar, intensely weathered; iron oxide staining and trace clay fill.		
761.0								
23.0								
760.0								
24.0								
759.0								
25.0								
758.0								
26.0								
757.0								
27.0		R-2	100% (35%)	FD5				
756.0								
28.0								
755.0								
29.0								
754.0		R-3	100% (54%)			29.7-30.8 ft R.D. = 72°, filling: not healed; surface: rough, planar; iron oxide		SC-1, 28.75-29.2 ft. 4/26/10, 0920
DATE STARTED: 4/24/10 DATE FINISHED: 4/26/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jesse Merkel						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-431

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 783.22 ft						DESCRIPTION	
753.0						staining. 20.3-30.7 ft SHALE, moderately soft, intensely to very intensely weathered, yellowish gray (5Y 7/2) with medium gray (N5), very closely to moderately fractured, no reaction to HCl, iron oxide staining 30.7-36.9 ft SHALE, moderately soft to moderately hard, moderately to intensely weathered, medium dark gray (N4) with yellowish gray (5Y 7/2), moderately to closely fractured, no reaction to HCl, iron oxide staining 	

REV 1 Final Boring B-431

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 783.22 ft						DESCRIPTION	
DESCRIPTION							
743.0						39.5-44.2 ft SHALE, moderately hard to moderately soft, moderately to slightly weathered, medium dark gray (N4) with yellowish gray (5Y 7/2), moderately fractured, no reaction to HCl, iron oxide staining 40-59.2 ft R.D. = 56°, very closely to widely spaced; filling: not healed; surface: rough, planar, slightly weathered; iron oxide staining.	
41.0							
742.0							
42.0		R -5	100% (74%)				
741.0							
43.0							
740.0							
44.0				FD5			
739.0							
45.0							
738.0							
46.0							
737.0							
47.0		R -6	100% (36%)				
736.0							
48.0							
735.0							
49.0				FD6			
734.0							
		R -7	98% (56%)				

REV 1 Final Boring B-431

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 340160.61 ft E. 2405519.42 ft GROUND SURFACE ELEVATION: 783.22 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
733.0		R -7	98% (56%)			49.2-53.7 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to closely fractured, no reaction to HCl		
51.0								
732.0								
52.0								
731.0								
53.0								
730.0								
				FD6		53.7-56.0 ft SHALE, moderately hard to moderately soft, moderately weathered, yellowish gray (5Y 7/2) with, very closely to closely fractured, no reaction to HCl, iron oxide staining		
54.0								
729.0								
55.0								
728.0								
56.0								
727.0								
								R -8
57.0								
726.0								
58.0								
725.0								
59.0								
724.0								
		R -9	94% (56%)	FD6		59.2-74.2 ft SHALE, moderately hard to hard, fresh to slightly weathered, dark gray (N3), moderately to closely fractured, no reaction to HCl, hydrocarbon staining, trace pyrite, oily sheen on rock surface 59.2-73.2 ft R.D. = 36°, moderately to widely spaced; filling: not healed;		
DATE STARTED: 4/24/10 DATE FINISHED: 4/26/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jesse Merkel						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

REV 1 Final Boring B-431

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 783.22 ft						DESCRIPTION	
DESCRIPTION							
723.0						surface: rough, planar, slightly weathered; iron oxide staining.	
61.0							
722.0							
62.0		R -9	94% (56%)			59.5-63.8 ft R.D. = 56°, moderately to closely spaced; filling: not healed; surface: rough, planar, slightly weathered; iron oxide staining.	
721.0						59.7-74.2 ft Bedding plane separation, R.D. = 10°, moderately to closely spaced; surface: smooth, planar, slightly weathered; iron oxide staining.	
63.0						59.2-74.2 ft SHALE, moderately hard to hard, fresh to slightly weathered, dark gray (N3), moderately to closely fractured, no reaction to HCl, hydrocarbon staining, trace pyrite, oily sheen on rock surface	
720.0							
64.0							
719.0							
65.0				FD6			
718.0							
66.0							
717.0		R -10	100% (48%)				
67.0							
716.0							
68.0							SC-2, 67.6-68.2 ft, 4/26/10, 12:10
715.0							
69.0							
714.0		R -11	100% (56%)			69.5-77.6 ft R.D. = 72-74°, very widely spaced; filling: not healed; surface: rough, planar, slightly weathered; iron oxide staining.	69.0 ft, loose all water return
DATE STARTED: 4/24/10 DATE FINISHED: 4/26/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jesse Merkel						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

REV 1 Final Boring B-431

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340160.61 ft E. 2405519.42 ft GROUND SURFACE ELEVATION: 783.22 ft DESCRIPTION		
713.0						59.2-74.2 ft SHALE, moderately hard to hard, fresh to slightly weathered, dark gray (N3), moderately to closely fractured, no reaction to HCl, hydrocarbon staining, trace pyrite, oily sheen on rock surface		
712.0								
711.0		R -11	100% (56%)	FD6				
710.0								
709.0						74.2-79.2 ft SHALE, moderately hard to hard, fresh to slightly weathered, dark gray (N3) with yellowish gray (5Y 7/2), moderately to closely fractured, no reaction to HCl, iron oxide staining, trace pyrite		
708.0						74.7-89.2 ft Bedding plane separation, R.D. = 10°, very closely to widely spaced; filling: not healed; surface: smooth, planar, slightly weathered; most are fresh with iron oxide staining on the rest.		
707.0						75-87.9 ft R.D. = 56°, widely to very closely spaced; filling: not healed; surface: rough, planar, slightly weathered; iron oxide staining.		
706.0		R -12	100% (54%)	FD6				
705.0								
704.0								
		R -13	98% (36%)			78.2-88.6 ft R.D. = 36°, very closely to widely spaced; filling: not healed; surface: rough, planar, slightly weathered.		
						79.2-89.2 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to closely fractured, no reaction to HCl, trace pyrite		
DATE STARTED: 4/24/10 DATE FINISHED: 4/26/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jesse Merkel						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-431

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340160.61 ft E. 2405519.42 ft GROUND SURFACE ELEVATION: 783.22 ft DESCRIPTION		
703.0						79.2-89.2 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to closely fractured, no reaction to HCl, trace pyrite		
81.0								
702.0								
82.0		R -13	98% (36%)					
701.0								
83.0								
700.0								
84.0								
699.0								
85.0				FD6				
698.0								
86.0								
697.0								
87.0		R -14	100% (76%)					
696.0								
88.0								
695.0								
89.0								
694.0		R -15	98% (78%)	FD6		89.2-96.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to closely fractured, no reaction to HCl, trace pyrite 89.2-96 ft Bedding plane separation, R.D. = 10°, very closely to moderately spaced; filling: not healed; surface: smooth, planar, slightly weathered; iron		
DATE STARTED: 4/24/10 DATE FINISHED: 4/26/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jesse Merkel						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-431

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COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 783.22 ft						DESCRIPTION	
693.0						oxide staining. 89.2-96.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to closely fractured, no reaction to HCl, trace pyrite	
91.0							
692.0							
92.0		R -15	98% (78%)				
691.0							
93.0							
690.0							
94.0							
689.0							
95.0				FD6			
688.0							
96.0							
687.0							
97.0		R -16	100% (30%)				
686.0							
98.0							
685.0							
99.0							
684.0							
		R -17	100% (84%)				
				FD4			
DATE STARTED: 4/24/10 DATE FINISHED: 4/26/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Jesse Merkel							
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	
						NOTES:	
						DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

PROJECT NO. 10-4310

BORING NO. B-431 SHEET 11 OF 11

REV 1 Final Boring B-432

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 340173.52 ft E. 2405665.64 ft							
GROUND SURFACE ELEVATION: 789.49 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
789.0	1.0	S-1	2-3-14 (17) 93%			0.0-1.5 ft Organic soil with gravel, (ol/oh), 80% fines, low plasticity, no dry strength, slow dilatancy, low toughness; 15% gravel, medium, subangular, flat, hard hardness; 5% sand, fine, subangular; dark yellowish brown (10YR 4/2), organic odor, moist, with roots, some rock fragments, maximum grain size if trace of fine gravel	ol/oh
788.0	2.0					1.5-2.5 ft Interval not sampled	
787.0	3.0	S-2	10-20-32 (52) 100%			2.5-3.0 ft Organic soil with gravel, (ol/oh), 80% fines, low plasticity, no dry strength, slow dilatancy, low toughness; 15% gravel, medium, subangular, flat, hard hardness; 5% sand, fine, subangular; maximum grain size = 1.0 inches, dark yellowish brown (10YR 4/2), organic odor, moist, with roots, some rock fragments	ol/oh
786.0	4.0	ST-1	100%			3.0-4.0 ft Silty gravel with sand, (gm), 40% gravel, fine; 30% sand, fine to coarse, angular; 30% fines, low plasticity, no dry strength, no dilatancy, low toughness; moderate brown (5YR 3/4) to moderate yellowish brown (10YR 5/4), no odor, moist, no HCl reaction, some rock fragments	gm
785.0	5.0					4.0-4.5 ft Poorly graded sand with gravel, (sp), 70% sand, fine to coarse, subangular; 25% gravel, fine, angular, medium hardness; 5% fines, no dry strength, no dilatancy; moderate yellowish brown (10YR 5/4), no odor, dry, no HCl reaction, trace rock fragments	sp
784.0	6.0	S-3	12-20-21 (41) 100%			4.0-4.5 ft Poorly graded sand with gravel, (sp), 70% sand, fine to coarse, subangular; 25% gravel, fine, angular, medium hardness; 5% fines, no dry strength, no dilatancy; moderate yellowish brown (10YR 5/4), no odor, dry, no HCl reaction, trace rock fragments	sm
783.0	7.0					4.5-5.0 ft Interval not sampled	
782.0	8.0	S-4	12-12-50/2 100%			5.0-6.5 ft Silty sand with gravel, (sm), 50% sand, fine to medium, subangular; 25% gravel, fine to coarse, angular, flat, medium hardness; 25% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.5 inches, moderate brown (5YR 3/4), no odor, moist, no HCl reaction, some rock fragments, trace coal, fragments of sandstone boulder	sm
781.0	9.0					6.5-7.5 ft Interval not sampled	
779.0	11.0	S-5	35-26-30 (56) 100%			7.5-8.65 ft Silty sand with gravel, (sm), 50% sand, fine to medium, subangular; 25% gravel, fine to coarse, angular, flat, medium hardness; 25% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.5 inches, moderate brown (5YR 3/4), no odor, moist, no HCl reaction, some rock fragments, trace coal, fragments of sandstone boulder	GC-GM
778.0	12.0					8.65-10.0 ft Interval not sampled	
777.0	13.0	S-6	32-30-24 (54) 67%			10.0-11.5 ft SILTY, CLAYEY GRAVEL WITH SAND, (GC-GM), 58% gravel, fine to coarse, angular, flat, medium hardness; 28% sand, fine to coarse, subangular; 14% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.8 inches, moderate brown (5YR 3/4), moist, no HCl reaction, fragments of sandstone boulder	GC-GM
776.0	14.0					11.5-12.5 ft Interval not sampled	
775.0	15.0	S-7	50-26-26 (52) 80%			12.5-14.0 ft SILTY, CLAYEY GRAVEL WITH SAND, (GC-GM), 58% gravel, fine to coarse, angular, flat, medium hardness; 28% sand, fine to coarse, subangular; 14% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.8 inches, moderate brown (5YR 3/4), moist, no HCl reaction, fragments of sandstone boulder	sm
774.0	16.0					14.0-15.0 ft Interval not sampled	
773.0	17.0					15.0-16.5 ft Silty sand with gravel, (sm), 50% sand, fine to medium, subangular; 25% gravel, fine to coarse, angular, flat, medium hardness; 25% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.5 inches, moderate brown (5YR 3/4), no odor, moist, no HCl reaction, some rock fragments, trace coal, fragments of sandstone boulder showing cross bedding 15 to 16.5 ft (alluvium)	ml
772.0	18.0	S-8	10-25-47 (72) 93%			15.0-16.5 ft Silty sand with gravel, (sm), 50% sand, fine to medium, subangular; 25% gravel, fine to coarse, angular, flat, medium hardness; 25% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.5 inches, moderate brown (5YR 3/4), no odor, moist, no HCl reaction, some rock fragments, trace coal, fragments of sandstone boulder showing cross bedding 15 to 16.5 ft (alluvium)	
771.0	19.0					16.5-17.5 ft Interval not sampled	
770.0							
DATE STARTED: 4/27/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jesse Merkel						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931


REV 1 Final Boring B-432

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS	
N. 340173.52 ft E. 2405665.64 ft GROUND SURFACE ELEVATION: 789.49 ft											
DESCRIPTION											
769.0	21.0	S-9	14-16-20 (36) 87%				17.5-19.0 ft Sandy silt with gravel, (ml), 60% fines, medium plasticity, no dry strength, no dilatancy, low toughness; 25% sand, fine; 15% gravel, fine to medium, subrounded, elongated; maximum grain size = 1.0 inches, moderate brown (5YR 4/4), no odor, moist, trace coal, some rock fragments		ml	29.25-30.0 ft, SC-1, 14:33, 4/27/10	
768.0	22.0		19.0-20.0 ft Interval not sampled								
767.0	23.0	S-10	25-22-24 (46) 73%				20.0-21.5 ft Sandy silt with gravel, (ml), 60% fines, low plasticity, no dry strength, no dilatancy, low toughness; 25% sand, fine; 15% gravel, fine to medium, subrounded, elongated; maximum grain size = 1.0 inches, moderate brown (5YR 4/4), no odor, moist, trace coal, some rock fragments				
766.0	24.0		21.5-22.5 ft Interval not sampled								
765.0	25.0	S-11	19-30-50/4 100%				22.5-24.0 ft SHALE, clayey, very soft, decomposed, clay sized particles, light olive brown (5Y 5/6) with dark yellowish orange (10YR 6/6), no odor, no reaction to HCl, moist				
764.0	26.0		24.0-25.0 ft Interval not sampled								
763.0	27.0	S-12	50 100%				25.0-26.35 ft SHALE, clayey, very soft, decomposed, clay sized particles, light olive brown (5Y 5/6) with dark yellowish orange (10YR 6/6), no odor, no reaction to HCl, moist				
762.0	28.0		26.35-27.5 ft Interval not sampled								
761.0	29.0	R-1	65% (65%)	FD6			27.5-28.0 ft SHALE, clayey, very soft, decomposed, clay sized particles, light olive brown (5Y 5/6) with dark yellowish orange (10YR 6/6), no odor, no reaction to HCl, moist				
760.0	30.0		28.0-44.3 ft SHALE, moderately soft, moderately weathered, clay sized particles, dark greenish gray (5G 4/1), no odor, closely fractured, no reaction to HCl, iron oxide staining								
759.0	31.0	R-2	96% (41%)	FD5			28.75-43.5 ft R.D. = 3°-80°, very closely to moderately spaced; filling; not healed to moderately healed, iron oxide staining, very thin to moderately thin clay; surface: moderately rough to rough, planar, undulating, slightly to intensely weathered. Fracture set #1.				
758.0	32.0										
757.0	33.0	R-3	100% (56%)								
756.0	34.0										
755.0	35.0										
754.0	36.0										
753.0	37.0										
752.0	38.0										
751.0	39.0										
750.0											
DATE STARTED: 4/27/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jesse Merkel							DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:		
APPROVED BY: Rolando Benitez							DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931		

REV 1 Final Boring B-432

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS			
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE					
GROUND SURFACE ELEVATION: 789.49 ft						DESCRIPTION				
DESCRIPTION										
749.0	41.0	R-4	100% (53%)	FD5		28.0-44.3 ft SHALE, moderately soft, moderately weathered, clay sized particles, dark greenish gray (5G 4/1), no odor, closely fractured, no reaction to HCl, iron oxide staining				
748.0	42.0									
747.0	43.0									
746.0	44.0									
745.0	45.0									
744.0	46.0	R-5	100% (78%)			44.3-115.55 ft SHALE, moderately soft, slightly to moderately weathered, clay sized particles, dark gray (N3), thinly bedded, no odor, closely to moderately fractured, no reaction to HCl, iron oxide staining				
743.0	47.0					44.65-52.45 ft R.D. = 0°-72°, closely to moderately spaced; filling: not healed to moderately healed, iron oxide staining, moderately thin clay, very thin clay and iron oxide staining, clean, very soft to soft; surface: smooth to rough, moderately to slightly weathered. Fracture set #2.				
742.0	48.0									
741.0	49.0									
740.0	50.0									
739.0	51.0	R-6	96% (26%)							
738.0	52.0									
737.0	53.0									
736.0	54.0									
735.0	55.0									
734.0	56.0	R-7	88% (16%)			52.8-59.75 ft R.D. = 17°-74°, very closely to moderately spaced; filling: not healed to moderately healed, clean, very thin to thin clay, iron oxide staining, very soft to soft; surface: smooth to rough, moderately to slightly weathered. Fracture set #3.				
733.0	57.0									
732.0	58.0									
731.0	59.0									
730.0										
DATE STARTED: 4/27/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jesse Merkel						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:		
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle				
						DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931				

REV 1 Final Boring B-432

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 340173.52 ft E. 2405665.64 ft GROUND SURFACE ELEVATION: 789.49 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
729.0 61.0		R-8	98% (60%)			44.3-115.55 ft SHALE, moderately soft, slightly to moderately weathered, clay sized particles, dark gray (N3), thinly bedded, no odor, closely to moderately fractured, no reaction to HCl, iron oxide staining 60-73.6 ft R.D. = 0°-77°, closely to widely spaced; filling: not healed to moderately healed, iron oxide staining, very thin to moderately thin clay, very soft; surface: smooth to rough, fresh to moderately weathered. Fracture set #4.	67.8-68.8 ft, SC-2, 08:23, 4/28/10
728.0 62.0							
727.0 63.0							
726.0 64.0							
725.0 65.0							
724.0 66.0		R-9	100% (55%)	FD5			
723.0 67.0							
722.0 68.0							
721.0 69.0							
720.0 70.0							
719.0 71.0		R-10	100% (56%)				
718.0 72.0							
717.0 73.0							
716.0 74.0							
715.0 75.0							
714.0 76.0		R-11	98% (54%)	FD6			
713.0 77.0							
712.0 78.0							
711.0 79.0							
710.0							
DATE STARTED: 4/27/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jesse Merkel						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

REV 1 Final Boring B-432

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340173.52 ft E. 2405665.64 ft GROUND SURFACE ELEVATION: 789.49 ft		
						DESCRIPTION		
709.0						44.3-115.55 ft SHALE, moderately soft, slightly to moderately weathered, clay sized particles, dark gray (N3), thinly bedded, no odor, closely to moderately fractured, no reaction to HCl, iron oxide staining		
81.0								
708.0								
82.0								
707.0		R-12	100% (36%)	FD6				
83.0								
706.0								
84.0								
705.0								
85.0								
704.0						87.7-97.45 ft R.D. = 0°-76°, very closely to moderately spaced; filling: not healed to moderately healed, thin to very thin clay, iron oxide staining, very soft; surface: smooth to rough, slightly to moderately weathered. Fracture set #6.		
86.0								
703.0								
87.0								
702.0		R-13	98% (42%)					
88.0								
701.0								
89.0								
700.0								
90.0								
699.0						98.1-116.9 ft R.D. = 31°-90°, very closely to widely spaced; filling: not healed to moderately healed, iron oxide staining, very thin to moderately thin clay, very thin calcite, fresh to moderately weathered, very soft; surface: smooth to rough, fresh to moderately weathered. Fracture set #7.		
91.0								
698.0								
92.0								
697.0		R-14	98% (38%)	FD5				
93.0								
696.0								
94.0								
695.0								
95.0								
694.0								
96.0								
693.0								
97.0								
692.0		R-15	100% (73%)	FD4				
98.0								
691.0								
99.0								
690.0								
DATE STARTED: 4/27/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jesse Merkel						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-432

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
GROUND SURFACE ELEVATION: 789.49 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
689.0 101.0 688.0 102.0 687.0 103.0 686.0 104.0 685.0 105.0 684.0 106.0 683.0 107.0 682.0 108.0 681.0 109.0 680.0 110.0 679.0 111.0 678.0 112.0 677.0 113.0 676.0 114.0 675.0 115.0 674.0 116.0 673.0 117.0 672.0 118.0 671.0 119.0 670.0		R-16 					

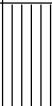



REV 1 Final Boring B-432

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 789.49 ft						DESCRIPTION	
DESCRIPTION							
669.0 121.0 668.0 122.0 667.0 123.0 666.0 124.0 665.0 125.0 664.0 126.0 663.0 127.0 662.0 128.0 661.0 129.0 660.0 130.0	R-20	100% (50%)	FD5	117.3-130.1 ft SHALE, moderately hard to hard, slightly weathered to fresh, dark gray (N3), thickly bedded, no odor, closely to widely fractured, no reaction to HCl			
	R-21	100% (86%)	FD3	----			
---- Bottom of Boring at 130.10 ft.----							
DATE STARTED: 4/27/10 DATE FINISHED: 4/28/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jesse Merkel						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	
						NOTES:	
						DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-433

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW(Sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES N. 340485.71 ft E. 2405380.47 ft GROUND SURFACE ELEVATION: 792.77 ft	USCS SYMBOL	REMARKS
							DESCRIPTION		
792.0	1.0	S-1	3-3-4 (7) 80%				0.0-1.5 ft Sandy silt with gravel, (ml), 65% fines, low plasticity, no dilatancy, low toughness; 20% sand, fine to coarse, subangular, hard hardness; 15% gravel, medium to coarse, subangular, flat and elongated, hard hardness; maximum grain size = 1 inches, dark yellowish brown (10YR 4/2), no odor, moist, no HCl reaction, trace coal, trace roots, (Till)	ml	
791.0	2.0						1.5-5.0 ft Interval not sampled		
790.0	3.0								
789.0	4.0								
788.0	5.0								
787.0	6.0	S-2	16-29-33 (62) 93%				5.0-6.5 ft CLAYEY GRAVEL WITH SAND, (GC), 43% gravel, fine to coarse, angular, flat, medium hardness; 43% sand, fine to coarse; 14% fines, low plasticity, low toughness; maximum grain size = 0.9 inches, dark yellowish orange (10YR 6/6) to dark yellowish brown (10YR 4/2), no odor, moist, no HCl reaction, trace roots, trace coal, (till)	GC	11.5-12.0 ft, ST-1, down pressure of 500 psi, no recovery, Shelby tube bent
786.0	7.0						6.5-10.0 ft Interval not sampled		
785.0	8.0								
784.0	9.0								
783.0	10.0								
782.0	11.0	S-3	11-19-21 (40) 87%				10.0-11.5 ft CLAYEY GRAVEL WITH SAND, (GC), 43% gravel, fine to coarse, angular, flat, medium hardness; 43% sand, fine to coarse; 14% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.9 inches, dark yellowish orange (10YR 6/6) to dark yellowish brown (10YR 4/2), no odor, moist, no HCl reaction, trace roots, trace coal, (till)	GC	
781.0	12.0	ST-1	0%				11.5-12.0 ft Shelby Tube sample attempted, no sample recovered		
780.0	13.0						12.0-15.0 ft Interval not sampled		
779.0	14.0								
778.0	15.0								
777.0	16.0	S-4	6-8-17 (25) 100%				15.0-15.5 ft Silt with gravel, (ml), medium, subrounded, medium hard hardness; 90% fines, low plasticity, low toughness; 10% sand; maximum grain size = 1/2 inches, light brown (5YR 5/6), moist, no HCl reaction	ml	15.5 ft, Weathered shale
776.0	17.0						15.5-16.5 ft SHALE, moderately soft, decomposed, clay sized particles, yellowish gray (5Y 7/2), no reaction to HCl, moist		
775.0	18.0						16.5-20.0 ft Interval not sampled		
774.0	19.0								
773.0									
DATE STARTED: 4/21/10 DATE FINISHED: 4/22/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jesse Merkel							DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez							DRILLER: D. Westbrook HELPER(S): J. Parlett	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	




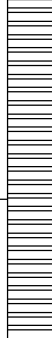
REV 1 Final Boring B-433

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340485.71 ft E. 2405380.47 ft GROUND SURFACE ELEVATION: 792.77 ft DESCRIPTION		
772.0	21.0	S-5	27-15-15 (30) 33%			20.0-21.5 ft SHALE, moderately soft, very intensely weathered, clay sized particles, yellowish gray (5Y 7/2), very thinly bedded, no reaction to HCl, dry		
771.0	22.0					21.5-25.0 ft Interval not sampled		
770.0	23.0							
769.0	24.0							
768.0	25.0							
767.0	26.0	S-6	10-12-31 (43) 100%			25.0-26.5 ft SHALE, soft, decomposed, clay sized particles, grayish yellow (5Y 8/4) to dark yellowish orange (10YR 6/6), no reaction to HCl, moist, iron oxide staining		
766.0	27.0					26.5-27.0 ft SHALE, soft, decomposed, clay sized particles, grayish yellow (5Y 8/4) to dark yellowish orange (10YR 6/6), no reaction to HCl, moist, iron oxide staining		
765.0	28.0	R-1	50% (30%)			27.0-30.5 ft SANDSTONE, hard, slightly weathered, boulder sized particles, light gray (N7), no reaction to HCl, boulder		
764.0	29.0							
763.0	30.0							
762.0	31.0					30.5-50.0 ft SHALE, clayey, very soft, decomposed, clay sized particles, medium gray (N5) to moderate yellowish brown (10YR 5/4), thinly to very thinly bedded, very closely to closely fractured, no reaction to HCl, moist, iron oxide staining		
761.0	32.0	R-2	44% (0%)			30.5-50 ft R.D. = 55°, closely spaced, both ends visible; filling is damp but no free water present, filling: not healed, moderately thin clay, very soft; surface: slightly rough, planar. Fracture set #1, discontinuity # 1.		
760.0	33.0							
759.0	34.0							
758.0	35.0							
757.0	36.0							
756.0	37.0							
755.0	38.0	R-3	88% (12%)					
754.0	39.0							
753.0								
DATE STARTED: 4/21/10 DATE FINISHED: 4/22/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jesse Merkel						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

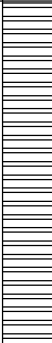
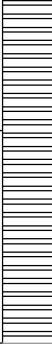

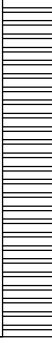
REV 1 Final Boring B-433

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 792.77 ft						DESCRIPTION		
DESCRIPTION								
752.0	41.0	R-4	86% (25%)	FD5		30.5-50.0 ft SHALE, clayey, very soft, decomposed, clay sized particles, medium gray (N5) to moderate yellowish brown (10YR 5/4), thinly to very thinly bedded, very closely to closely fractured, no reaction to HCl, moist, iron oxide staining		
751.0	42.0							
750.0	43.0							
749.0	44.0							
748.0	45.0							
747.0	46.0	R-5	84% (19%)	FD5				
746.0	47.0							
745.0	48.0							
744.0	49.0							
743.0	50.0							
742.0	51.0	R-6	98% (32%)	FD5		50.0-70.0 ft SHALE, moderately soft, slightly to moderately weathered, clay sized particles, dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining	50.55-51.3 ft, SC-2, 4/21/10, 1450	
741.0	52.0							
740.0	53.0							
739.0	54.0							
738.0	55.0							
737.0	56.0	R-7	86% (9%)	FD7		50-70 ft R.D. = 55°, closely spaced, both ends visible; filling: not healed; surface: slightly rough, planar. Fracture set #1, discontinuity # 2.		
736.0	57.0							
735.0	58.0							
734.0	59.0							
733.0								
DATE STARTED: 4/21/10 DATE FINISHED: 4/22/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jesse Merkel						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett		DRILL RIG: CME-550 (Buggy) HAMMER ID: 925

REV 1 Final Boring B-433

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE									
GROUND SURFACE ELEVATION: 792.77 ft						DESCRIPTION								
732.0	61.0	R-8	15% (0%)	FD7				50.0-70.0 ft SHALE, moderately soft, slightly to moderately weathered, clay sized particles, dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining						
731.0	62.0													
730.0	63.0													
729.0	64.0													
728.0	65.0	R-9	68% (22%)	FD8										
727.0	66.0													
726.0	67.0													
725.0	68.0													
724.0	69.0	R-10	98% (65%)	FD4		70.0-120.0 ft SHALE, moderately hard, slightly weathered to fresh, clay sized particles, dark gray (N3), widely fractured, no reaction to HCl, no staining, with fossiliferous zones, pyrite crystals trace after 94.1 ft 70-75.85 ft R.D. = 21°-69°, very closely to widely spaced; tight to moderately open; filling: not healed to moderately healed, moderately thin calcite, fresh to slightly weathered; surface: undulating, undualating and rough, moderately rough and planar, fresh to slightly weathered. Fracture set #2.								
723.0	70.0													
722.0	71.0													
721.0	72.0													
720.0	73.0	R-11	100% (92%)											
719.0	74.0													
718.0	75.0													
717.0	76.0													
716.0	77.0													
715.0	78.0													
714.0	79.0													
713.0														
DATE STARTED: 4/21/10 DATE FINISHED: 4/22/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jesse Merkel						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon				NOTES:				
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett				DRILL RIG: CME-550 (Buggy) HAMMER ID: 925				

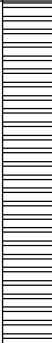
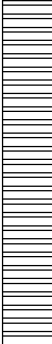
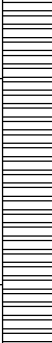
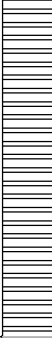
REV 1 Final Boring B-433

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 340485.71 ft E. 2405380.47 ft GROUND SURFACE ELEVATION: 792.77 ft										
							DESCRIPTION			
712.0		81.0	R-12	98% (92%)			70.0-120.0 ft SHALE, moderately hard, slightly weathered to fresh, clay sized particles, dark gray (N3), widely fractured, no reaction to HCl, no staining, with fossiliferous zones, pyrite crystals trace after 94.1 ft 80.1-95.5 ft R.D. = 18°-71°, closely to widely spaced; filling: not healed, very thin pyrite, fresh; surface: smooth to moderately rough, planar, fresh.			81.2-82.5 ft, SC-3, 4/22/10, 1033
711.0		82.0								
710.0		83.0								
709.0		84.0								
708.0		85.0	R-13	99% (90%)	FD3					
707.0		86.0								
706.0		87.0								
705.0		88.0								
704.0		89.0	R-14	98% (93%)						
703.0		90.0								
702.0		91.0								
701.0		92.0								
700.0		93.0	R-15	100% (92%)	FD1					
699.0		94.0								
698.0		95.0								
697.0		96.0								
696.0		97.0								
695.0		98.0								
694.0		99.0								
693.0										
DATE STARTED: 4/21/10 DATE FINISHED: 4/22/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jesse Merkel						DRILLING METHOD: Hollow Stem Auger, NQ DRILLING CO. Terracon				NOTES:
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett				DRILL RIG: CME-550 (Buggy) HAMMER ID: 925






REV 1 Final Boring B-433

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS			
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE					
GROUND SURFACE ELEVATION: 792.77 ft						DESCRIPTION				
692.0	101.0	R-16	100% (94%)	FD3		70.0-120.0 ft SHALE, moderately hard, slightly weathered to fresh, clay sized particles, dark gray (N3), widely fractured, no reaction to HCl, no staining, with fossiliferous zones, pyrite crystals trace after 94.1 ft 96.4-120.0 ft Weak reaction to HCl 97.3-119.3 ft R.D. = 10°-62°, very closely to widely spaced, neither ends visible; filling: not healed to moderately healed, clean, very thin pyrite, very thin calcite, fresh to slightly weathered; surface: smooth to moderately rough, planar and undulating, fresh. 96.4-120.0 ft Weak reaction to HCl				
691.0	102.0									
690.0	103.0									
689.0	104.0									
688.0	105.0	R-17	100% (93%)	FD3						
687.0	106.0									
686.0	107.0									
685.0	108.0									
684.0	109.0	R-18	98% (90%)	FD2						
683.0	110.0									
682.0	111.0									
681.0	112.0									
680.0	113.0	R-19	98% (91%)	FD4						
679.0	114.0									
678.0	115.0									
677.0	116.0									
676.0	117.0									
675.0	118.0									
674.0	119.0									
673.0										
DATE STARTED: 4/21/10						NOTES:				
DATE FINISHED: 4/22/10										
FIELD GEOLOGIST: Adam Meyer										
CHECKED BY: Jesse Merkel										
APPROVED BY: Rolando Benitez						DRILL RIG: CME-550 (Buggy)				
DATE STARTED: 4/21/10						HAMMER ID: 925				
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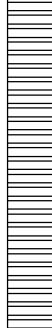



REV 1 Final Boring B-434

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS	
						N. 339641.97 ft E. 2404822.94 ft GROUND SURFACE ELEVATION: 709.00 ft			
						DESCRIPTION			
708.0	1.0	S-1	1-1-3 (4) 73%			0.0-0.35 ft Organic soil, (ol/oh), 95% fines, low plasticity, low dry strength, no dilatancy, low toughness; 5% sand, fine to medium, subangular, flat; very dusky red (10R 2/2), organic odor, moist, no HCl reaction, with roots, some rock fragments	ol/oh		
707.0	2.0					0.35-1.5 ft Poorly graded sand, (sp), 95% sand, fine, subangular; 5% fines, low plasticity, slow dilatancy, low toughness; moderate yellowish brown (10YR 5/4), no odor, moist, no HCl reaction, some roots	sp		
706.0	3.0					1.5-5.0 ft Interval not sampled			
705.0	4.0	S-2							
704.0	5.0								
703.0	6.0		10-15-27 (42) 100%		5.0-6.5 ft Silty sand, (sm), 75% sand, fine, subangular; 15% fines, medium plasticity, no dilatancy, low toughness; 10% gravel, medium to coarse, flat, medium hardness; brownish gray (5YR 4/1), no odor, moist, no HCl reaction, some rock fragments	sm			
702.0	7.0	S-3				6.5-10.0 ft Interval not sampled			
701.0	8.0								
700.0	9.0								
699.0	10.0	S-4	2-1-1 (2) 80%			10.0-11.5 ft Poorly graded sand, (sp), 100% sand, fine, subrounded; moderate brown (5YR 3/4) with light brown (5YR 5/6), no odor, moist, no HCl reaction, little rock fragments	sp		
698.0	11.0					11.5-15.0 ft Interval not sampled			
697.0	12.0								
696.0	13.0	S-4	12-50/5 100%			15.0-15.9 ft SHALE, moderately soft, moderately weathered, greenish black (5GY 2/1), moderate odor, very closely fractured, no reaction to HCl, no staining			
695.0	14.0					15.9-43.3 ft SHALE, moderately hard to moderately soft, slightly weathered to fresh, medium dark gray (N4) to dark gray (N3), moderately bedded, no odor, closely fractured, no reaction to HCl, fossiliferous zones, iron oxide staining restricted to fractures			
694.0	15.0					16.5-17.1 ft Bedding plane, R.D. = 11°-14°, moderately spaced, neither ends visible, slightly open; filling: not healed, very thin clay, iron oxide staining, very soft; surface: slightly rough, slightly weathered.			
693.0	16.0	R-1	79% (11%)	FD6		16.55-21.6 ft R.D. = 53°-60°, closely to widely spaced, neither ends visible; filling: slightly to moderately weathered; surface: moderately rough, slightly weathered; slightly to moderately open; filling: not healed to moderately healed, iron oxide staining.			
692.0	17.0								
691.0	18.0								
690.0	19.0	R-2							
DATE STARTED: 5/12/10 DATE FINISHED: 5/12/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jesse Merkel						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:		
APPROVED BY: Rolando Benítez						DRILLER: C. VanVactor HELPER(S): E. Zetwick	DRILL RIG: CME-55 (Truck) HAMMER ID: 955		

REV 1 Final Boring B-434

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
		N. 339641.97 ft E. 2404822.94 ft								
						GROUND SURFACE ELEVATION: 709.00 ft				
						DESCRIPTION				
688.0	21.0	R-2	96% (68%)	FD6		18.25-22.5 ft Bedding plane, R.D. = 8°-11°, very widely spaced, neither ends visible, moderately open; filling: not healed, very thin clay, iron oxide staining, very soft; surface: slightly rough, slightly weathered.				
687.0	22.0					19.85-20.95 ft R.D. = 22°-24°, closely to moderately spaced, neither ends visible; slightly to moderately open; filling: not healed, very thin caly, very soft; surface: slightly rough, moderately weathered.				
686.0	23.0					15.9-43.3 ft SHALE, moderately hard to moderately soft, slightly weathered to fresh, medium dark gray (N4) to dark gray (N3), moderately bedded, no odor, closely fractured, no reaction to HCl, fossiliferous zones, iron oxide staining restricted to fractures				
685.0	24.0					21.85-29.8 ft R.D. = 64°-68°, moderately to widely spaced, neither ends visible, slightly open; filling: not healed, clean (21.85 ft), very thin clay; surface: slightly rough, slightly weathered.				
684.0	25.0	R-3	94% (65%)	FD5		22.9-33.55 ft R.D. = 52°-54°, moderately spaced, neither ends visible; tight to slightly open; filling: not healed, clean, very thin clay (23.25 ft), very soft; surface: moderately rough to rough, fresh to slightly weathered.				
683.0	26.0					24.95-25.45 ft Neither ends visible, slightly open; filling: not healed, clean; surface: slightly rough; subvertical curved fracture that ends on the same side it begins, vertical to subvertical fractures.				
682.0	27.0					25.5-42.05 ft R.D. = 13°-18°, widely spaced, neither ends visible; moderately to slightly open; filling: not healed to partly healed, very thin calcite (42.05 ft), very thin to moderately thin clay, slightly weathered, very soft (clay) and moderately soft (calcite); surface: rough to slightly rough, slightly weathered.				
681.0	28.0									
680.0	29.0	R-4	100% (81%)			31-39.8 ft R.D. = 70°-73°, moderately to widely spaced, neither ends visible; tight to slightly open; filling: not healed, clean; surface: moderately rough, fresh.				
679.0	30.0					31.9-32.5 ft Joint, R.D. = 80°, moderately to widely spaced, neither ends visible, slightly open; filling: not healed, clean; surface: moderately rough.				
678.0	31.0									
677.0	32.0									
676.0	33.0	R-5	100% (92%)	FD3		34.6- ft Joint, R.D. = 40°, moderately to widely spaced, neither ends visible, moderately open; filling: not healed, clean; surface: moderately rough.				
675.0	34.0									
674.0	35.0									
673.0	36.0									
672.0	37.0	R-6								
671.0	38.0									
670.0	39.0									
DATE STARTED: 5/12/10 DATE FINISHED: 5/12/10 FIELD GEOLOGIST: Adam Meyer CHECKED BY: Jesse Merkel						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:		
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): E. Zetwick		DRILL RIG: CME-55 (Truck) HAMMER ID: 955		

REV 1 Final Boring B-434

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS	
		GROUND SURFACE ELEVATION: 709.00 ft									
		DESCRIPTION									
668.0 41.0		R-6		100% (100%)		FD3		15.9-43.3 ft SHALE, moderately hard to moderately soft, slightly weathered to fresh, medium dark gray (N4) to dark gray (N3), moderately bedded, no odor, closely fractured, no reaction to HCl, fossiliferous zones, iron oxide staining restricted to fractures			
667.0 42.0								42- ft R.D. = 4°, neither ends visible, slightly open; filling: not healed, very thin clay, very soft; surface: moderately rough.			
666.0 43.0								---- Bottom of Boring at 43.30 ft.----			

REV 1 Final Boring B-435

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339687.56 ft E. 2406056.31 ft							
GROUND SURFACE ELEVATION: 687.27 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
687.0	1.0	S-1	3-2-2 (4) 73%	FD8		0.0-0.5 ft Sandy silt/sandy elastic silt, (ml/mh), about 2% cobbles, subangular, hard; 50% fines, low plasticity, no dry strength, no dilatancy, low toughness; 30% sand, fine to medium, subangular; 10% gravel, fine to coarse, subangular, hard hardness; maximum grain size = 0.5 inches, dark yellowish brown (10YR 4/2), dry, no HCl reaction, very loose, with roots, with organics	ml/mh
686.0	2.0	S-2	3-5-5 (10) 97%			0.5-1.5 ft Silty sand, (sm), 70% sand, fine to medium, subangular; 25% fines, low plasticity, no dry strength, no dilatancy, low toughness; 5% gravel, fine to coarse, angular, hard hardness; maximum grain size = .03 inches, dark yellowish orange (10YR 6/6), moist, no HCl reaction, very loose	sm
685.0	3.0	S-3	2-3-3 (6) 100%			1.5-3.0 ft Silty sand, (sm), 80% sand, fine to medium, subangular; 18% fines, low plasticity, no dry strength, no dilatancy, low toughness; 2% gravel, fine to coarse, subangular, hard hardness; maximum grain size = 0.5 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, loose	sp-sm
684.0	4.0						sp-sm
683.0	5.0	S-4	2-2-1 (3) 100%			3.0-3.6 ft Poorly graded sand with silt, (sp-sm), about 5% cobbles, subangular, hard, flat and elongated; 80% sand, fine to medium, subangular; 10% gravel, fine to coarse, subangular, hard hardness; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.5 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, loose	sw-sm
682.0	6.0						sw-sm
681.0	7.0	S-5	2-1-2 (3) 100%			3.6-4.2 ft Poorly graded sand with silt and gravel, (sp-sm), about 5% cobbles, subangular, hard; 60% sand, fine to medium; 30% gravel, fine to coarse, subangular, hard hardness; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.5 inches, dark yellowish brown (10YR 4/2), moist, no HCl reaction, loose	sw
680.0	8.0	S-6	2-3-4 (7) 100%			4.2-4.5 ft Well graded sand with silt, (sw-sm), about 5% cobbles, subangular, hard; 80% sand, fine to coarse, subangular; 10% gravel, fine to coarse, subangular, hard hardness; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.5 inches, moderate yellowish brown (10YR 5/4), moist, no HCl reaction, very loose	gw
679.0	9.0	S-7	5-8-10 (18) 100%			4.5-9.8 ft Well graded sand, (sw), about 2% cobbles, subangular, hard; 95% sand, fine to coarse, subangular; 5% gravel, fine to coarse, subangular, hard hardness; 0% fines; maximum grain size = 0.01 inches, dark yellowish brown (10YR 4/2), moist, no HCl reaction, very loose to medium dense	
678.0	10.0						
677.0	11.0	S-8	7-50/5 100%			10.5-11.4 ft SHALE, soft to hard, fresh to slightly weathered, medium dark gray (N4) and dark yellowish orange (10YR 6/6), no reaction to HCl, wet, iron oxide staining, clay pockets that have low toughness and high plasticity, sand pockets, fissile shale	
676.0	12.0	S-9	50/2			11.4-12.0 ft No sample recovered	
675.0	13.0	R-1	100% (0%)	12.0-12.17 ft SHALE, soft to hard, fresh to slightly weathered, medium dark gray (N4) with dark yellowish orange (10YR 6/6), no reaction to HCl, wet, iron oxide staining, fissile			
674.0	14.0					12.17-12.2 ft Interval not sampled	
673.0	15.0	R-2	100% (0%)	12.2-20.1 ft SHALE, moderately hard to hard, fresh to slightly weathered, dark gray (N3), closely to very closely fractured, no reaction to HCl, wet, iron oxide staining			
672.0	16.0			12.2-20 ft Bedding plane separation, R.D. = 10°, very closely to closely spaced; surface: smooth, planar, slightly weathered; iron oxide staining present on some of bedding surfaces.			
671.0	17.0						
670.0	18.0						
669.0	19.0						
668.0							
DATE STARTED: 6/2/10						NOTES:	
DATE FINISHED: 6/3/10							
FIELD GEOLOGIST: Adrianna Semione							
CHECKED BY: Adrianna Semione						DRILLING METHOD: Casing Advancer, NQ	
						DRILLING CO. Terracon	
APPROVED BY: Rolando Benitez						DRILL RIG: CME-55 (Truck)	
						HAMMER ID: 955	

REV 1 Final Boring B-435

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339687.56 ft E. 2406056.31 ft GROUND SURFACE ELEVATION: 687.27 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
667.0		R - 3	100% (8%)	FD6		12.5-19.6 ft R.D. = 36°, closely to moderately spaced; surface: rough, planar, slightly weathered; few contain iron oxide staining.	27.7-28.1ft, SC-1, 6/3/10, 0903
666.0	21.0					13-20.1 ft R.D. = 56°, moderately to closely spaced; surface: rough, planar, slightly weathered; few contain iron oxide staining.	
665.0	22.0					20.1-30.1 ft SHALE, moderately hard to hard, fresh to slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining	
664.0	23.0					20.1-28.2 ft Bedding plane separation, R.D. = 10°, closely to moderately spaced; surface: smooth, planar, slightly weathered; iron oxide staining on bedding surface.	
663.0	24.0					20.7-28.65 ft R.D. = 56°, moderately spaced; surface: rough, planar, slightly weathered; iron oxide staining on fracture face.	
662.0	25.0	21-27.6 ft R.D. = 36°, moderately spaced; surface: rough, planar, slightly weathered; iron oxide staining on fracture face.					
661.0	26.0	R - 4	95% (17%)	FD6			
660.0	27.0						
659.0	28.0						
658.0	29.0						
657.0	30.0						
656.0	31.0	R - 5	100% (53%)	FD5		30.1-45.1 ft SHALE, moderately hard to hard, fresh, dark gray (N3), closely to widely fractured, no reaction to HCl	
655.0	32.0					30.5-41 ft R.D. = 56°, widely to very widely spaced; filling: clean; surface: rough, planar; fracture at 30.5 ft contains trace iron oxide staining and fresh to slightly weathered.	
654.0	33.0					31-39.1 ft Bedding plane separation, R.D. = 10°, very closely to widely spaced; filling: clean; surface: smooth, planar; bedding at 31.0 ft shows trace iron oxide staining and fresh to slightly weathered.	
653.0	34.0					31.1-40.6 ft R.D. = 36°, moderately to closely spaced; filling: clean; surface: rough, planar; fracture at 31.1 ft contains trace iron oxide staining and fresh to slightly weathered.	
652.0	35.0						
651.0	36.0	R - 6	100% (82%)	FD5			
650.0	37.0						
649.0	38.0						
648.0	39.0						
DATE STARTED: 6/2/10 DATE FINISHED: 6/3/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: Casing Advancer, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): R. Terral	DRILL RIG: CME-55 (Truck) HAMMER ID: 955

REV 1 Final Boring B-435

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 687.27 ft						DESCRIPTION	
DESCRIPTION							
647.0		R - 7	100% (60%)	FD6		crystal growth, also 36° angle fractures. 30.1-45.1 ft SHALE, moderately hard to hard, fresh, dark gray (N3), closely to widely fractured, no reaction to HCl	
646.0	41.0					41.35-53.4 ft R.D. = 10°, moderately to very widely spaced; filling: moderately healed, moderately thin calcite, fresh; surface: smooth, planar, fresh; few bedding surfaces do not contain calcite filling. 42.2-49.5 ft R.D. = 36°, widely spaced; filling: moderately healed, moderately thin calcite, fresh; surface: rough, planar, fresh; fracture at 42.2 ft, no calcite filling, fresh. 42.55-51.15 ft R.D. = 56°, moderately to very widely spaced; filling: clean, fresh; surface: rough, planar, fresh; fracture at 43.15 ft contains trace pyrite.	
645.0	42.0						
644.0	43.0						
643.0	44.0	R - 8	100% (99%)			45.1-54.5 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to widely fractured, no reaction to HCl	
642.0	45.0					47.3-47.7 ft Random fracture, R.D. = 60°; filling: clean; surface: rough, planar; possible mechanical break.	
641.0	46.0						
640.0	47.0						
639.0	48.0	R - 9	100% (98%)	FD3		50.5-51.1 ft Random fracture, R.D. = 70°, both ends visible; filling: moderately healed, thick calcite, fresh, hard; surface: fresh.	
638.0	49.0					52.35-53.4 ft Random fracture, R.D. = 75°, both ends visible; filling: moderately healed, very thin calcite, fresh; surface: fresh.	
637.0	50.0						
636.0	51.0						
635.0	52.0	R - 10	100% (100%)	FD0		54.5-60.2 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, trace pyrite and calcite replaced shell casts 54.6-57.8 ft Bedding plane separation, R.D. = 10°, very closely to widely spaced; filling: moderately healed, moderately thick calcite, fresh; surface: fresh; bedding at 54.6 and 54.65 ft are filled with very thin filling of pyrite, totally healed, fresh.	
634.0	53.0						
633.0	54.0						
632.0	55.0						
631.0	56.0	R - 11					
630.0	57.0						
629.0	58.0						
628.0	59.0						
DATE STARTED: 6/2/10 DATE FINISHED: 6/3/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: Casing Advancer, NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): R. Terral	DRILL RIG: CME-55 (Truck) HAMMER ID: 955

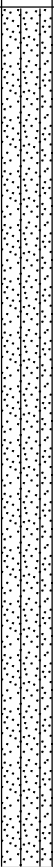
REV 1 Final Boring B-435

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
627.0			100% (100%)			N. 339687.56 ft E. 2406056.31 ft GROUND SURFACE ELEVATION: 687.27 ft		
						---- Bottom of Boring at 60.20 ft.----		
DATE STARTED: 6/2/10 DATE FINISHED: 6/3/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: Casing Advancer, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: C. VanVactor HELPER(S): R. Terral		DRILL RIG: CME-55 (Truck) HAMMER ID: 955


REV 1 Final Boring B-436

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339698.74 ft E. 2406180.69 ft GROUND SURFACE ELEVATION: 682.97 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
682.0	1.0	S-1	1-2-2 (4) 87%			0.0-12.5 ft Silty sand, (sm), 70% sand, fine to medium, rounded, soft hardness; 30% fines, medium plasticity, no dry strength, no dilatancy, low toughness; moderate brown (5YR 4/4), moist, no HCl reaction, loose, homogeneous	sm
681.0	2.0	S-2	2-3-4 (7) 93%				
680.0	3.0	S-3	2-2-2 (4) 93%				
679.0	4.0						
678.0	5.0	S-4	2-2-3 (5) 100%				
677.0	6.0						
676.0	7.0	S-5	2-2-4 (6) 100%				
675.0	8.0	S-6	4-3-6 (9) 100%				
674.0	9.0	ST-1					
673.0	10.0		100%				
672.0	11.0	S-7	7-7-6 (13) 60%				
671.0	12.0						
670.0	13.0	S-8	2-4-6 (10) 67%		12.5-15.5 ft Silty sand, (sm), 85% sand, fine to medium, rounded, soft hardness; 15% fines, no dry strength, no dilatancy; moderate brown (5YR 4/4) and moderate brown (5YR 3/4), moist, no HCl reaction, loose, homogeneous	sm	
669.0	14.0	S-9	5-6-7 (13) 87%				
668.0	15.0						
667.0	16.0	S-10	10-13-11 (24) 67%		15.5-17.0 ft Silty sand with gravel, (sm), 75% sand, fine to medium, subrounded, soft hardness; 15% gravel, medium to coarse, subangular, flat and elongated, medium hardness; 10% fines, no dry strength, no dilatancy; maximum grain size = 0.5 inches, moderate brown (5YR 4/4) and light brown (5YR 5/6), moist, no HCl reaction, dense	sm	
666.0	17.0	S-11	14-13-10 (23) 67%				
665.0	18.0						
664.0	19.0	S-12	8-8-12 (20) 47%		17.0-18.5 ft Silty sand with gravel, (sm), 50% sand, fine to medium, subangular, flat, soft hardness; 40% gravel, fine to coarse, subangular, flat and elongated, medium hardness; 10% fines, no dry strength, no dilatancy; maximum grain size = 1 inches, dark reddish brown (10R 3/4) and moderate brown (5YR 4/4), moist, no HCl reaction, loose	gp-gc	
DATE STARTED: 6/3/10 DATE FINISHED: 6/4/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione					DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez					DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665

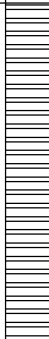
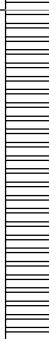
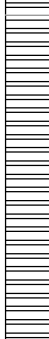

REV 1 Final Boring B-436

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES N. 339698.74 ft E. 2406180.69 ft GROUND SURFACE ELEVATION: 682.97 ft		USCS SYMBOL	REMARKS
							DESCRIPTION			
662.0	21.0	S-13	8-11-14 (25) 50%				18.5-21.5 ft Poorly graded gravel with clay and sand, (gp-gc), 60% gravel, fine to coarse, subangular, flat and elongated, medium hardness; 30% sand, medium, subangular, soft hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1 inches, moderate reddish brown (10R 4/6) and moderate brown (5YR 4/4), moist, no HCl reaction, medium dense	gp-gc		
661.0	22.0	S-14	16-36-32 (68) 93%				21.5-27.4 ft Poorly graded gravel with clay and sand, (gp-gc), 60% gravel, fine to coarse, subangular, flat and elongated, medium hardness; 30% sand, fine to coarse, subangular, medium hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.4 inches, light brown (5YR 5/6) and dark gray (N3), moist, no HCl reaction, loose to medium dense			
660.0	23.0									
659.0	24.0	S-15	16-22-50 (72) 87%				gp-gc			
658.0	25.0	S-16	22-30-39 (69) 100%							
657.0	26.0									
656.0	27.0	S-17	26-17-50/5 100%							
655.0	28.0	S-18	50 100%				27.4-27.5 ft Interval not sampled 27.7-28.0 ft SHALE, moderately soft, slightly weathered, dark gray (N3), no reaction to HCl, iron oxide staining			
654.0	29.0						28.0-29.0 ft Interval not sampled			
653.0	30.0	S-19	25-27-50 (77) 90%				gp-gc			
652.0	31.0			29.0-30.5 ft Poorly graded gravel with clay and sand, (gp-gc), 65% gravel, fine to coarse, subangular, flat and elongated, medium hardness; 25% sand, fine to coarse, subangular, flat and elongated, soft hardness; 10% fines, medium plasticity, no dry strength, low toughness; maximum grain size = 0.6 inches, dark gray (N3) and dark yellowish brown (10YR 4/2), moist, no HCl reaction, dense						
651.0	32.0	S-20	24-50/4 100%	gp-gc	30.5-31.5 ft Interval not sampled 31.5-32.3 ft Poorly graded gravel with clay and sand, (gp-gc), 65% gravel, fine to coarse, subangular, flat and elongated, medium hardness; 25% sand, fine to coarse, subangular, flat and elongated, soft hardness; 10% fines, medium plasticity, no dry strength, low toughness; maximum grain size = 0.6 inches, dark gray (N3) and dark yellowish brown (10YR 4/2), moist, no HCl reaction, dense					
650.0	33.0				32.3-34.0 ft Interval not sampled					
649.0	34.0	R-1	90% (0%)	FD7	34.0-35.0 ft SHALE, horizontal, moderately hard, moderately weathered, dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining, 10° bedding plane.					
648.0	35.0				34-40 ft Joint, R.D. = 27-67°, closely spaced; filling: not healed, intensely weathered; surface: slightly rough, planar, intensely weathered; fracture face's have iron oxidation staining. Fracture set #F-1.					
647.0	36.0				35.0-40.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), moderately fractured, no reaction to HCl, iron oxide staining, strong HCl reaction to the calcite white (N9) laminae, 10° bedding plane, trace of pyrite					
646.0	37.0	R-2	44% (20%)	FD5						
645.0	38.0									
644.0	39.0									
DATE STARTED: 6/3/10 DATE FINISHED: 6/4/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione							DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez							DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-436

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS		
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE				
GROUND SURFACE ELEVATION: 682.97 ft						DESCRIPTION			
642.0	41.0	R-3	78% (0%)	FD7		40.0-45.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), closely fractured, no reaction to HCl, iron oxide staining, strong HCl reaction to the calcite white (N9) laminae, 10° bedding plane, trace of pyrite, closely spaced bedding planes			
641.0	42.0					45.0-50.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), widely fractured, no reaction to HCl, strong HCl reaction to the calcite white (N9) laminae, 10° bedding plane			
640.0	43.0								
639.0	44.0								
638.0	45.0	R-4	90% (90%)						
637.0	46.0								
636.0	47.0								
635.0	48.0								
634.0	49.0	R-5	98% (98%)	FD1					
633.0	50.0								
632.0	51.0								
631.0	52.0								
630.0	53.0	R-6	100% (100%)						
629.0	54.0								
628.0	55.0								
627.0	56.0								
626.0	57.0								
625.0	58.0								
624.0	59.0								
DATE STARTED: 6/3/10 DATE FINISHED: 6/4/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						--- Bottom of Boring at 60.00 ft.--- DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon			
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley			
						NOTES: DRILL RIG: CME-55 (Track) HAMMER ID: 340665			

REV 1 Final Boring B-437

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 339709.67 ft E. 2406305.29 ft								
GROUND SURFACE ELEVATION: 679.59 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
679.0	1.0	S-1	1-2-2 (4) 100%			0.0-12.0 ft Silty sand, (sm), 75% sand, fine to medium, subrounded, soft hardness; 25% fines, low plasticity, no dry strength, no dilatancy, low toughness; moderate brown (5YR 4/4), moist, no HCl reaction, very loose to medium dense	sm	
678.0	2.0	S-2	2-3-3 (6) 87%					
677.0	3.0							
676.0	4.0	S-3	3-3-3 (6) 100%					
675.0	5.0	S-4	2-5-7 (12) 47%					
674.0	6.0							
673.0	7.0	S-5	7-9-10 (19) 100%					
672.0	8.0	S-6	4-8-10 (18) 87%					
671.0	9.0							
670.0	10.0	S-7	8-8-11 (19) 100%					
669.0	11.0	S-8	6-10-14 (24) 100%					
668.0	12.0							
667.0	13.0	S-9	11-14-14 (28) 100%					
666.0	14.0	S-10	4-15-14 (29) 87%					
665.0	15.0							
664.0	16.0	S-11	13-22-27 (49) 93%					
663.0	17.0	S-12	16-28-19 (47) 60%					
662.0	18.0							
661.0	19.0	S-13	9-12-12 (24) 77%					
660.0		S-14					sp-sc	
DATE STARTED: 6/6/10 DATE FINISHED: 6/7/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jesse Merkel						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		
						DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931		

REV 1 Final Boring B-437

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 339709.67 ft E. 2406305.29 ft GROUND SURFACE ELEVATION: 679.59 ft										
							DESCRIPTION			
659.0		21.0	S-14	14-11-14 (25) 67%			18.0-21.0 ft Poorly graded sand with clay and gravel, (sp-sc), 60% sand, fine to coarse, subangular, soft hardness; 30% gravel, fine to coarse, angular, flat and elongated, medium hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.05 inches, moderate brown (5YR 3/4) and moderate reddish brown (10R 4/6), moist, no HCl reaction, medium dense	sp-sc		
658.0		22.0	S-15	34-15-15 (30) 80%			21.0-22.5 ft Poorly graded sand with clay and gravel, (sp-sc), 50% sand, fine to coarse, subangular, soft hardness; 40% gravel, medium to coarse, angular, flat and elongated, medium hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.1 inches, dusky brown (5YR 2/2) and dusky red (5R 3/4), moist, no HCl reaction, medium dense	sp-sc		
657.0		23.0	S-16	14-12-16 (28) 67%			22.5-27.0 ft Poorly graded gravel with clay and sand, (gp-gc), 65% gravel, fine to coarse, subangular, flat and elongated, medium hardness; 25% sand, fine to coarse, subangular, flat and elongated, soft hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.11 inches, moderate brown (5YR 4/4), moist, no HCl reaction, medium dense, blocky	gp-gc		
656.0		24.0								
655.0		25.0	S-17	10-7-10 (17) 60%						
654.0		26.0	S-18	8-8-10 (18) 80%						
653.0		27.0								
652.0		28.0	S-19	10-12-22 (34) 73%						
651.0		29.0	S-20	50/4 100%						
650.0		30.0								
649.0		31.0	S-21	4-25-18 (43) 73%			30.0-31.5 ft Poorly graded gravel with clay and sand, (gp-gc), 65% gravel, fine to coarse, subangular, flat and elongated, medium hardness; 25% sand, fine to coarse, subangular, flat and elongated, soft hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.11 inches, moderate brown (5YR 4/4) and dark gray (N3), moist, no HCl reaction, dense to very dense, blocky, weathered shale	gp-gc	Overburden material. Mechanically broken.	
648.0		32.0	S-22	50 100%			31.5-32.0 ft SHALE, moderately soft, slightly weathered, dark gray (N3), no reaction to HCl			
647.0		33.0					32.0-33.0 ft Interval not sampled			
646.0		34.0					33.0-36.0 ft SANDSTONE, moderately hard, fresh to slightly weathered, dark gray (N3) and white (N9), no reaction to HCl, iron oxide staining, quartz constitutes a third of the sample, overburden material (boulders)			
645.0		35.0	R-1	60% (33%)						
644.0		36.0								
643.0		37.0								
642.0		38.0	R-2	78% (53%)			36.0-40.9 ft SANDSTONE, horizontal, moderately hard, slightly to intensely weathered, dark gray (N3), no reaction to HCl, overburden material (boulder)			
641.0		39.0								
640.0			R-3							
DATE STARTED: 6/6/10 DATE FINISHED: 6/7/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jesse Merkel							DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez							DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-437

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 679.59 ft						DESCRIPTION		
639.0	41.0	R-3	96% (80%)	FD0		40.9-44.6 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), very widely fractured, no reaction to HCl, iron oxide staining		
638.0	42.0							
637.0	43.0							
636.0	44.0							
635.0	45.0							
634.0	46.0	R-4	100% (100%)	FD0		44.6-60.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), extremely widely fractured, no reaction to HCl		
633.0	47.0							
632.0	48.0							
631.0	49.0							
630.0	50.0							
629.0	51.0	R-5	100% (100%)	FD0				
628.0	52.0							
627.0	53.0							
626.0	54.0							
625.0	55.0							
624.0	56.0	R-6	94% (94%)	FD0				
623.0	57.0							
622.0	58.0							
621.0	59.0							
620.0								
DATE STARTED: 6/6/10 DATE FINISHED: 6/7/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jesse Merkel						--- Bottom of Boring at 60.00 ft.--- DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931


REV 1 Final Boring B-438

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339721.41 ft E. 2406429.61 ft GROUND SURFACE ELEVATION: 679.00 ft		
						DESCRIPTION		
678.0	1.0	S-1	2-2-4 (6) 100%			0.0-3.0 ft Silty sand, (sm), 80% sand, fine; 20% fines, low plasticity, no dry strength, no dilatancy, low toughness; moderate brown (5YR 4/4) with pale yellowish brown (10YR 6/2), moist, no HCl reaction, stiff to medium stiff	sm	
677.0	2.0	S-2	4-5-6 (11) 100%					
676.0	3.0							
675.0	4.0	S-3	7-10-12 (22) 100%			3.0-4.6 ft Silty sand, (sm), 80% sand, fine; 20% fines, low plasticity, no dry strength, no dilatancy, low toughness; moderate yellowish brown (10YR 5/4), moist, no HCl reaction, very stiff	sm	
674.0	5.0	S-4	7-11-12 (23) 73%			4.6-6.0 ft Well graded sand, (sw), 80% sand, fine to medium; 10% gravel, fine to medium, subangular; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.5 inches, moderate brown (5YR 3/4), moist, no HCl reaction, medium dense	sw	
673.0	6.0							
672.0	7.0	S-5	8-11-12 (23) 73%			6.0-7.5 ft Well graded sand, (sw), 90% sand, fine to medium; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; moderate brown (5YR 3/4), moist, no HCl reaction, medium dense	sw	
671.0	8.0	S-6	8-11-13 (24) 100%			7.5-9.0 ft Poorly graded sand with silt, (sp-sm), 90% sand, fine to medium; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; grayish brown (5YR 3/2), moist, no HCl reaction, medium dense, 8.9-8.93, black (N1) lamination of clay/silt	sp-sm	
670.0	9.0							
669.0	10.0	S-7	9-10-10 (20) 100%			9.0-11.0 ft Silty sand, (sm), 70% sand, fine to medium; 30% fines, medium plasticity, no dry strength, no dilatancy, low toughness; dusky brown (5YR 2/2), wet, no HCl reaction, medium dense	sm	
668.0	11.0	S-8	7-8-8 (16) 100%			11.0-12.0 ft Silty sand, (sm), 70% sand, fine to medium; 30% fines, medium plasticity, no dry strength, no dilatancy, low toughness; dusky brown (5YR 2/2), moist, no HCl reaction, medium dense	sm	
667.0	12.0							
666.0	13.0	S-9	11-15-15 (30) 100%			12.0-15.0 ft Sandy elastic silt/sandy lean clay, (mh/cl), 70% fines, medium plasticity, no dry strength, no dilatancy, low toughness; 30% sand; moderate yellowish brown (10YR 5/4) with black (N1), moist, hard	mh/cl	
665.0	14.0	S-10	11-21-10 (31) 100%					
664.0	15.0							
663.0	16.0	S-11	7-10-11 (21) 87%			15.0-21.0 ft Clayey gravel, (gc), 60% gravel, fine to coarse, subangular; 30% fines, medium plasticity, no dry strength, no dilatancy, low toughness; 10% sand, fine to medium, subangular; maximum grain size = 1.5 inches, dark yellowish brown (10YR 4/2), moist, no HCl reaction, dense	gc	
662.0	17.0	S-12	7-11-14 (25) 77%					
661.0	18.0							
660.0	19.0	S-13	7-8-9 (17) 53%					
		S-14						
DATE STARTED: 5/11/10 DATE FINISHED: 5/12/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES: DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett		

REV 1 Final Boring B-438

PROJECT NO. 10-4310

						COORDINATES		USCS SYMBOL	REMARKS	
						N. 339721.41 ft E. 2406429.61 ft				
						GROUND SURFACE ELEVATION: 679.00 ft				
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW(SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION				
658.0	21.0	S-14	4-7-13 (20) 73%					gc	ST-1, 21.0-21.9 ft, recovered 0.5 ft, down pressure of 350 psi with max at end of 500 psi with refusal of shelby, let set 15 minutes	
		ST -1	56%			21.0-21.9 ft Silty gravel, (gm), 60% gravel, fine to coarse, subangular; 30% fines, medium plasticity, no dry strength, no dilatancy, low toughness; 10% sand, fine to medium, subangular; maximum grain size = 0.5 inches, dark yellowish brown (10YR 4/2), moist, no HCl reaction		gm		
657.0	22.0									
656.0	23.0	S-15	4-7-12 (19) 67%			21.9-24.9 ft Well graded sand with silt and gravel, (sw-sm), about 2% cobbles, subangular; 60% sand, fine to coarse, subangular; 30% gravel, fine to coarse, subangular; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.5 inches, dusky brown (5YR 2/2), wet, no HCl reaction, medium dense		sw-sm		
655.0	24.0	S-16	6-11-14 (25) 50%							
654.0	25.0									
653.0	26.0	S-17	5-5-10 (15) 67%			24.9-26.4 ft Silty gravel, (gm), about 2% cobbles, subangular; 1% boulders, subangular; 70% gravel, fine to coarse, subangular; 20% fines, medium plasticity, no dry strength, no dilatancy, low toughness; 10% sand, fine to coarse, subangular; maximum grain size = 1.5 inches, dark yellowish brown (10YR 4/2), wet, no HCl reaction, medium dense		gm		
652.0	27.0	S-18	8-9-10 (19) 57%			26.4-27.9 ft Well graded sand with silt and gravel, (sw-sm), about 2% cobbles, subangular; 50% sand, fine to coarse, subangular; 40% gravel, fine to coarse, subangular; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.5 inches, dark yellowish brown (10YR 4/2), wet, no HCl reaction, medium dense		sw-sm		
651.0	28.0									
650.0	29.0	S-19	8-8-12 (20) 73%			27.9-29.4 ft Silty gravel, (gm), about 5% cobbles, subangular; 10% boulders, subangular; 70% gravel, fine to coarse, subangular; 20% fines, medium plasticity, no dry strength, no dilatancy, low toughness; 10% sand, fine to coarse, subangular; maximum grain size = 1.5 inches, dark yellowish brown (10YR 4/2), wet, no HCl reaction, medium dense		gm		
649.0	30.0	S-20	8-8-10 (18) 100%							
648.0	31.0					29.4-32.4 ft Well graded gravel with silt and sand, (gw-gm), about 5% cobbles, subangular; 2% boulders, subangular; 70% gravel, fine to coarse, subangular; 20% sand, fine to coarse, subangular; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 2.0 inches, dark yellowish brown (10YR 4/2), wet, no HCl reaction, medium dense		gw-gm		
647.0	32.0	S-21	4-7-19 (26) 67%							
646.0	33.0	S-22	9-22-12 (34) 57%			32.4-35.4 ft Well graded gravel with silt and sand, (gw-gm), about 5% cobbles, subangular; 0% boulders; 70% gravel, fine to coarse, subangular; 20% sand, fine to coarse, subangular; 10% fines, non plastic, no dry strength, no dilatancy, no toughness; maximum grain size = 1.0 inches, dark yellowish brown (10YR 4/2), wet, no HCl reaction, dense to medium dense		gw-gm		
645.0	34.0									
644.0	35.0	S-23	3-6-8 (14) 67%							
643.0	36.0	S-24	4-6-11 (17) 60%		35.4-35.65 ft Well graded sand with silt, (sw-sm), 90% sand, fine to coarse, subangular; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; medium dark gray (N4), medium dense		sw-sm gm			
642.0	37.0	S-25	50/4 33%		35.65-36.9 ft Silty gravel with sand, (gm), about 5% cobbles, subangular; 1% boulders, subangular; 60% gravel, fine to coarse, subangular; 20% sand, fine to coarse, subangular; 20% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 2.0 inches, dark yellowish brown (10YR 4/2), wet, no HCl reaction, medium dense					
641.0	38.0									
640.0	39.0	S-26	50/4 100%		36.9-37.23 ft SHALE, moderately hard, fresh, medium dark gray (N4), weak reaction to HCl					
		R -1	46% (38%)	FD4	37.23-38.4 ft Interval not sampled				39.0-40.5 ft mechanically broken	
DATE STARTED: 5/11/10 DATE FINISHED: 5/12/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:		
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett		DRILL RIG: CME-550 (Buggy) HAMMER ID: 925		

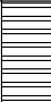
REV 1 Final Boring B-438

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339721.41 ft E. 2406429.61 ft GROUND SURFACE ELEVATION: 679.00 ft DESCRIPTION		
638.0	41.0	R -1	46% (38%)			38.4-38.75 ft SHALE, moderately hard, fresh, medium dark gray (N4), weak reaction to HCl		
637.0	42.0					38.75-39.0 ft Interval not sampled		
636.0	43.0	R -2	100% (98%)	FD4		39.0-51.5 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to widely fractured, no reaction to HCl		
635.0	44.0					40.5-41.5 ft R.D. = 90°; filling: moderately healed, moderately thin calcite, fresh; surface: fresh.		
634.0	45.0					41.1-41.5 ft R.D. = 65°; filling: moderately healed, moderately thick calcite, fresh; surface: fresh.		
633.0	46.0					41.5-43.8 ft R.D. = 56°; widely spaced; filling: clean; surface: rough, planar.		
632.0	47.0	R -3	100% (95%)			43.2-49.7 ft R.D. = 10°, very widely spaced; filling: clean; surface: smooth, planar.		
631.0	48.0					47.8-51.5 ft R.D. = 36°; filling: clean; surface: rough, planar.		
630.0	49.0							
629.0	50.0							
628.0	51.0	R -4	100% (100%)	FD2		51.5-61.5 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely to extremely widely fractured, no reaction to HCl, trace calcite and pyrite replaced shell casts		
627.0	52.0							
626.0	53.0							
625.0	54.0							
624.0	55.0	R -5	97% (97%)	FD0				
623.0	56.0							
622.0	57.0							
621.0	58.0							
620.0	59.0							
DATE STARTED: 5/11/10 DATE FINISHED: 5/12/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

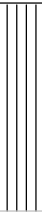
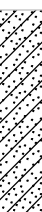

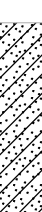
REV 1 Final Boring B-438

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
						N. 339721.41 ft	E. 2406429.61 ft		
						GROUND SURFACE ELEVATION: 679.00 ft			
						DESCRIPTION			
618.0	61.0	R-5	97% (97%)	FD0		51.5-61.5 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely to extremely widely fractured, no reaction to HCl, trace calcite and pyrite replaced shell casts			
						---- Bottom of Boring at 61.50 ft.----			
DATE STARTED: 5/11/10 DATE FINISHED: 5/12/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook HELPER(S): J. Parlett		DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	



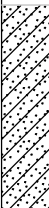
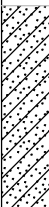
REV 1 Final Boring B-439

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS	
N. 339757.11 ft E. 2406541.81 ft GROUND SURFACE ELEVATION: 677.06 ft											
DESCRIPTION											
677.0		S-1	1-1-2 (3) 100%				0.0-1.5 ft Sandy silt/sandy elastic silt, (ml/mh), 70% fines, low plasticity, no dry strength, no dilatancy, low toughness; 30% sand, fine; 0% gravel; dark yellowish brown (10YR 4/2) and moderate yellowish brown (10YR 5/4), moist, no HCl reaction, very soft, 0.0-0.5 ft roots and organic material, color changes from dark yellowish brown (10YR 4/2) to moderate yellowish brown (10YR 5/4) at 0.6 ft		ml/mh	Auger set to 5.0 ft for temporary casing	
676.0	1.0						1.5-2.5 ft Interval not sampled				
675.0	2.0		S-2	7-14-16 (30) 100%			2.5-4.0 ft Clayey sand with gravel, (sc), about 5% cobbles, subangular, hard, flat; 40% fines, low plasticity, no dry strength, no dilatancy, low toughness; 30% gravel, fine to coarse, subangular, flat, hard hardness; 30% sand, fine to coarse, subangular; maximum grain size = 2 inches, dark yellowish brown (10YR 4/2) and moderate yellowish brown (10YR 5/4), moist, no HCl reaction, medium dense		sc		
674.0	3.0	4.0-5.0 ft Interval not sampled									
673.0	4.0	S-3		5-13-22 (35) 97%			5.0-5.4 ft Sandy silt/sandy elastic silt, (ml/mh), 60% fines, low plasticity, no dry strength, no dilatancy, low toughness; 30% sand, fine to coarse, subangular; 10% gravel, fine to coarse, subangular, flat, hard hardness; maximum grain size = 0.25 inches, dark yellowish brown (10YR 4/2) and moderate yellowish brown (10YR 5/4), moist, no HCl reaction, hard, 5.35-5.4, Laminae of organic smelling material, grayish black (N2) to black (N1).		ml/mh		
672.0	5.0		5.4-5.7 ft Well graded sand with silt, (sw-sm), 90% sand, fine to coarse, subangular; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; 0% gravel; moderate yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/2), moist, no HCl reaction, dense				sw-sm				
671.0	6.0		S-4	12-11-11 (22) 67%			5.7-6.5 ft Clayey sand with gravel, (sc), about 5% cobbles, subangular, hard; 2% boulders, subangular, hard; 40% sand, fine to coarse, subangular; 30% gravel, fine to coarse, subangular, hard hardness; 25% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 2 inches, dark yellowish brown (10YR 4/2), moist, no HCl reaction, dense		sc		
670.0	7.0	6.5-7.5 ft Interval not sampled									
669.0	8.0	7.5-9.0 ft Clayey sand with gravel, (sc), about 5% cobbles, subangular; 2% boulders, subangular, hard; 40% sand, fine to coarse, subangular, hard hardness; 30% gravel, fine to coarse, subangular, hard hardness; 30% fines, high plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 2 inches, dark yellowish brown (10YR 4/2), wet, no HCl reaction, medium dense					sc				
668.0	9.0	9.0-10.0 ft Interval not sampled									
DATE STARTED: 5/22/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione								DRILLING METHOD: Casing Advancer, NQ DRILLING CO. Terracon			NOTES:
APPROVED BY: Rolando Benítez								DRILLER: J. Parlett HELPER(S): E. Zetwick			DRILL RIG: CME-550 (Buggy) HAMMER ID: 925




REV 1 Final Boring B-439

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/(in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS	
						N. 339757.11 ft E. 2406541.81 ft GROUND SURFACE ELEVATION: 677.06 ft			
						DESCRIPTION			
667.0		S-5	9-12-12 (24) 67%			10.0-11.5 ft Clayey sand with gravel, (sc), about 5% cobbles, subangular; 40% sand, fine to coarse, subangular, hard hardness; 30% gravel, fine to coarse, subangular, hard hardness; 30% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1 inches, dark yellowish brown (10YR 4/2), wet, no HCl reaction, medium dense	sc		
666.0	11.0					11.5-12.5 ft Interval not sampled			
665.0	12.0	S-6	14-17-23 (40) 77%		12.5-14.0 ft Clayey sand with gravel, (sc), about 5% cobbles, subangular; 1% boulders, subangular; 50% sand, fine to coarse, subangular, hard hardness; 30% gravel, fine to coarse, subangular, hard hardness; 20% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 2 inches, pale brown (5YR 5/2), wet, no HCl reaction, dense	sc			
664.0	13.0				14.0-15.0 ft Interval not sampled				
663.0	14.0	S-7	10-22-25 (47) 60%		15.0-16.5 ft Clayey sand with gravel, (sc), about 5% cobbles, subangular; 2% boulders, subangular; 50% sand, fine to coarse, subangular, hard hardness; 30% gravel, fine to coarse, subangular, hard hardness; 20% fines, high plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 3.5 inches, pale brown (5YR 5/2), wet, no HCl reaction, dense	sc			
662.0	15.0				16.5-17.5 ft Interval not sampled				
661.0	16.0	S-8	14-19-26 (45) 67%		17.5-19.0 ft Clayey sand with gravel, (sc), about 10% cobbles, subangular, very hard; 2% boulders, subangular, hard; 40% gravel, fine to coarse, subangular, hard hardness; 40% sand, fine to coarse, subangular, hard hardness; 20% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.5 inches, dark yellowish brown (10YR 4/2), wet, no HCl reaction, dense	sc			
660.0	17.0								
659.0	18.0								
658.0	19.0								
DATE STARTED: 5/22/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: Casing Advancer, NQ DRILLING CO. Terracon	NOTES:		
APPROVED BY: Rolando Benitez						DRILLER: J. Parlett HELPER(S): E. Zetwick	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925		




REV 1 Final Boring B-439

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 339757.11 ft E. 2406541.81 ft GROUND SURFACE ELEVATION: 677.06 ft		
657.0		S-9	7-9-9 (18) 67%			20.0-21.5 ft Well graded sand with clay and gravel, (sw-sc), about 10% cobbles, subangular, hard; 2% boulders, subangular, hard; 50% sand, fine to coarse, subangular, hard hardness; 40% gravel, fine to coarse, subangular, hard hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.5 inches, dark yellowish brown (10YR 4/2), wet, no HCl reaction, medium dense	sw-sc	
656.0	21.0					21.5-22.5 ft Interval not sampled		
655.0	22.0	S-10	10-9-12 (21) 73%			22.5-24.0 ft Clayey sand with gravel, (sc), about 5% cobbles, subangular, hard; 5% boulders, subangular, hard; 40% sand, fine to coarse, subangular, hard hardness; 30% gravel, fine to coarse, subangular, hard hardness; 30% fines, high plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.5 inches, dark yellowish brown (10YR 4/2), wet, no HCl reaction, medium dense	sc	
654.0	23.0					24.0-25.0 ft Interval not sampled		
653.0	24.0	S-11	10-23-23 (46) 63%			25.0-26.5 ft Clayey gravel with sand, (gc), about 10% cobbles, subangular, hard; 5% boulders, subangular, hard; 50% gravel, fine to coarse, subangular, hard hardness; 30% sand, fine to coarse, subangular, hard hardness; 20% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 2.5 inches, dark yellowish brown (10YR 4/2), wet, no HCl reaction, dense	gc	
652.0	25.0					26.5-27.5 ft Interval not sampled		
651.0	26.0	S-12	50/1			27.5-27.62 ft 100% boulders; 100% gravel, hard hardness; maximum grain size = 2.5 inches, medium dark gray (N4), wet, no HCl reaction, very dense, shale boulder		
650.0	27.0	S-13	100% 50/0			27.62-27.9 ft Interval not sampled		
649.0	28.0					27.9 ft Very dense, shale boulder		
648.0	29.0					27.91-30.0 ft Interval not sampled		
DATE STARTED: 5/22/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: Casing Advancer, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Parlett HELPER(S): E. Zetwick	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-439

PROJECT NO. 10-4310

						COORDINATES		USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	N. 339757.11 ft E. 2406541.81 ft GROUND SURFACE ELEVATION: 677.06 ft	DESCRIPTION		
647.0		S-14	5-7-17 (24) 47%			30.0-31.5 ft Well graded sand with silt and gravel, (sw-sm), about 2% cobbles, subangular, very hard; 2% boulders, subangular, hard; 70% sand, fine to coarse, subangular, hard hardness; 20% gravel, fine to coarse, subangular, hard hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 2.0 inches, medium dark gray (N4), wet, no HCl reaction, medium dense		sw-sm	
646.0	31.0					31.5-32.5 ft Interval not sampled			
645.0	32.0	S-15	25-25-50/3 80%		32.5-33.75 ft Well graded gravel, (gw), 95% boulders, subangular; 100% gravel, coarse; maximum grain size = 1.0 inches, medium dark gray (N4) with light brownish gray (5YR 6/1), wet, no HCl reaction, very dense, fissile shale boulder		gw		
644.0	33.0				33.75-35.0 ft Interval not sampled				
643.0	34.0	S-16	37-40-50/2 26%		35.0-36.17 ft Well graded gravel, (gw), about 2% cobbles; 50% boulders, subangular, hard; 90% gravel, fine to coarse, subangular, very hard hardness; 5% sand, fine to coarse, subangular, very hard hardness; 5% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 2.0 inches, medium dark gray (N4), wet, no HCl reaction, very dense, domanited by shale fragments that are fissile		gw		
642.0	35.0				36.17-42.5 ft No sample recovered				
641.0	36.0								36.17-42.5 ft. attempted to start coring due to refusal, no core recovery, switching back to SPT
640.0	37.0								
639.0	38.0								
638.0	39.0								
DATE STARTED: 5/22/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: Casing Advancer, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Parlett HELPER(S): E. Zetwick		DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-439

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339757.11 ft E. 2406541.81 ft GROUND SURFACE ELEVATION: 677.06 ft DESCRIPTION		
637.0						36.17-42.5 ft No sample recovered		
636.0	41.0							
635.0	42.0							
		S-17	50/3 100%			42.5-42.75 ft SHALE, moderately hard to hard, fresh, medium dark gray (N4), no reaction to HCl, no staining, fissile		
634.0	43.0							
		S-18	50/1 0%			43.4-43.5 ft No recovery, SPT refusal suggest rock 43.5-44.8 ft No core recovered		
633.0	44.0							
632.0	45.0					44.8-55.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to very widely fractured, no reaction to HCl, no staining, trace pyrite and calcite replaced shell casts		Casing set to 44.8 ft.
631.0	46.0							
630.0	47.0							
629.0	48.0	R-1	100% (98%)	FD3		48.2-54.3 ft R.D. = 10°, widely to very widely spaced; filling: clean; surface: smooth, planar.		
628.0	49.0							
DATE STARTED: 5/22/10 DATE FINISHED: 5/24/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: Casing Advancer, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Parlett HELPER(S): E. Zetwick	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-439

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						<p>N. 339757.11 ft E. 2406541.81 ft</p> <p>GROUND SURFACE ELEVATION: 677.06 ft</p>		
627.0						<p>44.8-55.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to very widely fractured, no reaction to HCl, no staining, trace pyrite and calcite replaced shell casts</p> <p>50.05-51.25 ft R.D. = 36°, widely spaced; filling: clean; surface: rough, planar.</p>		
626.0	51.0							
		R -2	100% (98%)	FD4				
625.0	52.0							
624.0	53.0							
623.0	54.0					<p>53.75-54.4 ft R.D. = 88°; filling: moderately healed, moderately thick calcite, fresh; surface: fresh.</p>		
622.0	55.0							
621.0	56.0					<p>55.0-60.2 ft SHALE, hard to moderately hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, no staining, trace calcite and pyrite replaced shell casts</p> <p>55.35-59.45 ft Bedding plane separation, R.D. = 10°, very widely spaced; filling: clean; surface: smooth, planar.</p>		
620.0	57.0	R -3	100% (94%)	FD1				
619.0	58.0							
618.0	59.0							
<p>DATE STARTED: 5/22/10</p> <p>DATE FINISHED: 5/24/10</p> <p>FIELD GEOLOGIST: Adrianna Semione</p> <p>CHECKED BY: Adrianna Semione</p>						<p>DRILLING METHOD: Casing Advancer, NQ</p> <p>DRILLING CO. Terracon</p>	NOTES:	
<p>APPROVED BY: Rolando Benitez</p>						<p>DRILLER: J. Parlett</p> <p>HELPER(S): E. Zetwick</p>	<p>DRILL RIG: CME-550 (Buggy)</p> <p>HAMMER ID: 925</p>	

PROJECT NO. 10-4310

BORING NO. B-439 SHEET 7 OF 7

REV 1 Final Boring B-440

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 339706.74 ft E. 2406546.24 ft GROUND SURFACE ELEVATION: 675.97 ft		
675.0	1.0	S-1	1-1-3 (4) 100%			0.0-4.3 ft Silt with sand, (ml), about 2% cobbles, subangular; 65% fines, low plasticity, no dry strength, no dilatancy, low toughness; 30% sand, fine to medium; 5% gravel, medium to coarse; maximum grain size = 1 inches, dark yellowish orange (10YR 6/6) and moderate yellowish brown (10YR 5/4), moist, no HCl reaction, soft to hard		Temporary casing set to 10.0 ft Casing advancer set to 34.3 ft
674.0	2.0	S-2	4-9-21 (30) 93%				ml	
673.0	3.0							
672.0	4.0	S-3	19-15-24 (39) 100%					
671.0	5.0	S-4	23-16-12 (28) 80%			4.3-5.2 ft Poorly graded gravel, (gp), 100% gravel, coarse; pale brown (5YR 5/2), dry, no HCl reaction, dense, sandstone boulder	gp	
670.0	6.0					5.2-7.5 ft Well graded gravel with silt, (gw-gm), about 2% cobbles, subangular; 2% boulders, subangular; 90% gravel, subangular; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.5 inches, dark yellowish brown (10YR 4/2) and grayish red (10R 4/2), dry, no HCl reaction, very dense	gw-gm	
669.0	7.0	S-5	30-21-16 (37) 67%					
668.0	8.0	S-6	15-15-15 (30) 93%			7.5-10.0 ft Silty gravel, (gm), about 2% cobbles, subangular; 2% boulders, subangular; 70% gravel, fine to coarse, subangular; 20% fines, low plasticity, no dry strength, no dilatancy, low toughness; 10% sand, fine to coarse, subangular; maximum grain size = 1.5 inches, moderate brown (5YR 3/4), dry, no HCl reaction, dense to very dense, 10.0 ft refusal on sandstone boulder	gm	
667.0	9.0	S-7	26-50 100%					
DATE STARTED: 5/13/10 DATE FINISHED: 5/21/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook/ J. Parlett HELPER(S): J. Parlett/ E. Zetwick	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-440

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 339706.74 ft E. 2406546.24 ft GROUND SURFACE ELEVATION: 675.97 ft		
665.0	11.0	S-8	4-17-30 (47) 67%			10.0-11.5 ft Clayey sand with gravel, (sc), about 2% cobbles, subangular, hard; 1% boulders, subangular, hard; 50% sand, fine to coarse, subangular; 30% gravel, fine to coarse, subangular, hard hardness; 20% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1 inches, dark yellowish brown (10YR 4/2), wet, no HCl reaction, dense	sc	
664.0	12.0	S-9	17-27-19 (46) 73%			11.5-11.9 ft Well graded gravel, (gw), about 3% cobbles, subangular; 100% gravel, fine to coarse, subangular, hard hardness; maximum grain size = 1.5 inches, light gray (N7) and medium gray (N5), wet, no HCl reaction, dense	gw	
663.0	13.0					11.9-13.0 ft Clayey sand with gravel, (sc), about 2% cobbles, subangular, very hard; 50% sand, fine to coarse, subangular; 30% gravel, fine to coarse, subangular; 20% fines, low plasticity, no dry strength, rapid dilatancy, low toughness; maximum grain size = 1.0 inches, dark yellowish brown (10YR 4/2), wet, no HCl reaction, dense	sc	
662.0	14.0	S-10	15-16-19 (35) 67%			13.0-14.5 ft Silty gravel with sand, (gm), about 3% cobbles, subangular, hard; 2% boulders, subangular, hard; 40% gravel, fine to coarse, subangular, very hard hardness; 40% fines, high plasticity, no dry strength, rapid dilatancy, low toughness; 20% sand, fine to coarse, subangular; maximum grain size = 2.0 inches, dark yellowish brown (10YR 4/2) and moderate brown (5YR 3/4), wet, no HCl reaction, dense	gm	
661.0	15.0	S-11	11-11-22 (33) 67%			14.5-16.0 ft Clayey gravel with sand, (gc), about 3% cobbles, subangular, hard; 3% boulders, subangular, hard; 40% gravel, fine to coarse, subangular, very hard hardness; 40% fines, high plasticity, no dry strength, rapid dilatancy, low toughness; 20% sand, medium to coarse, subangular; maximum grain size = 1.5 inches, dark yellowish brown (10YR 4/2), wet, no HCl reaction, dense, gravel, cobbles and boulders include sandstones, shale, anthracite coal	gc	
660.0	16.0	S-12	30-38-28 (66) 47%			16.0-17.5 ft Clayey gravel, (gc), about 2% cobbles, subangular, very hard; 1% boulders, subangular, very hard; 70% gravel, fine to coarse, subangular; 20% fines, high plasticity, rapid dilatancy, low toughness; 10% sand, fine to medium, subangular; maximum grain size = 1 inches, medium dark gray (N4) with moderate yellowish brown (10YR 5/4), wet, no HCl reaction, very dense, decomposed shale fragments	gc	
659.0	17.0					17.5-19.0 ft Well graded gravel with silt and sand, (gw-gm), about 5% cobbles, subangular, hard; 2% boulders, subangular, very hard; 60% gravel, fine to coarse, subangular; 30% sand, fine to coarse, subangular; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.5 inches, dark yellowish brown (10YR 4/2), wet, no HCl reaction, medium dense	gw-gm	
658.0	18.0	S-13	12-14-14 (28) 57%					
657.0	19.0	S-14	16-23-25 (48) 73%			19.0-19.3 ft Well graded sand with gravel, (sw), 85% sand, fine to coarse, subangular; 15% gravel, medium to coarse, subangular, hard hardness; maximum grain size = 0.5 inches, dark gray (N3), wet, no HCl reaction, dense	sw	
							gw-gc	
DATE STARTED: 5/13/10 DATE FINISHED: 5/21/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook/ J. Parlett HELPER(S): J. Parlett/ E. Zetwick	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-440

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)		SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 339706.74 ft E. 2406546.24 ft											
GROUND SURFACE ELEVATION: 675.97 ft									DESCRIPTION		
655.0	21.0	S-14	16-23-25 (48) 73%					19.3-20.5 ft Well graded gravel with clay and sand, (gw-gc), about 5% cobbles, subangular, very hard, elongated; 60% gravel, fine to coarse, subangular, very hard hardness; 30% sand, medium to coarse, subangular; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.0 inches, dark gray (N3), wet, no HCl reaction, dense	gw-gc	Clay seams found in bedrock some contained a strong organic smell	
									gw		
654.0	22.0	S-15	22-27-40 (67) 80%				20.5-21.0 ft Well graded gravel, (gw), 100% boulders, subangular; 100% gravel, coarse, subangular, medium hardness; maximum grain size = 4 inches, dark gray (N3), wet, no HCl reaction, very dense, zone contains boulder of granite and shale, shale is fissile and fresh to slightly weathered	sw-sc			
					21.0-22.3 ft Well graded sand with clay and gravel, (sw-sc), about 5% cobbles, subangular, medium; 60% sand, fine to coarse, subangular; 30% gravel, fine to coarse, subangular; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.0 inches, moderate yellowish brown (10YR 5/4), wet, no HCl reaction, very dense						
653.0	23.0	S-16	16-17-22 (39) 67%				22.3-23.5 ft Clayey sand with gravel, (sc), about 2% cobbles, subangular, medium; 40% gravel, fine to coarse, subangular, hard hardness; 40% sand, fine to coarse, subangular; 20% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.5 inches, dark yellowish brown (10YR 4/2), wet, no HCl reaction, dense	sc			
					23.5-24.5 ft Clayey gravel with sand, (gc), about 5% cobbles, subangular, very hard; 2% boulders, subangular, hard; 50% gravel, fine to coarse, subangular, very hard hardness; 30% sand, fine to coarse, subangular; 20% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.5 inches, dark gray (N3) with moderate yellowish brown (10YR 5/4), wet, no HCl reaction, very dense	gc					
652.0	24.0	S-17	10-50 80%				24.5-26.5 ft SHALE, shale boulder, interval not sampled				
651.0	25.0										
650.0	26.0										
649.0	27.0	S-18	16-27-37 (64) 80%				26.5-28.0 ft Well graded gravel with silt and sand, (gw-gm), about 10% cobbles, subangular; 15% boulders, subangular, very hard; 70% gravel, fine to coarse, subangular, very hard hardness; 20% sand, medium to coarse, subangular; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 2.0 inches, pale yellowish orange (10YR 8/6) and yellowish gray (5Y 7/2), wet, weak HCl reaction, very dense, HCl reaction is to sand and silt pockets not to gravels, cobbles and boulders	gw-gm			
648.0	28.0										
647.0	29.0	S-19	36-26-29 (55) 60%				28.0-31.0 ft Well graded gravel with silt and sand, (gw-gm), about 5% cobbles, subangular, hard; 5% boulders, medium; 50% gravel, fine to coarse, subangular, very hard hardness; 40% sand, fine to coarse, subangular; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 2.0 inches, medium dark gray (N4) and yellowish gray (5Y 7/2), wet, weak HCl reaction, very dense, HCl reaction to sand and silt pockets	gw-gm			
		S-20	18-35-18 (53) 60%								
DATE STARTED: 5/13/10 DATE FINISHED: 5/21/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione								DRILLING METHOD: NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez								DRILLER: D. Westbrook/ J. Parlett HELPER(S): J. Parlett/ E. Zetwick		DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-440

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339706.74 ft E. 2406546.24 ft GROUND SURFACE ELEVATION: 675.97 ft		
						DESCRIPTION		
645.0	31.0	S-20	18-35-18 (53) 60%				gw-gm	Casing advancer set to 40.0 ft due to rock conditions, 5/20/10
644.0	32.0	S-21	12-12-8 (20) 57%			31.0-32.5 ft SHALE, very soft to hard, fresh, medium dark gray (N4), no reaction to HCl, wet		
643.0	33.0	S-22	9-16-40 (56) 73%			32.5-34.0 ft Well graded gravel with clay and sand, (gw-gc), about 5% cobbles, subangular, hard; 10% boulders, subangular, hard; 70% gravel, fine to coarse, subangular, hard hardness; 20% sand, fine to coarse, subangular; 10% fines, high plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 2 inches, medium dark gray (N4), wet, no HCl reaction, very dense, fissile shale and contains trace pieces of sandstone	gw-gc	
642.0	34.0	S-23	50/3 0%			34.0-34.25 ft No sample collected, spoon bouncing on top of shale bed rock		
641.0	35.0	R -1	100% (82%)		FD5	34.3-41.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to very closely fractured, no reaction to HCl, no staining 34.3-34.75 ft R.D. = 56°; filling: clean; surface: rough, planar.		
640.0	36.0					36.2-50.7 ft Bedding plane separation, R.D. = 10°, very closely to widely spaced; filling: clean; surface: smooth, planar; 39.1 ft, 39.15 ft, and 41.65 ft bedding totally healed, moderately thick (39.1 ft) and very thin (39.15 ft and 41.65 ft) fresh calcite filling.		
639.0	37.0							
638.0	38.0	R -2	96% (83%)			39-39.55 ft R.D. = 36°, moderately spaced; filling: clean; surface: rough, planar.		
637.0	39.0							
DATE STARTED: 5/13/10 DATE FINISHED: 5/21/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook/ J. Parlett HELPER(S): J. Parlett/ E. Zetwick	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-440

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339706.74 ft E. 2406546.24 ft GROUND SURFACE ELEVATION: 675.97 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
		R -2	96% (83%)	FD5		34.3-41.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to very closely fractured, no reaction to HCl, no staining	
635.0	41.0						
		R -3	100% (79%)	FD4		41.0-51.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to moderately fractured, no reaction to HCl, no staining, trace pyrite and calcite replaced shell casts	
634.0	42.0						
633.0	43.0						
632.0	44.0						
631.0	45.0						
630.0	46.0					46-46.8 ft Soft zone during drilling, clay pulled from inner barrel (0.25 ft), low toughness, high plasticity, rapid dilatancy.	
629.0	47.0						
628.0	48.0	R -4	88% (82%)				
627.0	49.0						
DATE STARTED: 5/13/10 DATE FINISHED: 5/21/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook/ J. Parlett HELPER(S): J. Parlett/ E. Zetwick	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925

REV 1 Final Boring B-440

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339706.74 ft E. 2406546.24 ft GROUND SURFACE ELEVATION: 675.97 ft DESCRIPTION		
625.0	51.0	R-4	88% (82%)	FD4		41.0-51.0 ft SHALE, moderately hard to hard, fresh, dark gray (N3), widely to moderately fractured, no reaction to HCl, no staining, trace pyrite and calcite replaced shell casts		
624.0	52.0	R-5	100% (71%)	FD6		51.0-52.2 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to closely fractured, no reaction to HCl, no staining, trace pyrite and calcite, clay zone from 51.85-52.05 ft, medium gray (N5)		
						52.2-52.6 ft Sample lost due to destructive drilling used to remove pieces from destroyed bit		
623.0	53.0					52.6-61.2 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, no staining, trace pyrite and calcite replaced shell casts		
622.0	54.0	R-6	100% (100%)					
621.0	55.0							
620.0	56.0			FD0				
619.0	57.0							
618.0	58.0	R-7	100% (100%)					
617.0	59.0							
DATE STARTED: 5/13/10 DATE FINISHED: 5/21/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook/ J. Parlett HELPER(S): J. Parlett/ E. Zetwick	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-440

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						<p>N. 339706.74 ft E. 2406546.24 ft</p> <p>GROUND SURFACE ELEVATION: 675.97 ft</p>		
615.0	61.0	R -7	100% (100%)	FD0		52.6-61.2 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, no staining, trace pyrite and calcite replaced shell casts		60.3-60.7 ft, SC-1, 5/21/10, 11:15
614.0	62.0					61.2-61.4 ft Fat clay, (ch), 100% fines, high plasticity, medium dry strength, slow dilatancy, low toughness; 0% gravel; 0% sand; medium dark gray (N4), wet, no HCl reaction	ch	
613.0	63.0					61.2-66.4 ft Bedding plane separation, R.D. = 10°, closely to moderately spaced; filling: clean; surface: smooth, planar.		
612.0	64.0	R -8	100% (93%)	FD4		61.4-70.9 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to very widely fractured, no reaction to HCl, no staining, trace pyrite and calcite replaced shell casts, clay seam from 66.2-66.3 ft, medium dark gray (N4), low toughness, high plasticity		
611.0	65.0					61.45-61.55 ft R.D. = 56°; filling: clean; surface: rough, planar.		
610.0	66.0					66-66.01 ft Bedding plane separation, R.D. = 10°, very closely spaced; filling: moderately healed, moderately thin calcite, fresh, hard; surface: fresh; bedding shows displacement between very closely spaced beds, approximately 1 cm.		
609.0	67.0							
608.0	68.0	R -9	99% (88%)	FD0				
607.0	69.0							
DATE STARTED: 5/13/10 DATE FINISHED: 5/21/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook/ J. Parlett HELPER(S): J. Parlett/ E. Zetwick	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

REV 1 Final Boring B-440

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339706.74 ft E. 2406546.24 ft GROUND SURFACE ELEVATION: 675.97 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
		R -9	99% (88%)	FD0		61.4-70.9 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to very widely fractured, no reaction to HCl, no staining, trace pyrite and calcite replaced shell casts, clay seam from 66.2-66.3 ft, medium dark gray (N4), low toughness, high plasticity	
605.0	71.0					70.9-75.8 ft SHALE, moderately hard to hard, fresh, dark gray (N3), closely to very widely fractured, no reaction to HCl, no staining, trace pyrite and calcite replaced shell casts, clay seam with rock fragments from 71.35-71.6 ft and 75.3-75.4 ft, medium dark gray (N4), low toughness, high plasticity	
604.0	72.0			FD6		71.4-72.7 ft Bedding plane separation, R.D. = 10°, very closely to moderately spaced; filling: clean; surface: smooth, planar.	
603.0	73.0	R -10	100% (94%)				
602.0	74.0			FD1			
601.0	75.0						
600.0	76.0					75.8-85.3 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, no staining, trace pyrite and calcite replaced shell casts	
599.0	77.0						
598.0	78.0	R -11	100% (100%)	FD0			
597.0	79.0						
DATE STARTED: 5/13/10 DATE FINISHED: 5/21/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: NQ DRILLING CO. Terracon	NOTES:
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook/ J. Parlett HELPER(S): J. Parlett/ E. Zetwick	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925

REV 1 Final Boring B-440

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 339706.74 ft E. 2406546.24 ft GROUND SURFACE ELEVATION: 675.97 ft		
		R -11				75.8-85.3 ft SHALE, moderately hard to hard, fresh, dark gray (N3), very widely fractured, no reaction to HCl, no staining, trace pyrite and calcite replaced shell casts		
595.0	81.0			FD0		81-81.15 ft R.D. = 36°; filling: clean; surface: rough, planar.		
594.0	82.0							
593.0	83.0	R -12	100% (100%)	FD1				
592.0	84.0							
591.0	85.0							
590.0	86.0					85.3-90.3 ft SHALE, moderately hard to hard, fresh, dark gray (N3), closely to very widely fractured, no reaction to HCl, no staining, trace pyrite and calcite replaced shell casts, clay laminae at 84.67-85.1 ft medium dark gray (N4), low toughness, high plasticity, rock fragment laminae		
589.0	87.0					85.45-85.75 ft Bedding plane separation, R.D. = 10°; surface: smooth, planar.		
588.0	88.0	R -13	100% (94%)	FD0				
587.0	89.0							
DATE STARTED: 5/13/10 DATE FINISHED: 5/21/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook/ J. Parlett HELPER(S): J. Parlett/ E. Zetwick	DRILL RIG: CME-550 (Buggy) HAMMER ID: 925	

PROJECT NO. 10-4310

BORING NO. B-440 SHEET 10 OF 11

REV 1 Final Boring B-440

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES N. 339706.74 ft E. 2406546.24 ft GROUND SURFACE ELEVATION: 675.97 ft	USCS SYMBOL	REMARKS
						DESCRIPTION		
575.0		R -15		FD0		----		
						Bottom of Boring at 100.30 ft.----		
DATE STARTED: 5/13/10 DATE FINISHED: 5/21/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: NQ DRILLING CO. Terracon		NOTES: DRILL RIG: CME-550 (Buggy) HAMMER ID: 925
APPROVED BY: Rolando Benitez						DRILLER: D. Westbrook/ J. Parlett HELPER(S): J. Parlett/ E. Zetwick		

REV 1 Final Boring B-441

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW(SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339619.81 ft E. 2407095.21 ft GROUND SURFACE ELEVATION: 666.90 ft		
						DESCRIPTION		
666.0	1.0	S-1	1-1-2 (3) 100%			0.0-1.5 ft Silty sand, (sm), 80% sand, fine; 20% fines, low plasticity, low toughness; moderate yellowish brown (10YR 5/4), moist, no HCl reaction, very loose	sm	
665.0	2.0	S-2	2-3-5 (8) 100%			1.5-3.0 ft Silty sand, (sm), 80% sand, fine; 20% fines, low plasticity, low toughness; moderate yellowish brown (10YR 5/4), moist, no HCl reaction, loose	sm	
664.0	3.0							
663.0	4.0	S-3	4-5-6 (11) 100%			3.0-4.5 ft Silty sand, (sm), 80% sand, fine to medium; 20% fines, low plasticity, low toughness; moderate yellowish brown (10YR 5/4), moist, no HCl reaction, medium dense	sm	
662.0	5.0	S-4	4-4-4 (8) 93%			4.5-6.0 ft Silty sand, (sm), 80% sand, fine to medium; 20% fines, low plasticity, low toughness; dark yellowish brown (10YR 4/2), moist, no HCl reaction, loose	sm	
661.0	6.0							
660.0	7.0	S-5	2-2-5 (7) 87%			6.0-7.5 ft Silty sand, (sm), 85% sand, fine to medium; 15% fines, low plasticity, low toughness; dark yellowish brown (10YR 4/2), moist, no HCl reaction, loose	sm	
659.0	8.0	S-6	7-32-37 (69) 100%			7.5-9.0 ft Well graded sand with silt and gravel, (sw-sm), 70% sand, medium; 20% gravel, fine to medium, subangular, flat and elongated, medium hardness; 10% fines, non plastic, no toughness; maximum grain size = 0.25 inches, dark yellowish brown (10YR 4/2) with dark gray (N3), moist, no HCl reaction, very dense, fine to medium gravel size shale fragments	sw-sm	7.5 ft Switch to casing advancer
658.0	9.0	S-7	13-50/5 92%			9.0-9.9 ft Poorly graded sand with clay and gravel, (sp-sc), 60% sand, fine to medium; 30% gravel, fine to medium, angular, flat and elongated, hard hardness; 10% fines, low plasticity, low toughness; maximum grain size = 0.25 inches, dark yellowish brown (10YR 4/2) with dark gray (N3), moist, no HCl reaction, very dense	sp-sc	
657.0	10.0							
656.0	11.0	S-8	40-50/1 86%			9.9-10.5 ft Interval not sampled	gm	
655.0	12.0	S-9	50/1 0%			10.5-11.1 ft Silty gravel with sand, (gm), 40% gravel, fine to coarse; 30% sand, fine to medium, subangular, medium hardness; 30% fines, medium plasticity, medium toughness; maximum grain size = 0.25 inches, dark yellowish brown (10YR 4/2) and dark gray (N3), moist, no HCl reaction, very dense		12.0-13.5 ft., no recovery, destroyed SPT driving shoe, destructively drilling to 13.5 ft.
654.0	13.0							
653.0	14.0	S-10	23-50/3 93%			11.1-12.0 ft Interval not sampled	sm	
652.0	15.0					12.0-12.1 ft No sample recovered		
651.0	16.0	S-11	20-30-50/0 90%			13.5-14.25 ft Silty sand with gravel, (sm), 40% gravel, fine to medium, subangular, hard hardness; 40% sand, fine to coarse; 20% fines, medium plasticity, low toughness; maximum grain size = 0.5 inches, dark gray (N3) with dark yellowish brown (10YR 4/2), wet, no HCl reaction, very dense	sm	
650.0	17.0	S-12	37-35-50/2 94%			14.25-15.0 ft Interval not sampled		
649.0	18.0					15.0-16.0 ft Silty sand with gravel, (sm), 50% sand, fine to coarse; 35% gravel, fine to medium, subangular, hard hardness; 15% fines, medium plasticity, low toughness; maximum grain size = 0.5 inches, dark yellowish brown (10YR 4/2) and dark gray (N3), wet, no HCl reaction, very dense, sampling through sandstone boulder/cobbles grayish red (5R 4/2) and yellowish gray (5Y 7/2), hard, rounded, medium size gravel fragments	sp-sm	
648.0	19.0	S-13	33-15-40 (55) 73%			16.0-16.5 ft Interval not sampled	sp-sm	
647.0		S-14				16.5-17.65 ft Poorly graded sand with silt and gravel, (sp-sm), 50% sand, fine to coarse; 40% gravel, fine to medium, subangular, hard hardness; 10% fines, medium plasticity, low toughness; maximum grain size = 0.5 inches,	sp-	
DATE STARTED: 6/2/10 DATE FINISHED: 6/4/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES: DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		

PROJECT NO. 10-4310

BORING NO. B-441 SHEET 2 OF 4


REV 1 Final Boring B-441

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 339619.81 ft E. 2407095.21 ft										
GROUND SURFACE ELEVATION: 666.90 ft								DESCRIPTION		
626.0	41.0	S-27	4-15-27 (42) 100%					finer, low plasticity, low toughness; maximum grain size = 1.0 inches, dark gray (N3) and pale yellowish brown (10YR 6/2), wet, no HCl reaction, medium dense	sm	Attempted to core at 45.0-46.6 ft. still in soil, resume SPTs.
625.0	42.0	S-28	35-32-30 (62) 87%					37.0-38.5 ft Poorly graded sand with clay and gravel, (sp-sc), 60% sand, fine to coarse; 30% gravel, fine, subangular, hard hardness; 10% fines, low plasticity, low toughness; maximum grain size = 0.1 inches, dark gray (N3) and pale yellowish brown (10YR 6/2), wet, no HCl reaction, medium dense	sc	
624.0	43.0							38.5-40.0 ft Clayey sand, (sc), 80% sand, fine to medium; 20% fines; light brown (5YR 5/6) and dusky yellowish brown (10YR 2/2), wet, no HCl reaction, medium dense	sc	
623.0	44.0	S-29	16-30-40 (70) 80%					40.0-41.5 ft Silty sand, (sm), 70% sand, fine to coarse; 25% fines; 5% gravel, fine, subangular, hard hardness; maximum grain size = 0.1 inches, moderate brown (5YR 3/4) and grayish brown (5YR 3/2), dense	gc	
622.0	45.0	S-30	50/2 29%					41.5-43.0 ft Clayey sand with gravel, (sc), 60% sand, fine to coarse; 20% gravel, fine to medium, subangular, medium hardness; 20% fines, low plasticity, low toughness; maximum grain size = 0.5 inches, grayish red (5R 4/2) and medium dark gray (N4), wet, no HCl reaction, very dense	sc	
621.0	46.0							43.0-44.5 ft Clayey sand with gravel, (sc), 60% sand, fine to coarse; 20% gravel, fine to medium, subangular, hard hardness; 20% fines, medium plasticity, low toughness; maximum grain size = 0.5 inches, moderate red (5R 5/4) and pale yellowish brown (10YR 6/2), moist, no HCl reaction, very dense	sm	
620.0	47.0	S-31	36-25-27 (52) 93%					44.5-44.65 ft Clayey gravel, (gc), 75% gravel, fine to medium, subrounded, hard hardness; 20% fines, low plasticity, low toughness; 5% sand, fine to coarse; maximum grain size = 0.5 inches, grayish red (5R 4/2) and light olive gray (5Y 6/1), moist, no HCl reaction, very dense	sm	
619.0	48.0	S-32	50/4 100%					44.65-46.6 ft Interval not sampled	sm	
618.0	49.0							46.6-48.1 ft Clayey sand with gravel, (sc), 35% gravel, fine to coarse, subrounded, hard hardness; 35% sand, fine to coarse; 30% fines, low plasticity, low toughness; maximum grain size = 1.0 inches, dark gray (N3) and light brown (5YR 5/6), moist, no HCl reaction, very dense	sp-sm	
617.0	50.0	S-33	12-13-21 (34) 60%					48.1-48.44 ft Silty sand, (sm), 60% sand, fine to coarse; 30% fines, medium plasticity, low toughness; 10% gravel, fine to medium, subangular, hard hardness; maximum grain size = 0.5 inches, dark yellowish orange (10YR 6/6) and grayish red (5R 4/2), moist, no HCl reaction, very dense	sc	
616.0	51.0							48.44-50.0 ft Interval not sampled		
615.0	52.0	S-34	16-8-22 (30) 40%					50.0-51.5 ft Silty sand, (sm), 70% sand, fine to coarse; 20% fines, medium plasticity, low toughness; 10% gravel, fine, subrounded, hard hardness; maximum grain size = 0.2 inches, light olive gray (5Y 5/2) and dark reddish brown (10R 3/4), wet, no HCl reaction, dense		
614.0	53.0							51.5-53.0 ft Poorly graded sand with silt and gravel, (sp-sm), 70% sand, fine to coarse; 20% gravel, fine to medium, subrounded, hard hardness; 10% fines, low plasticity, low toughness; maximum grain size = 0.25 inches, greenish gray (5GY 6/1) and dark gray (N3), wet, no HCl reaction, medium dense		
613.0	54.0	S-35	13-19-50 (69) 47%					53.0-54.5 ft Clayey sand, (sc), 70% sand, fine to coarse; 20% fines, low plasticity, low toughness; 10% gravel, fine to medium, subangular, hard hardness; maximum grain size = 0.25 inches, greenish gray (5GY 6/1) and light olive gray (5Y 5/2), wet, no HCl reaction, very dense		
612.0	55.0							54.5-55.8 ft Interval not sampled		
611.0	56.0							55.8-64.0 ft SHALE, moderately hard, fresh, dark gray (N3), massive, closely to widely fractured, no reaction to HCl, trace fossils and pyrite		
610.0	57.0	R-1	100% (100%)		FD0			56.3-59 ft R.D. = 70-90°, moderately spaced; filling: totally healed, moderately		
609.0	58.0									
608.0	59.0	R-2	100% (91%)		FD1					
607.0										
DATE STARTED: 6/2/10 DATE FINISHED: 6/4/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione								DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez								DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931




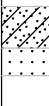




REV 1 Final Boring B-441

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 339619.81 ft E. 2407095.21 ft GROUND SURFACE ELEVATION: 666.90 ft		
606.0	61.0	R-2	100% (91%)	FD1		thin calcite, fresh, moderately hard; surface: stepped, planar, fresh; closely-spaced, thin, totally-calcite healed, horizontal (0-10 °) fractures 59.7-60.2 ft. Fracture set #F-1. 55.8-64.0 ft SHALE, moderately hard, fresh, dark gray (N3), massive, closely to widely fractured, no reaction to HCl, trace fossils and pyrite		
605.0	62.0							
604.0	63.0							
603.0	64.0					---- Bottom of Boring at 64.00 ft.----		
DATE STARTED: 6/2/10 DATE FINISHED: 6/4/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring B-442

PROJECT NO. 10-4310

						COORDINATES				USCS SYMBOL	REMARKS
						N. 339570.73 ft E. 2406579.03 ft					
						GROUND SURFACE ELEVATION: 673.20 ft					
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION					
673.0		S-1	1-2-2 (4) 97%			0.0-0.6 ft Silty sand, (sm), 60% sand, fine to medium; 40% fines, non plastic, no dry strength, no dilatancy, no toughness; 0% gravel; dark yellowish brown (10YR 4/2), moist, weak HCl reaction, very loose, top 0.1 ft contains organic material (roots and corn stalk)				sm	
672.0	1.0					0.6-1.5 ft Silty sand, (sm), 60% sand, fine to medium; 40% fines, low plasticity, no dry strength, no dilatancy, low toughness; 0% gravel; moderate yellowish brown (10YR 5/4) to dark yellowish brown (10YR 4/2), moist, no HCl reaction, very loose				sm	
671.0	2.0	S-2	3-12-14 (26) 100%			1.5-2.5 ft Interval not sampled				ml	
670.0	3.0					2.5-4.0 ft Sandy silt, (ml), about 2% cobbles, subangular, hard; 55% fines, medium plasticity, no dry strength, no dilatancy, low toughness; 40% sand, fine to medium; 5% gravel, fine to coarse, subangular, hard hardness; maximum grain size = 1.0 inches, dark yellowish orange (10YR 6/6) and moderate yellowish brown (10YR 5/4), moist, weak HCl reaction, mottled, reaction to HCl is weak					
669.0	4.0					4.0-5.0 ft Interval not sampled					
668.0	5.0	S-3	24-30-50/4 81%			5.0-5.2 ft Sandy silt, (ml), about 2% cobbles, subangular, hard; 55% fines, medium plasticity, no dry strength, no dilatancy, low toughness; 40% sand, fine to medium; 5% gravel, fine to coarse, subangular, hard hardness; maximum grain size = 1.0 inches, dark yellowish orange (10YR 6/6) and moderate yellowish brown (10YR 5/4), moist, weak HCl reaction, mottled, reaction to HCl is weak				ml	
667.0	6.0					5.2-5.4 ft Well graded sand with silt and gravel, (sw-sm), about 10% cobbles, subangular, hard; 50% sand, fine to coarse, subangular; 40% gravel, fine to coarse, subangular, very hard hardness; 10% fines, non plastic, no dry strength, no dilatancy, no toughness; maximum grain size = 1.0 inches, pale brown (5YR 5/2), dry, no HCl reaction, very dense				sw-sm	
666.0	7.0	S-4	25-50 70%			5.4-6.13 ft Well graded gravel, (gw), about 10% cobbles, subangular, hard; 20% boulders, subangular, very hard; 90% gravel, fine to coarse, subangular, hard hardness; 10% sand, medium to coarse; 0% fines; maximum grain size = 2.0 inches, pale brown (5YR 5/2) and very pale orange (10YR 8/2), dry, no HCl reaction, very dense				gw-sm	
665.0	8.0					6.13-7.5 ft Interval not sampled					
664.0	9.0	S-5	50/5 88%			7.5-8.1 ft Clayey sand with gravel, (sc), about 20% cobbles, subangular, hard; 5% boulders, subangular, very hard; 50% sand, fine to coarse, subangular; 30% gravel, fine to coarse, subangular, hard hardness; 20% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.5 inches, moderate brown (5YR 3/4), wet, no HCl reaction, very dense				gw-gm	
663.0	10.0					8.1-8.5 ft SANDSTONE, no reaction to HCl, boulder					
662.0	11.0					8.5-10.0 ft Interval not sampled					
661.0	12.0	S-6	40-50/1 83%			10.0-10.4 ft Well graded gravel with silt and sand, (gw-gm), about 2% cobbles, subangular; 40% boulders, subangular, very hard; 50% gravel, fine to coarse, subangular, very hard hardness; 40% sand, medium to coarse, subangular, hard hardness; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.0 inches, dark yellowish brown (10YR 4/2), wet, no HCl reaction, very dense, boulder, diorite (?)				gc	
660.0	13.0					10.4-12.5 ft Interval not sampled					
659.0	14.0	S-7	50/4 0%			12.5-13.1 ft SHALE, hard, fresh, medium dark gray (N4), no reaction to HCl, no staining, boulder					
658.0	15.0					13.1-15.0 ft Interval not sampled					
657.0	16.0					15.0-15.35 ft Boulder, no recovery					
656.0	17.0	S-8	14-18-27 (45) 73%			15.35-17.5 ft Interval not sampled					
655.0	18.0										
654.0	19.0										
DATE STARTED: 5/24/10						DRILLING METHOD: NQ				NOTES:	
DATE FINISHED: 5/26/10						DRILLING CO. Terracon					
FIELD GEOLOGIST: Adrianna Semione											
CHECKED BY: Adrianna Semione											
APPROVED BY: Rolando Benitez						DRILLER: J. Parlett HELPER(S): E. Zetwick				DRILL RIG: CME-550	
										HAMMER ID: 925	

PROJECT NO. 10-4310

BORING NO. B-442 SHEET 2 OF 4

REV 1 Final Boring B-442

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR % REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339570.73 ft E. 2406579.03 ft GROUND SURFACE ELEVATION: 673.20 ft		
						DESCRIPTION		
633.0		S-17 R -1	0%	FD8		subangular; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 2.0 inches, dark gray (N3) and pale red (5R 6/2), wet, no HCl reaction, very dense, shale and sandstone boulder		
632.0	41.0		100% (0%)			35.65-37.5 ft Interval not sampled		
631.0	42.0					37.5-37.9 ft Well graded gravel with clay and sand, (gw-gc), about 5% cobbles, subangular, hard; 0% boulders; 70% gravel, fine to coarse, subangular, hard hardness; 20% sand, fine to coarse, subangular; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1.0 inches, dark gray (N3) and medium dark gray (N4), wet, no HCl reaction, very dense		
630.0	43.0	R -2	100% (94%)			37.9-40.0 ft Interval not sampled		
629.0	44.0					40.0-40.1 ft No recovery		
628.0	45.0			FD4		40.1-40.6 ft SHALE, moderately hard to hard, fresh, medium dark gray (N4), closely fractured, no reaction to HCl, no staining, oily sheen when wet		
627.0	46.0					40.1-40.25 ft R.D. = 56°; filling: clean; surface: rough, planar.		
626.0	47.0					40.6-50.6 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to widely fractured, no reaction to HCl, no staining, trace calcite and pyrite replaced shell casts, 40.6-40.65 ft small clay lamina; medium dark gray (N4), low toughness, high plasticity.		
625.0	48.0	R -3	100% (100%)			40.9-41.5 ft R.D. = 88°; filling: moderately healed, thin calcite, fresh; surface: fresh.		
624.0	49.0					41.7-42.15 ft R.D. = 36°, moderately spaced; filling: moderately healed, thick calcite, fresh, hard; surface: fresh.		
623.0	50.0					42.2-42.5 ft R.D. = 90°; filling: moderately healed, thick calcite, fresh, hard; surface: fresh.		
622.0	51.0			FD5		42.5-46.7 ft R.D. = 85-90°, closely spaced; filling: moderately healed, moderately thick calcite, fresh, hard; surface: fresh; fracture starts at 85° and then goes between 88-90°, thickness ranges from very thin to thick throughout, parallel fractures.		
621.0	52.0					47.02-47.03 ft Bedding plane separation, R.D. = 10°, very closely spaced; filling: moderately healed, very thin calcite, fresh, hard; surface: fresh.		
620.0	53.0	R -4	100% (80%)	FD6		47.15-47.9 ft R.D. = 85°; filling: moderately healed, moderately thin calcite, fresh, hard; surface: fresh.		
619.0	54.0					50.05-50.6 ft R.D. = 75°, very closely spaced; filling: moderately healed, very thin calcite, fresh, hard; surface: fresh; fractures dominately have calcite infilling, very thin but can range up to thick.		
618.0	55.0			FD5		50.6-60.6 ft SHALE, moderately hard to hard, fresh, dark gray (N3), moderately to widely fractured, no reaction to HCl, no staining, trace calcite and pyrite replaced shell casts		
617.0	56.0					50.6-50.72 ft R.D. = 56°; filling: moderately healed, moderately thick calcite, fresh, hard; surface: fresh.		
616.0	57.0					50.85-59.6 ft Bedding plane separation, R.D. = 10°, very closely to widely spaced; filling: moderately healed, very thin calcite, fresh, hard; surface: smooth, planar, fresh; bedding containing calcite filling are at 52.0 ft, 53.3 ft, and 59.6 ft, remaining depths contain no calcite and have fresh bedding plane.		
615.0	58.0	R -5	100% (88%)	FD3		52.2-53.1 ft R.D. = 52°, very closely to closely spaced; filling: moderately healed, very thin calcite, fresh; surface: fresh.		
614.0	59.0					52.75-53 ft Random fracture, R.D. = 60°; filling: moderately healed, moderately thick calcite, fresh, hard; surface: fresh.		
						57-58.3 ft R.D. = 56°, widely spaced; filling: moderately healed, moderately thin calcite, fresh; surface: fresh.		
DATE STARTED: 5/24/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Parlett HELPER(S): E. Zetwick	DRILL RIG: CME-550 HAMMER ID: 925	

REV 1 Final Boring B-442							PROJECT NO. 10-4310	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339570.73 ft E. 2406579.03 ft GROUND SURFACE ELEVATION: 673.20 ft		
613.9		R-5		FD3		60-60.05 ft R.D. = 36°; filling: clean; surface: rough, planar.		60.05-60.6 ft, SC-1, 0859, 5/26/10
						---- Bottom of Boring at 60.80 ft.----		
DATE STARTED: 5/24/10 DATE FINISHED: 5/26/10 FIELD GEOLOGIST: Adrianna Semione CHECKED BY: Adrianna Semione						DRILLING METHOD: NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Parlett HELPER(S): E. Zetwick		DRILL RIG: CME-550 HAMMER ID: 925

REV 1 Final Boring B-443

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 341137.47 ft E. 2405090.24 ft GROUND SURFACE ELEVATION: 728.19 ft DESCRIPTION		
728.0		S-1	4-13-15 (28) 60%			0.0-1.5 ft Poorly graded gravel with clay and sand, (gp-gc), 60% gravel, fine to medium, subrounded, hard hardness; 30% sand, fine to medium, subrounded, soft hardness; 10% fines, low plasticity, no dry strength, low toughness; maximum grain size = 1 inches, moderate brown (5YR 4/4) and pale brown (5YR 5/2), moist, loose to dense, homogeneous	gp-gc	
727.0	1.0					1.5-2.5 ft Interval not sampled		
726.0	2.0	S-2	12-15-10 (25) 73%			2.5-4.0 ft Clayey sand with gravel, (sc), 65% sand, fine to medium, subrounded, very soft hardness; 20% fines, low plasticity, no dry strength, no dilatancy, low toughness; 15% gravel, medium, subrounded, flat, medium hardness; maximum grain size = 1 inches, light brown (5YR 5/6) and moderate brown (5YR 4/4), no odor, moist, no HCl reaction, medium dense	sc	
725.0	3.0					4.0-5.0 ft Interval not sampled		
724.0	4.0	S-3	6-24-15 (39) 100%			5.0-6.5 ft Clayey sand with gravel, (sc), 60% sand, fine to medium, subrounded, soft hardness; 20% gravel, medium, subrounded, flat, medium hardness; 20% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1 inches, dark reddish brown (10R 3/4) and light brown (5YR 5/6), moist, no HCl reaction, medium dense	sc	
723.0	5.0					6.5-7.5 ft Interval not sampled		
722.0	6.0	S-4	9-12-15 (27) 100%			7.5-9.0 ft Clayey sand, (sc), 60% sand, fine to medium, subrounded, soft hardness; 30% fines, low plasticity, no dry strength, no dilatancy, low toughness; 10% gravel, medium, subangular, flat and elongated, medium hardness; maximum grain size = 0.4 inches, light brown (5YR 5/6) and dusky brown (5YR 2/2), moist, no HCl reaction, dense	sc	
721.0	7.0					9.0-10.0 ft Interval not sampled		
720.0	8.0	S-5	12-13-15 (28) 100%			10.0-11.5 ft Clayey sand with gravel, (sc), 40% gravel, medium, subangular, medium hardness; 40% sand, fine to medium, subrounded, soft hardness; 20% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1 inches, dark reddish brown (10R 3/4) and light brown (5YR 5/6), moist, no HCl reaction, medium dense to loose	sc	
719.0	9.0					11.5-12.5 ft Interval not sampled		
718.0	10.0	S-6	32-50/1 100%			12.5-13.1 ft Clayey sand with gravel, (sc), 40% gravel, medium, subangular, flat and elongated, medium hardness; 40% sand, fine to medium, subrounded, soft hardness; 20% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.6 inches, light brown (5YR 5/6) and medium light gray (N6), moist, no HCl reaction, dense	sc	
717.0	11.0					13.1-15.0 ft Interval not sampled		
716.0	12.0	S-7	8-10-12 (22) 67%			15.0-16.5 ft Clayey sand with gravel, (sc), 70% sand, medium, subrounded, soft hardness; 15% gravel, medium, subangular, flat and elongated, medium hardness; 15% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.1 inches, light brown (5YR 5/6), moist, no HCl reaction, medium dense	sc	
715.0	13.0					16.5-17.5 ft Interval not sampled		
714.0	14.0	S-8	10-12-15 (27) 100%			17.5-19.0 ft Well graded sand with clay and gravel, (sw-sc), 60% sand, medium, subrounded, soft hardness; 30% gravel, medium, subangular, hard hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1 inches, light brown (5YR 5/6) and medium light gray (N6), moist, no HCl reaction, dense	sw-sc	
713.0	15.0					19.0-20.0 ft Interval not sampled		
712.0	16.0							
711.0	17.0							
710.0	18.0							
709.0	19.0							
DATE STARTED: 5/21/10 DATE FINISHED: 5/22/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-443

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 341137.47 ft E. 2405090.24 ft GROUND SURFACE ELEVATION: 728.19 ft										
							DESCRIPTION			
708.0		21.0	S-9	10-11-12 (23) 47%			20.0-21.5 ft Clayey sand, (sc), 70% sand, medium, subrounded, soft hardness; 20% fines, medium plasticity, no dry strength, no dilatancy, low toughness; 10% gravel, medium, subangular, elongated, medium hardness; maximum grain size = 0.6 inches, light brown (5YR 5/6), moist, no HCl reaction, medium dense		SC	
707.0							21.5-22.5 ft Interval not sampled			
706.0	22.0	23.0	S-10	8-7-10 (17) 73%		22.5-24.0 ft Well graded sand with clay and gravel, (sw-sc), 60% sand, fine to medium, subrounded, soft hardness; 30% gravel, medium, subangular, flat and elongated, medium hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.5 inches, light brown (5YR 5/6), moist, no HCl reaction, medium dense		SW-SC		
705.0						24.0-25.0 ft Interval not sampled				
704.0	24.0	25.0	S-11	9-9-15 (24) 90%		25.0-26.5 ft Well graded sand with clay and gravel, (sw-sc), 60% sand, fine to medium, subrounded, soft hardness; 30% gravel, medium, subangular, flat and elongated, medium hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.5 inches, light brown (5YR 5/6), moist, no HCl reaction, medium dense		SW-SC		
703.0						26.5-27.5 ft Interval not sampled				
702.0	26.0	28.0	S-12	7-10-12 (22) 53%		27.5-29.0 ft Well graded sand with clay and gravel, (sw-sc), 60% sand, fine to medium, subrounded, soft hardness; 30% gravel, medium, subangular, flat and elongated, medium hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.5 inches, light brown (5YR 5/6), moist, no HCl reaction, medium dense		SW-SC		
701.0						29.0-30.0 ft Interval not sampled				
700.0	29.0	31.0	S-13	17-17-17 (34) 73%		30.0-31.5 ft Poorly graded sand with clay and gravel, (sp-sc), 60% sand, medium, subrounded, soft hardness; 30% gravel, medium, subangular, medium hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1 inches, light brown (5YR 5/6) and light gray (N7), moist, no HCl reaction, dense		sp-sc		
699.0						31.5-32.5 ft Interval not sampled				
698.0	30.0	33.0	S-14	9-12-25 (37) 100%		32.5-34.0 ft Poorly graded sand with clay and gravel, (sp-sc), 45% gravel, medium, subangular, flat and elongated, medium hardness; 45% sand, medium, subrounded, soft hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.1 inches, dark gray (N3) and light brown (5YR 5/6), moist, no HCl reaction, medium dense		sp-sc		
697.0						34.0-35.0 ft Interval not sampled				
696.0	32.0	35.0	R-1	60% (38%)	FD2	35.0-39.0 ft SHALE, horizontal, moderately soft to moderately hard, slightly weathered to decomposed, dark gray (N3), closely to moderately fractured, no reaction to HCl, 10° bedding plane, intensely mechanically broken				
695.0						36.2-36.7 ft Joint, R.D. = 30°, closely spaced; filling: not healed, very thin clay, slightly weathered, very soft; surface: slightly rough, planar, slightly weathered. Fracture set #F-1.				
694.0	34.0	39.0	R-2	72% (42%)						
693.0										
692.0	36.0									
691.0	37.0									
690.0	38.0									
689.0	39.0									
DATE STARTED: 5/21/10							DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:	
DATE FINISHED: 5/22/10										
FIELD GEOLOGIST: Jason Lucey							DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665	
CHECKED BY: Adrianna Semione										
APPROVED BY: Rolando Benitez										

REV 1 Final Boring B-443

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 341137.47 ft E. 2405090.24 ft GROUND SURFACE ELEVATION: 728.19 ft DESCRIPTION		
688.0	41.0	R-2	72% (42%)			39.0-44.0 ft SHALE, horizontal, moderately hard to moderately soft, slightly weathered, dark gray (N3), moderately to widely fractured, no reaction to HCl, 10° bedding plane, moderately mechanically broken		
687.0	42.0							
686.0	43.0							
685.0	44.0	R-3	100% (86%)	FD2		44.0-49.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), closely to widely fractured, no reaction to HCl, 10° bedding plane		
684.0	45.0							
683.0	46.0					45.6-46.4 ft Joint, R.D. = 22°, closely spaced; filling: not healed; surface: slightly rough, planar; iron oxide staining in the fractures. Fracture set #F-2.		
682.0	47.0	R-4	100% (100%)					
681.0	48.0							
680.0	49.0					49.0-54.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), widely fractured, no reaction to HCl, 10° bedding plane		
679.0	50.0	R-5	100% (100%)	FD0				
678.0	51.0							
677.0	52.0							
676.0	53.0	R-6	100% (100%)			54.0-59.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), very widely fractured, no reaction to HCl, 10° bedding plane		
675.0	54.0							
674.0	55.0							
673.0	56.0							
672.0	57.0							
671.0	58.0							
670.0	59.0					59.0-64.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), very widely fractured, no reaction to HCl, 10° bedding plane		
669.0								
DATE STARTED: 5/21/10 DATE FINISHED: 5/22/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-443

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 341137.47 ft E. 2405090.24 ft GROUND SURFACE ELEVATION: 728.19 ft		
668.0						59.0-64.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), very widely fractured, no reaction to HCl, 10° bedding plane		
667.0	61.0	R-6	100% (100%)					
666.0	62.0							
665.0	63.0							
664.0	64.0					64.0-69.0 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), no reaction to HCl, 10° bedding plane		
663.0	65.0							
662.0	66.0	R-7	100% (100%)					
661.0	67.0							
660.0	68.0							
659.0	69.0					69.0-71.5 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), no reaction to HCl, 10° bedding plane		
658.0	70.0	R-8	100% (100%)					
657.0	71.0							
						---- Bottom of Boring at 71.50 ft.----		
DATE STARTED: 5/21/10 DATE FINISHED: 5/22/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-444

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW(SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 341202.71 ft E. 2405787.65 ft GROUND SURFACE ELEVATION: 782.61 ft		
						DESCRIPTION		
782.0	1.0	S-1	2-2-3 (5) 60%			0.0-1.5 ft Clayey sand, (sc), 80% sand, fine to medium, subrounded, soft hardness; 20% fines, medium plasticity, no dry strength, no dilatancy, low toughness; 0% gravel; moderate brown (5YR 4/4), moist, no HCl reaction, medium dense	sc	
781.0	2.0					1.5-2.5 ft Interval not sampled		
780.0	3.0	S-2	50/3 100%			2.5-2.75 ft Well graded sand with clay and gravel, (sw-sc), 60% sand, fine to medium, subrounded, soft hardness; 30% gravel, medium, subangular, flat, medium hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.8 inches, moderate brown (5YR 4/4) and light gray (N7), moist, no HCl reaction, medium dense	sw-sc	
779.0	4.0					2.75-5.0 ft Interval not sampled		
778.0	5.0					4.1-5.9 ft Joint, R.D. = 19°, very closely spaced; filling: not healed, very thin clay, slightly weathered, very soft; surface: slightly rough, planar, slightly weathered. Fracture set #F-1.		
777.0	6.0	S-3	8-13-7 (20) 100%			5.0-6.5 ft Well graded sand with clay, (sw-sc), 90% sand, fine to medium, subrounded, soft hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; light brown (5YR 5/6), moist, no HCl reaction, medium dense	sw-sc	
776.0	7.0					6.5-7.5 ft Interval not sampled		
775.0	8.0					7.5-9.0 ft Well graded sand with clay, (sw-sc), 90% sand, fine to medium, subrounded, soft hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; light brown (5YR 5/6), moist, no HCl reaction, medium dense	sw-sc	
774.0	9.0	S-4	3-7-9 (16) 90%			9.0-10.0 ft Interval not sampled		
773.0	10.0					10.0-11.5 ft Clayey sand with gravel, (sc), 60% sand, fine to medium, subrounded, soft hardness; 25% gravel, medium, subangular, flat and elongated, medium hardness; 15% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1 inches, pale brown (5YR 5/2) and moderate brown (5YR 4/4), moist, no HCl reaction, medium dense	sc	
772.0	11.0	S-5	10-14-24 (38) 100%			11.5-12.5 ft Interval not sampled		
771.0	12.0					12.5-14.0 ft Clayey sand with gravel, (sc), 70% sand, fine to medium, subrounded, soft hardness; 15% gravel, medium, subangular, medium hardness; 15% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.8 inches, light brown (5YR 5/6), moist, no HCl reaction, medium dense	sc	
770.0	13.0	S-6	13-15-20 (35) 93%			14.0-15.0 ft Interval not sampled		
769.0	14.0					15.0-16.5 ft Well graded sand with clay, (sw-sc), 80% sand, medium, subrounded, soft hardness; 10% gravel, medium, subangular, flat and elongated, medium hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.5 inches, light brown (5YR 5/6) and light gray (N7), moist, no HCl reaction, dense	sw-sc	
768.0	15.0					16.5-17.5 ft Interval not sampled		
767.0	16.0	S-7	16-22-21 (43) 100%			17.5-19.0 ft Well graded sand with clay, (sw-sc), 80% sand, fine to medium, subrounded, soft hardness; 10% gravel, medium, subangular, flat and elongated, medium hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.6 inches, light brown (5YR 5/6) and pale brown (5YR 5/2), moist, no HCl reaction, dense	sw-sc	
766.0	17.0							
765.0	18.0	S-8	16-20-50 (70) 100%					
764.0	19.0							
763.0								
DATE STARTED: 5/23/10 DATE FINISHED: 5/23/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring B-444

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 341202.71 ft E. 2405787.65 ft GROUND SURFACE ELEVATION: 782.61 ft										
							DESCRIPTION			
762.0		21.0	S-9	37-50 100%			19.0-20.0 ft Interval not sampled		sw-sc	
761.0		22.0					20.0-21.0 ft Well graded sand with clay, (sw-sc), 80% sand, fine to medium, subrounded, soft hardness; 10% gravel, medium, subangular, flat and elongated, medium hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.6 inches, light brown (5YR 5/6) and pale brown (5YR 5/2), moist, no HCl reaction, dense			
760.0		23.0	S-10	32-50/4 94%			21.0-22.5 ft Interval not sampled		sp-sc	
759.0		24.0					22.5-23.3 ft Poorly graded sand with clay and gravel, (sp-sc), 50% sand, medium, subangular, soft hardness; 40% gravel, medium, subangular, flat and elongated, medium hardness; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 1 inches, medium light gray (N6) and, moist, no HCl reaction, dense			
758.0		25.0					23.3-24.5 ft Interval not sampled			
757.0		26.0					24.5-29.5 ft SHALE, clayey, soft to moderately hard, very intensely weathered, light brown (5YR 5/6) and medium light gray (N6), no reaction to HCl, iron oxide staining, weathered shale into clay then back into weathered shale, fracture spacing difficult to determine due to intense weathering and condition of sample			
756.0		27.0	R-1	50% (0%)	FD6					
755.0		28.0								
754.0		29.0								
753.0		30.0					29.5-34.5 ft SHALE, horizontal, moderately hard, slightly to moderately weathered, dark gray (N3), very closely to widely fractured, no reaction to HCl, 10° bedding plane			
752.0		31.0								
751.0		32.0	R-2	100% (80%)						
750.0		33.0								
749.0		34.0								
748.0		35.0			FD1		34.5-39.5 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), closely to widely fractured, no reaction to HCl, 10° bedding plane			
747.0		36.0								
746.0		37.0	R-3	100% (98%)						
745.0		38.0								
744.0		39.0								
743.0			R-4							
DATE STARTED: 5/23/10 DATE FINISHED: 5/23/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione							DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez							DRILLER: S. Silverman HELPER(S): J. Tousley		DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

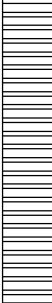
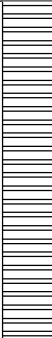

REV 1 Final Boring B-444

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 341202.71 ft E. 2405787.65 ft GROUND SURFACE ELEVATION: 782.61 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
742.0	41.0	R-4	100% (100%)			39.5-44.5 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), widely to very widely fractured, no reaction to HCl, 10° bedding plane		
741.0	42.0							
740.0	43.0							
739.0	44.0							
738.0	45.0	R-5	100% (100%)	FD1		44.5-49.5 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), widely to very widely fractured, no reaction to HCl, 10° bedding plane		
737.0	46.0							
736.0	47.0							
735.0	48.0							
734.0	49.0	R-6	100% (100%)			49.5-54.5 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), widely to very widely fractured, no reaction to HCl, 10° bedding plane, fossilized shells throughout		
733.0	50.0							
732.0	51.0							
731.0	52.0							
730.0	53.0	R-7	100% (100%)			52.2-52.22 ft Joint, R.D. = 60°; filling: totally healed, very thin clay, fresh, very soft; surface: slightly rough, planar, fresh. Fracture set #F-2.		
729.0	54.0							
728.0	55.0							
727.0	56.0							
726.0	57.0	R-8	100% (100%)	FD0		54.5-59.5 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), widely to very widely fractured, no reaction to HCl, 10° bedding plane, fossilized shells throughout		
725.0	58.0							
724.0	59.0							
723.0								
DATE STARTED: 5/23/10 DATE FINISHED: 5/23/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley		








REV 1 Final Boring B-444

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
		N. 341202.71 ft E. 2405787.65 ft GROUND SURFACE ELEVATION: 782.61 ft								
						DESCRIPTION				
722.0	61.0	R-8	100% (100%)	FD0		59.5-64.5 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), very widely fractured, no reaction to HCl, 10° bedding plane, fossilized shells throughout				
721.0	62.0									
720.0	63.0									
719.0	64.0									
718.0	65.0									
717.0	66.0	R-9	100% (100%)	FD4		64.5-69.5 ft SHALE, horizontal, moderately hard, fresh to slightly weathered, dark gray (N3), moderately to widely fractured, no reaction to HCl, 10° bedding plane, fossilized shells throughout				
716.0	67.0					66.35-66.6 ft Joint, R.D. = 52°, closely spaced; filling: partly healed, very thin clay, slightly weathered, very soft; surface: slightly rough, planar, slightly weathered; Bedding plane fracture t the same depth.. Fracture set #F-3.				
715.0	68.0					67.45-68.05 ft Joint, R.D. = 30°, closely spaced; filling: not healed, very thin clay, slightly weathered, very soft; surface: slightly rough, planar, slightly weathered. Fracture set #F-4.				
714.0	69.0									
713.0	70.0									
		R-10	100% (100%)	FD0		69.5-70.5 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), moderately fractured, no reaction to HCl, 10° bedding plane, fossilized shells throughout				
						---- Bottom of Boring at 70.50 ft.----				
DATE STARTED: 5/23/10 DATE FINISHED: 5/23/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon			NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley			DRILL RIG: CME-55 (Track) HAMMER ID: 340665	

REV 1 Final Boring MW401

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340753.25 ft E. 2405097.68 ft GROUND SURFACE ELEVATION: 780.44 ft		
						DESCRIPTION		
780.0	1.0					0.0-3.0 ft Lean clay with sand, (cl-ml), 75% fines, medium plasticity, no dilatancy, medium toughness; 20% sand, fine, subrounded; 5% gravel, medium, subangular; maximum grain size = 0.5 inches, moderate yellowish brown (10YR 5/4) to moderate brown (5YR 3/4), moist	cl-ml	0 - 16.0 ft. Destructive drilling, no samples taken, descriptions based on air hammer cuttings.
779.0	2.0							
778.0	3.0							
777.0	4.0					3.0-6.0 ft Poorly graded gravel, (gp), 90% gravel, medium to coarse, subangular, soft hardness; 5% sand, fine, subrounded; 5% fines; moderate brown (5YR 4/4), dry, no HCl reaction	gp	
776.0	5.0							
775.0	6.0							
774.0	7.0					6.0-10.0 ft Poorly graded gravel with silt, (gp-gm), 85% gravel, fine to medium, subangular, medium hardness; 10% fines; 5% sand, fine, subrounded; light brown (5YR 6/4) to greenish black (5GY 2/1), dry, Gravel is black (N1)	gp-gm	
773.0	8.0							
772.0	9.0							
771.0	10.0					10.0-11.0 ft Poorly graded sand with silt and gravel, (sp-sm), 70% sand, fine to medium, subrounded; 20% gravel, medium, subangular, soft hardness; 10% fines; pale brown (5YR 5/2) to moderate brown (5YR 3/4), dry	sp-sm	
770.0	11.0							
769.0	12.0					11.0-12.0 ft Poorly graded gravel with silt and sand, (gp-gm), 60% gravel, fine, subrounded, medium hardness; 30% sand, fine, subrounded; 10% fines; olive gray (5Y 4/1) to brownish gray (5YR 4/1), dry	gp-gm	
768.0	13.0							Weathered shale from 12.0 -16.0 ft
767.0	14.0					12.0-14.0 ft Poorly graded sand with silt and gravel, (sp-sm), 60% sand, fine, subrounded; 30% gravel, fine, subrounded, soft hardness; 10% fines; medium bluish gray (5B 5/1) to medium light gray (N6), dry	sp-sm	
766.0	15.0					14.0-16.0 ft SHALE, moderately hard, dark greenish gray (5GY 4/1) to greenish black (5G 2/1), dry		Top of bedrock at 16.0 ft
765.0	16.0					---- Bottom of Boring at 16.00 ft.----		Changed drilling rig, description continues on following page
DATE STARTED: 4/7/10 DATE FINISHED: 4/7/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check						DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.	NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: J. Trish HELPER(S): B. Kuntz	DRILL RIG: T4-W 1250 HAMMER ID: NA	

REV 1 Final Boring MW401

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS	
						N. 340753.25 ft	E. 2405097.68 ft			
						GROUND SURFACE ELEVATION: 780.44 ft				
						DESCRIPTION				
780.0	1.0								Continuation of MW401 boring log, see previous page for description for 0-16.0 ft	
779.0	2.0									
778.0	3.0									
777.0	4.0									
776.0	5.0									
775.0	6.0									
774.0	7.0									
773.0	8.0									
772.0	9.0									
771.0	10.0									
770.0	11.0									
769.0	12.0									
768.0	13.0									
767.0	14.0									
766.0	15.0									
765.0	16.0									
764.0	17.0	R-1	100% (67%)			16.0-17.5 ft SHALE, moderately soft, medium gray (N5), moderately fractured 16-17.5 ft Fracture zone, R.D. = 50 - 70°, closely spaced, slightly open; surface: rough, undulating. Fracture set #3, discontinuity # 1.				
763.0	18.0									
762.0	19.0	R-2	100% (47%)	FD5		17.5-22.2 ft SHALE, moderately soft, medium gray (N5), moderately fractured				
761.0										
DATE STARTED: 4/8/10 DATE FINISHED: 4/10/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.				NOTES:
APPROVED BY: Daniel Bansah						DRILLER: J. Malecki HELPER(S): F. Smith				DRILL RIG: CME-75 HAMMER ID: NA

REV 1 Final Boring MW401

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 340753.25 ft E. 2405097.68 ft GROUND SURFACE ELEVATION: 780.44 ft										
							DESCRIPTION			
760.0		21.0	R-2	100% (47%)	FD5		17.5-22.2 ft SHALE, moderately soft, medium gray (N5), moderately fractured			
759.0		22.0	R-3	100% (40%)			22.2-24.8 ft SHALE, soft to moderately soft, slightly to moderately weathered, pale yellowish brown (10YR 6/2) to dark yellowish orange (10YR 6/6), very thinly bedded, moderately fractured, no reaction to HCl, iron oxide staining			
758.0		23.0								
757.0		24.0	R-4	93% (68%)			24.5-24.7 ft Joint, R.D. = 60°; filling: clay, moderately weathered, very soft; surface: rough, moderately weathered, moderately soft. Fracture set #3, discontinuity # 2.			
756.0		25.0					24.8-33.9 ft SHALE, moderately soft, medium gray (N5), slightly fractured			
755.0		26.0					26.5-36 ft Joint, R.D. = 45°, closely spaced, moderately continuous, slightly open; surface: moderately rough, planar, moderately hard; some of the fracture surfaces react strongly to HCL. Fracture set #2, discontinuity # 3.			
754.0		27.0								
753.0		28.0	R-5	100% (100%)	FD3					
752.0		29.0								
751.0		30.0								
750.0		31.0								
749.0		32.0	R-6	97% (89%)			33.9-34.7 ft SHALE, soft to moderately soft, slightly to moderately weathered, pale yellowish brown (10YR 6/2) to dark yellowish orange (10YR 6/6), very thinly bedded, slightly fractured, no reaction to HCl, iron oxide staining			
748.0		33.0					34.7-57.9 ft SHALE, hard, fresh to slightly weathered, medium gray (N5), slightly fractured			
747.0		34.0								
746.0		35.0								
745.0		36.0								
744.0		37.0								
743.0		38.0								
742.0		39.0								
741.0										
DATE STARTED: 4/8/10 DATE FINISHED: 4/10/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check							DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES:	
APPROVED BY: Daniel Bansah							DRILLER: J. Malecki HELPER(S): F. Smith		DRILL RIG: CME-75 HAMMER ID: NA	

REV 1 Final Boring MW401

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 780.44 ft						DESCRIPTION		
DESCRIPTION								
740.0	41.0	R-7	100% (100%)	FD1		34.7-57.9 ft SHALE, hard, fresh to slightly weathered, medium gray (N5), slightly fractured		
739.0	42.0							
738.0	43.0							
737.0	44.0							
736.0	45.0							
735.0	46.0	R-8	98% (96%)	FD1				
734.0	47.0							
733.0	48.0							
732.0	49.0							
731.0	50.0							
730.0	51.0							
729.0	52.0							
728.0	53.0							
727.0	54.0							
726.0	55.0							
725.0	56.0	R-9	99% (97%)	FD1		55.2-55.3 ft Joint, R.D. = 42°, slightly open; surface: slightly rough, planar, hard. Fracture set #2, discontinuity # 4.		
724.0	57.0							
723.0	58.0							
722.0	59.0							
721.0								
DATE STARTED: 4/8/10 DATE FINISHED: 4/10/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES:
APPROVED BY: Daniel Bansah						DRILLER: J. Malecki HELPER(S): F. Smith		DRILL RIG: CME-75 HAMMER ID: NA

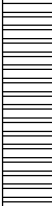
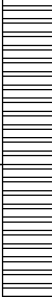
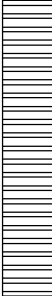
REV 1 Final Boring MW401

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 340753.25 ft E. 2405097.68 ft GROUND SURFACE ELEVATION: 780.44 ft		
720.0						57.9-93.0 ft SHALE, calcareous, hard, fresh, medium gray (N5), strong reaction to HCl, some nodules of pyrite and traces of fossils (calcite) throughout the entire section of core		
61.0		R-9	99% (97%)					
719.0								
62.0								
718.0								
63.0								
717.0								
64.0								
716.0								
65.0								
715.0								
66.0								
714.0								
67.0		R-10	99% (95%)	FD1		67.7-68 ft Joint, R.D. = 43°, slightly open; surface: smooth, planar, hard; iron oxide staining on fracture surface. Fracture set #2, discontinuity # 5.		Iron oxide stained, slightly weathered material
713.0								
68.0								
712.0								
69.0								
711.0								
70.0								
710.0								
71.0								
709.0								
72.0		R-11	87% (87%)					
708.0								
73.0								
707.0						73.15-73.4 ft Joint, R.D. = 60°, slightly open; surface: slightly rough, planar, hard. Fracture set #3, discontinuity # 6.		
74.0						73.9-75.25 ft Fracture zone, R.D. = 0 - 20°, closely to moderately spaced, slightly open; surface: rough, undulating, moderately hard to hard; iron oxide staining. Fracture set #1, discontinuity # 7.		
706.0				FD2				
75.0								
705.0								
76.0								
704.0		R-12	97% (93%)					
77.0								
703.0								
78.0								
702.0								
79.0								
701.0								
DATE STARTED: 4/8/10 DATE FINISHED: 4/10/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: J. Malecki HELPER(S): F. Smith	DRILL RIG: CME-75 HAMMER ID: NA	

REV 1 Final Boring MW401

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS			
N. 340753.25 ft E. 2405097.68 ft GROUND SURFACE ELEVATION: 780.44 ft										
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION				
700.0		R-12	97% (93%)	FD0		57.9-93.0 ft SHALE, calcareous, hard, fresh, medium gray (N5), strong reaction to HCl, some nodules of pyrite and traces of fossils (calcite) throughout the entire section of core				
81.0										
699.0										
82.0										
698.0										
83.0		R-13	99% (95%)	FD1 FD1		86.45-87.25 ft Joint, R.D. = 70 - 90°, slightly open; surface: stepped, undulating, hard; iron oxide staining on fractured surface, two fractures spaced moderately apart. Fracture set #4, discontinuity # 8.				
697.0										87.65-87.85 ft Joint, R.D. = 41°, slightly open; filling: clay; surface: stepped, planar, moderately hard to hard. Fracture set #2, discontinuity # 9.
84.0										
696.0										
85.0										
695.0										
86.0										
694.0										
87.0										
693.0										
88.0		R-14	100% (95%)			93.0-99.6 ft SHALE, calcareous, hard, fresh, medium gray (N5), strong reaction to HCl, no staining, traces of calcite and some pyrite throughout entire section of core				
692.0										
89.0										
691.0										
90.0										
690.0										
91.0										
689.0										
92.0										
688.0										
93.0										
687.0										
94.0										
686.0										
95.0										
685.0										
96.0										
684.0										
97.0										
683.0										
98.0										
682.0										
99.0										
681.0										
DATE STARTED: 4/8/10 DATE FINISHED: 4/10/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES:			
APPROVED BY: Daniel Bansah						DRILLER: J. Malecki HELPER(S): F. Smith	DRILL RIG: CME-75 HAMMER ID: NA			

REV 1 Final Boring MW401

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES N. 340753.25 ft E. 2405097.68 ft GROUND SURFACE ELEVATION: 780.44 ft		USCS SYMBOL	REMARKS						
							DESCRIPTION									
680.0			R-14	100% (95%)			99.6-113.0 ft SHALE, calcareous, hard, fresh, medium dark gray (N4), strong reaction to HCl, some nodules of pyrite and trace fossils (calcite) throughout the entire section of core			Vugs partially filled with pyrite						
101.0																
679.0																
102.0																
678.0																
103.0			R-15	100% (100%)			105.6-105.7 ft Joint, R.D. = 39°, moderately open; surface: smooth, planar, moderately hard. Fracture set #2, discontinuity # 10.									
677.0																
104.0																
676.0																
105.0																
675.0																
106.0																
674.0																
107.0																
673.0																
108.0			R-16	100% (100%)			107.6-107.65 ft Joint, R.D. = 10°; filling: totally healed, very thin calcite, hard. Fracture set #1, discontinuity # 11.									
672.0																
109.0																
671.0																
110.0																
670.0			R-16	100% (100%)			111.6-111.7 ft Joint, R.D. = 18°; filling: totally healed, thin calcite, hard. Fracture set #1, discontinuity # 12.									
112.0																
669.0																
113.0																
668.0																
114.0																
667.0																
115.0																
666.0																
116.0																
665.0																
117.0																
664.0																
118.0																
663.0																
119.0																
662.0																
119.0																
661.0																
DATE STARTED: 4/8/10 DATE FINISHED: 4/10/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check							DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.				NOTES:					
APPROVED BY: Daniel Bansah							DRILLER: J. Malecki HELPER(S): F. Smith				DRILL RIG: CME-75 HAMMER ID: NA					

REV 1 Final Boring MW401

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
N. 340753.25 ft E. 2405097.68 ft GROUND SURFACE ELEVATION: 780.44 ft							
DESCRIPTION							
660.0		R-16	100% (100%)			113.0-143.0 ft SHALE, moderately hard to hard, fresh, medium dark gray (N4), no reaction to HCl, nodules of pyrite and trace fossils (calcite) from 113.0 to 114.0 ft bgs, sporadic fossils throughout remainder of core section	
121.0							
659.0							
122.0							
658.0							
123.0							
657.0							
124.0							
656.0							
125.0							
655.0							
126.0							
654.0							
127.0							
653.0							
128.0							
652.0							
129.0							
651.0							
130.0							
650.0							
131.0							
649.0							
132.0							
648.0							
133.0							
647.0							
134.0							
646.0							
135.0							
645.0							
136.0							
644.0							
137.0							
643.0							
138.0							
642.0							
139.0							
641.0							
133.2-133.4 ft Joint, R.D. = 30°, moderately open; surface: slightly rough, planar; slight iron oxide staining. Fracture set #2, discontinuity # 13.							
DATE STARTED: 4/8/10 DATE FINISHED: 4/10/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check						NOTES:	
APPROVED BY: Daniel Bansah						DRILL RIG: CME-75 HAMMER ID: NA	
DRILLER: J. Malecki HELPER(S): F. Smith							

REV 1 Final Boring MW401

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS		
N. 340753.25 ft E. 2405097.68 ft GROUND SURFACE ELEVATION: 780.44 ft									
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION			
640.0		R-18	95% (91%)	FD1		113.0-143.0 ft SHALE, moderately hard to hard, fresh, medium dark gray (N4), no reaction to HCl, nodules of pyrite and trace fossils (calcite) from 113.0 to 114.0 ft bgs, sporadic fossils throughout remainder of core section			
141.0									
639.0									
142.0									
638.0		R-19	100% (88%)	FD4		143.0-151.0 ft SHALE, moderately hard to moderately soft, slightly to moderately weathered, medium dark gray (N4), fossils (calcite) sporadically throughout section of core, calcareous from 150.0 to 151.0 ft bgs 143.4-143.5 ft Joint, R.D. = 22°, moderately open; filling: moderately weathered; surface: slightly rough, planar, moderately weathered. Fracture set #2, discontinuity # 14.			
143.0									
637.0									
144.0									
636.0									
145.0									
635.0									
146.0									
634.0		R-20	100% (100%)	FD4		147.4-147.6 ft Fracture zone; weathered, iron oxide staining (fracture angles cannot be determined). discontinuity # 15. 148-148.4 ft Fracture zone; intensely weathered, iron oxide staining, clay infilling (fracture angles cannot be determined). discontinuity # 16.			
147.0									
633.0									
148.0									
632.0		R-21	100% (100%)	FD0		151.0-183.0 ft SHALE, calcareous, moderately hard, fresh, medium dark gray (N4), weak reaction to HCl, sporadic calcite and pyrite throughout section of core, numerous bands of fossiliferous (calcite) zones from 151.0 to 173.0 ft bgs			
149.0									
631.0									
150.0									
630.0		R-22	100% (100%)	FD0					
151.0									
629.0									
152.0									
628.0		R-23	100% (100%)	FD0					
153.0									
627.0									
154.0									
626.0		R-24	100% (100%)	FD0					
155.0									
625.0									
156.0									
624.0		R-25	100% (100%)	FD0					
157.0									
623.0									
158.0									
622.0		R-26	100% (100%)	FD0					
159.0									
621.0									
DATE STARTED: 4/8/10 DATE FINISHED: 4/10/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES:		
APPROVED BY: Daniel Bansah						DRILLER: J. Malecki HELPER(S): F. Smith	DRILL RIG: CME-75 HAMMER ID: NA		

REV 1 Final Boring MW401

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS		
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE				
N. 340753.25 ft E. 2405097.68 ft GROUND SURFACE ELEVATION: 780.44 ft									
DESCRIPTION									
620.0		R-21	100% (100%)			151.0-183.0 ft SHALE, calcareous, moderately hard, fresh, medium dark gray (N4), weak reaction to HCl, sporadic calcite and pyrite throughout section of core, numerous bands of fossiliferous (calcite) zones from 151.0 to 173.0 ft bgs			
161.0									
619.0									
162.0									
618.0									
163.0		R-22	100% (100%)						
617.0									
164.0									
616.0									
165.0									
615.0									
166.0									
614.0									
167.0									
613.0									
168.0		R-23	100% (100%)						
612.0									
169.0									
611.0									
170.0									
610.0		R-23	100% (100%)						
171.0									
609.0									
172.0									
608.0									
173.0									
607.0									
174.0									
606.0									
175.0									
605.0		R-23	100% (100%)						
176.0									
604.0									
177.0									
603.0									
178.0		R-23	100% (100%)						
602.0									
179.0									
601.0									
DATE STARTED: 4/8/10 DATE FINISHED: 4/10/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check								NOTES:	
APPROVED BY: Daniel Bansah								DRILL RIG: CME-75 HAMMER ID: NA	
DRILLER: J. Malecki HELPER(S): F. Smith									

REV 1 Final Boring MW401

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS						
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE								
N. 340753.25 ft E. 2405097.68 ft GROUND SURFACE ELEVATION: 780.44 ft													
DESCRIPTION													
600.0		R-23	100% (100%)										
181.0													
599.0													
182.0													
598.0													
183.0		R-24	100% (100%)										
597.0													
184.0													
596.0													
185.0													
595.0													
186.0													
594.0													
187.0													
593.0													
188.0													
592.0													
189.0													
591.0													
190.0													
590.0		R-25	100% (100%)	FD0									
191.0													
589.0													
192.0													
588.0													
193.0													
587.0													
194.0													
586.0													
195.0													
585.0													
196.0													
584.0													
197.0													
583.0													
198.0													
582.0													
199.0													
581.0													
DATE STARTED: 4/8/10 DATE FINISHED: 4/10/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check								NOTES:					
APPROVED BY: Daniel Bansah								DRILL RIG: CME-75 HAMMER ID: NA					

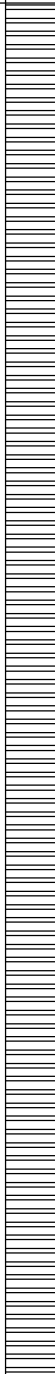
REV 1 Final Boring MW401

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS										
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE												
GROUND SURFACE ELEVATION: 780.44 ft						DESCRIPTION											
580.0		R-25	100% (100%)	FD0		183.0-213.0 ft SHALE, moderately hard, fresh, medium dark gray (N4), no reaction to HCl, sporadic fossiliferous bands and fossils throughout core section											
201.0																	
579.0																	
202.0																	
578.0																	
203.0																	
577.0																	
204.0																	
576.0																	
205.0																	
575.0		R-26	100% (100%)														
206.0																	
574.0																	
207.0																	
573.0																	
208.0																	
572.0																	
209.0																	
571.0																	
210.0																	
570.0																	
211.0																	
569.0																	
212.0																	
568.0																	
213.0		R-27	100% (100%)					213.0-253.0 ft SHALE, moderately hard, fresh, medium dark gray (N4), no reaction to HCl, trace calcite (fossils) and pyrite									
567.0																	
214.0																	
566.0																	
215.0																	
565.0																	
216.0																	
564.0																	
217.0																	
563.0																	
218.0																	
562.0																	
219.0																	
561.0																	
DATE STARTED: 4/8/10 DATE FINISHED: 4/10/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check								DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES:							
APPROVED BY: Daniel Bansah								DRILLER: J. Malecki HELPER(S): F. Smith		DRILL RIG: CME-75 HAMMER ID: NA							

REV 1 Final Boring MW401

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS					
N. 340753.25 ft E. 2405097.68 ft GROUND SURFACE ELEVATION: 780.44 ft												
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION						
560.0		R-27	100% (100%)	FD0		213.0-253.0 ft SHALE, moderately hard, fresh, medium dark gray (N4), no reaction to HCl, trace calcite (fossils) and pyrite						
221.0												
559.0												
222.0												
558.0												
223.0												
557.0												
224.0												
556.0		R-28	100% (100%)									
225.0												
555.0												
226.0												
554.0												
227.0												
553.0												
228.0												
552.0		R-29	95% (95%)									
229.0												
551.0												
230.0												
550.0												
231.0												
549.0												
232.0												
548.0												
233.0												
547.0												
234.0												
546.0												
235.0												
545.0												
236.0												
544.0												
237.0												
543.0												
238.0												
542.0												
239.0												
541.0												
DATE STARTED: 4/8/10 DATE FINISHED: 4/10/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check								DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES:		
APPROVED BY: Daniel Bansah								DRILLER: J. Malecki HELPER(S): F. Smith				
					DRILL RIG: CME-75 HAMMER ID: NA							

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BORING NO. MW401 SHEET 14 OF 14

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PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
785.0	1.0					0.0-10.0 ft Sandy lean clay with gravel/sandy silt with gravel, (cl-ml), 55% fines, high plasticity, low toughness; 30% sand, fine to medium, subrounded; 15% gravel, fine to medium, subangular; light brown (5YR 5/6) to moderate brown (5YR 4/4), no odor, moist, no HCl reaction, trace roots	cl-ml	0 - 30.0 ft. Destructive drilling, no samples taken, descriptions based on air hammer cuttings.
784.0	2.0							
783.0	3.0							
782.0	4.0							
781.0	5.0							
780.0	6.0							
779.0	7.0							
778.0	8.0							
777.0	9.0							
776.0	10.0							
775.0	11.0					10.0-14.0 ft Silty sand with gravel, (sm), 55% sand, fine to medium, subangular; 30% gravel, fine to medium, subangular; 15% fines; light brown (5YR 5/6) to moderate brown (5YR 4/4), no odor, moist, no HCl reaction	sm	
774.0	12.0							
773.0	13.0							
772.0	14.0							
771.0	15.0					14.0-20.0 ft Well graded sand with silt and gravel, (sw-sm), 65% sand, fine to medium, subrounded; 25% gravel, fine to medium, subangular; 10% fines; light brown (5YR 5/6) to moderate brown (5YR 3/4), no odor, moist, no HCl reaction	sw-sm	
770.0	16.0							
769.0	17.0							
768.0	18.0							
767.0	19.0							
766.0								
DATE STARTED: 4/8/10 DATE FINISHED: 4/8/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Mark Zatezalo						DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.	NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: J. Trish HELPER(S): B. Kuntz	DRILL RIG: T4-W 1250 HAMMER ID: NA	

REV 1 Final Boring MW402

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 340870.66 ft E. 2405855.94 ft GROUND SURFACE ELEVATION: 785.24 ft		
765.0	21.0					20.0-24.0 ft Well graded sand with silt and gravel, (sw-sm), 75% sand, fine to medium, subangular; 15% gravel, fine to medium, subangular; 10% fines; light brown (5YR 5/6) to moderate brown (5YR 4/4), no odor, moist, no HCl reaction	sw-sm	
764.0	22.0							
763.0	23.0							
762.0	24.0							
761.0	25.0					24.0-25.0 ft Poorly graded sand with silt and gravel, (sp-sm), 60% sand, fine, subangular; 30% gravel, fine to medium, subangular, medium hardness; 10% fines; medium light gray (N6) to moderate brown (5YR 4/4), dry, some Shale	sp-sm	
760.0	26.0					25.0-30.0 ft SHALE, moderately soft, silt sized particles, medium light gray (N6), no odor, no reaction to HCl, dry		
759.0	27.0							
758.0	28.0							
757.0	29.0							
756.0	30.0					---- Bottom of Boring at 30.00 ft.----		Changed drilling rig, description continues on following page
DATE STARTED: 4/8/10 DATE FINISHED: 4/8/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Mark Zatezalo						DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.	NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: J. Trish HELPER(S): B. Kuntz	DRILL RIG: T4-W 1250 HAMMER ID: NA	

REV 1 Final Boring MW402

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS		
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE				
GROUND SURFACE ELEVATION: 785.24 ft						DESCRIPTION			
765.0	21.0					<p>30.0-32.0 ft SHALE, calcareous, lenticular, hard, moderately weathered, clay sized particles, dark gray (N3), thinly bedded, R.D. = 45°, moderately fractured</p> <p>30-44.3 ft R.D. = 40-65°, widely spaced, moderately continuous; dry with no previous evidence, but water flow possible, filling: fresh, very hard; surface: rough, undulating, fresh, very hard; Mechanical breaks are variable in angle and spacing. Fracture set #2/3, discontinuity # 1.</p> <p>32.0-61.5 ft SHALE, calcareous, inclined, interbedded, hard to very hard, fresh, dark gray (N3), thinly bedded, extremely widely fractured, weak reaction to HCl, pyrite nodules</p>	Continuation of MW402 boring log, see previous page for description for 0-30.0 ft		
764.0	22.0								
763.0	23.0								
762.0	24.0								
761.0	25.0								
760.0	26.0								
759.0	27.0								
758.0	28.0								
757.0	29.0								
756.0	30.0								
755.0	31.0	R-1	100% (45%)	FD5					
754.0	32.0								
753.0	33.0								
752.0	34.0	R-2	98% (90%)						
751.0	35.0								
750.0	36.0								
749.0	37.0			FD1					
748.0	38.0								
747.0	39.0	R-3	100% (86%)						
746.0									
DATE STARTED: 4/9/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo								DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES:
APPROVED BY: Daniel Bansah								DRILLER: T. Growden HELPER(S): J. Bechtel	DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA

REV 1 Final Boring MW402

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 340870.66 ft E. 2405855.94 ft GROUND SURFACE ELEVATION: 785.24 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
745.0		R-3	100% (86%)	FD1		32.0-61.5 ft SHALE, calcareous, inclined, interbedded, hard to very hard, fresh, dark gray (N3), thinly bedded, extremely widely fractured, weak reaction to HCl, pyrite nodules	
744.0	41.0						
743.0	42.0						
742.0	43.0						
741.0	44.0						
740.0	45.0						
739.0	46.0						
738.0	47.0						
737.0	48.0						
736.0	49.0						
735.0	50.0						
734.0	51.0						
733.0	52.0						
732.0	53.0						
731.0	54.0						
730.0	55.0						
729.0	56.0						
728.0	57.0						
727.0	58.0						
726.0	59.0						
		R-4	96% (94%)	FD1			
		R-5	98% (98%)				
		R-6	98% (92%)	FD1			
		R-7	98% (94%)				

DATE STARTED: 4/9/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo	DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES:
APPROVED BY: Daniel Bansah	DRILLER: T. Growden HELPER(S): J. Bechtel	DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA

PROJECT NO. 10-4310BORING NO. MW402 SHEET 5 OF 13

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PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 340870.66 ft E. 2405855.94 ft GROUND SURFACE ELEVATION: 785.24 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
705.0		R-12	100% (98%)	FD1		61.5-84.5 ft SHALE, calcareous, banded, very hard, fresh, clay sized particles, pyrite, medium dark gray (N4) to grayish black (N2), thinly bedded, R.D. = 30°, extremely widely fractured, iron oxide staining, two parallel fractures at 60.2 ft and 60.4 ft, oriented 30° with iron oxide staining and calcite filling	Fracture at 90.0 to 90.4 dipping 65°	
704.0	81.0							
703.0	82.0							
702.0	83.0							
701.0	84.0	R-13	100% (90%)	FD1	84.5-111.5 ft SHALE, very hard, fresh, calcite inclusions, grayish black (N2) to medium dark gray (N4), very thinly bedded, R.D. = 0° to 30°, extremely widely fractured, occasional fossils with calcite, fracture zone from 106.0 ft to 107.0 ft with iron oxide staining, fractures are approximately 0.1 ft apart, pyrite inclusions			
700.0	85.0							
699.0	86.0							
698.0	87.0							
697.0	88.0	R-14	98% (88%)		90-90.4 ft Joint, R.D. = 69-°, extremely widely spaced, slightly open; filling is damp but no free water present, filling: very thin iron oxide, slightly weathered; surface: moderately rough, undulating, slightly weathered, moderately soft. Fracture set #3, discontinuity # 3.			
696.0	89.0							
695.0	90.0							
694.0	91.0							
693.0	92.0	R-15	100% (100%)	FD0				
692.0	93.0							
691.0	94.0							
690.0	95.0							
689.0	96.0	R-16	100% (100%)					
688.0	97.0							
687.0	98.0							
686.0	99.0							
DATE STARTED: 4/9/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES:
APPROVED BY: Daniel Bansah						DRILLER: T. Growden HELPER(S): J. Bechtel		DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA

REV 1 Final Boring MW402

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 785.24 ft						DESCRIPTION		
685.0		R-16	100% (100%)	FD0		84.5-111.5 ft SHALE, very hard, fresh, calcite inclusions, grayish black (N2) to medium dark gray (N4), very thinly bedded, R.D. = 0° to 30°, extremely widely fractured, occasional fossils with calcite, fracture zone from 106.0 ft to 107.0 ft with iron oxide staining, fractures are approximately 0.1 ft apart, pyrite inclusions		
684.0	101.0							
683.0	102.0							
682.0	103.0							
681.0	104.0	R-17	100% (100%)	FD0				
680.0	105.0							
679.0	106.0							
678.0	107.0							
677.0	108.0	R-18	88% (62%)	FD7				
676.0	109.0							
675.0	110.0							
674.0	111.0							
673.0	112.0	R-19	98% (94%)	FD0		111.5-126.8 ft SHALE, very hard, fresh, clay sized particles, dark gray (N3) to grayish black (N2), thinly bedded, calcareous and fossiliferous		
672.0	113.0							
671.0	114.0							
670.0	115.0							
669.0	116.0	R-20	98% (92%)	FD0				
668.0	117.0							
667.0	118.0							
666.0	119.0							
DATE STARTED: 4/9/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES:
APPROVED BY: Daniel Bansah						DRILLER: T. Growden HELPER(S): J. Bechtel		DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA

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PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 340870.66 ft E. 2405855.94 ft GROUND SURFACE ELEVATION: 785.24 ft		
665.0		R-20	98% (92%)			111.5-126.8 ft SHALE, very hard, fresh, clay sized particles, dark gray (N3) to grayish black (N2), thinly bedded, calcareous and fossiliferous		
664.0	121.0							
663.0	122.0							
662.0	123.0	R-21	100% (98%)	FD0				
661.0	124.0							
660.0	125.0							soft clay lens temporarily blocked the core barrel
659.0	126.0							
658.0	127.0					126.8-156.3 ft SHALE, wavy, very hard, fresh, clay sized particles, medium dark gray (N4) to dark gray (N3), thinly to thickly bedded, weak reaction to HCl, calcareous		
657.0	128.0	R-22	100% (98%)					
656.0	129.0							
655.0	130.0							
654.0	131.0							
653.0	132.0	R-23	94% (90%)	FD0				
652.0	133.0							
651.0	134.0							
650.0	135.0							
649.0	136.0							
648.0	137.0							
647.0	138.0	R-24	98% (94%)					
646.0	139.0							
DATE STARTED: 4/9/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: T. Growden HELPER(S): J. Bechtel	DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA	

REV 1 Final Boring MW402

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340870.66 ft E. 2405855.94 ft GROUND SURFACE ELEVATION: 785.24 ft		
						DESCRIPTION		
645.0		R-24	98% (94%)			126.8-156.3 ft SHALE, wavy, very hard, fresh, clay sized particles, medium dark gray (N4) to dark gray (N3), thinly to thickly bedded, weak reaction to HCl, calcareous		
141.0								
644.0								
142.0								
643.0								
143.0								
642.0		R-25	90% (88%)					
144.0								
641.0								
145.0								
640.0								
146.0								
639.0								
147.0								
638.0								
148.0								
637.0		R-26	100% (98%)					
149.0								
636.0								
150.0								
635.0				FD0				
151.0								
634.0								
152.0								
633.0								
153.0								
632.0		R-27	100% (98%)					
154.0								
631.0								
155.0								
630.0								
156.0								
629.0								
157.0								
628.0								
158.0		R-28	100% (96%)			156.3-168.9 ft SHALE, banded, very hard, fresh, clay sized particles, dark gray (N3) to medium dark gray (N4), very thinly to moderately bedded, weak reaction to HCl, calcareous nodule at 156.4 ft, and 168.5 ft, unit is fossiliferous, calcite filled fossils, pyrite inclusions		
159.0								
626.0								
DATE STARTED: 4/9/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: T. Growden HELPER(S): J. Bechtel	DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA	

REV 1 Final Boring MW402

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 340870.66 ft E. 2405855.94 ft GROUND SURFACE ELEVATION: 785.24 ft		
625.0		R-28	100% (96%)			156.3-168.9 ft SHALE, banded, very hard, fresh, clay sized particles, dark gray (N3) to medium dark gray (N4), very thinly to moderately bedded, weak reaction to HCl, calcareous nodule at 156.4 ft, and 168.5 ft, unit is fossiliferous, calcite filled fossils, pyrite inclusions		
624.0	161.0							
623.0	162.0							
622.0	163.0	R-29	100% (96%)					
621.0	164.0							
620.0	165.0							
619.0	166.0							
618.0	167.0							
617.0	168.0	R-30	100% (98%)			168.9-191.0 ft SHALE, banded, very hard, fresh, clay sized particles, dark gray (N3) to grayish black (N2), very thinly to moderately bedded, no reaction to HCl		
616.0	169.0							
615.0	170.0			FD0				
614.0	171.0							
613.0	172.0							
612.0	173.0	R-31	100% (100%)					
611.0	174.0							
610.0	175.0							
609.0	176.0							
608.0	177.0							
607.0	178.0	R-32	98% (98%)					
606.0	179.0							
DATE STARTED: 4/9/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: T. Growden HELPER(S): J. Bechtel	DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA	

REV 1 Final Boring MW402

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 340870.66 ft E. 2405855.94 ft GROUND SURFACE ELEVATION: 785.24 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
605.0		R-32	98% (98%)			168.9-191.0 ft SHALE, banded, very hard, fresh, clay sized particles, dark gray (N3) to grayish black (N2), very thinly to moderately bedded, no reaction to HCl	
604.0	181.0						
603.0	182.0	R-33	96% (96%)	FD0			
602.0	183.0						
601.0	184.0	R-34	100% (100%)				
600.0	185.0						
599.0	186.0	R-35	100% (100%)	FD0		191.0-196.0 ft SHALE, hard, fresh, dark gray (N3), moderately bedded, no reaction to HCl, trace fossils with partially replaced pyrite at 193.3 ft, also traces of flakes of pyrite though the entire core	
598.0	187.0						
597.0	188.0	R-36	100% (100%)			196.0-206.0 ft SHALE, hard, fresh, dark gray (N3), thinly to moderately bedded, no reaction to HCl, trace of fossil with partially replaced by pyrite at 204.2 ft, also some nuggets of pyrite though the entire core	
596.0	189.0						
595.0	190.0						
594.0	191.0						
593.0	192.0						
592.0	193.0						
591.0	194.0						
590.0	195.0						
589.0	196.0						
588.0	197.0						
587.0	198.0						
586.0	199.0						
DATE STARTED: 4/9/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES:
APPROVED BY: Daniel Bansah						DRILLER: T. Growden HELPER(S): J. Bechtel	DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA




REV 1 Final Boring MW402

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 340870.66 ft E. 2405855.94 ft GROUND SURFACE ELEVATION: 785.24 ft		
585.0		R-36	100% (100%)	FD0		196.0-206.0 ft SHALE, hard, fresh, dark gray (N3), thinly to moderately bedded, no reaction to HCl, trace of fossil with partially replaced by pyrite at 204.2 ft, also some nuggets of pyrite though the entire core		
584.0	201.0							
583.0	202.0							
582.0	203.0	R-37	92% (92%)					
581.0	204.0							
580.0	205.0							
579.0	206.0			FD0		206.0-224.0 ft SHALE, hard, fresh, dark gray (N3), moderately bedded, no reaction to HCl, traces of fossil (clams shapes at 206.4 ft and 207.6 ft), also traces of flakes of pyrite though the entire core		
578.0	207.0							
577.0	208.0							
576.0	209.0	R-38	100% (100%)					
575.0	210.0							
574.0	211.0							
573.0	212.0							
572.0	213.0	R-39	100% (100%)					
571.0	214.0							
570.0	215.0			FD0				
569.0	216.0							
568.0	217.0							
567.0	218.0	R-40	100% (100%)					
566.0	219.0							
DATE STARTED: 4/9/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: T. Growden HELPER(S): J. Bechtel	DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA	

REV 1 Final Boring MW402

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ftin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340870.66 ft E. 2405855.94 ft GROUND SURFACE ELEVATION: 785.24 ft DESCRIPTION		
565.0	221.0	R-41	100% (100%)	FD0		206.0-224.0 ft SHALE, hard, fresh, dark gray (N3), moderately bedded, no reaction to HCl, traces of fossil (clams shapes at 206.4 ft and 207.6 ft), also traces of flakes of pyrite though the entire core		
564.0	222.0							
563.0	223.0							
562.0	224.0							
561.0	225.0	R-42	100% (100%)	FD0		224.0-234.0 ft SHALE, banded, hard, fresh, dark gray (N3), thinly to moderately bedded, no reaction to HCl, traces of flakes of pyrite and calcite though the entire core		
560.0	226.0							
559.0	227.0							
558.0	228.0							
557.0	229.0	R-43	100% (100%)					
556.0	230.0							
555.0	231.0							
554.0	232.0							
553.0	233.0							
552.0	234.0					---- Bottom of Boring at 234.00 ft.----		
DATE STARTED: 4/9/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: T. Growden HELPER(S): J. Bechtel	DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA	

REV 1 Final Boring MW403

PROJECT NO. 10-4310


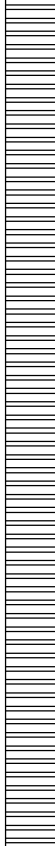
COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 801.97 ft						DESCRIPTION		
801.0	1.0					0.0-2.0 ft Poorly graded sand with silt and gravel, (sp-sm), 70% sand, fine to medium, subrounded; 20% gravel, fine to medium, subangular, medium hardness; 10% fines; pale brown (5YR 5/2) to dark yellowish brown (10YR 4/2), no odor, moist, no HCl reaction, trace roots	sp-sm	0 - 60.0 ft. Destructive drilling, no samples taken, descriptions based on air hammer cuttings.
800.0	2.0					2.0-10.0 ft Well graded sand with silt and gravel, (sw-sm), 60% sand, fine, subangular; 30% gravel, fine to medium, subrounded, hard hardness; 10% fines; maximum grain size = 1.5 inches, light brown (5YR 5/6) to dark yellowish brown (10YR 4/2), no odor, moist, no HCl reaction	sw-sm	
799.0	3.0							
798.0	4.0							
797.0	5.0							
796.0	6.0							
795.0	7.0							
794.0	8.0							
793.0	9.0							
792.0	10.0							
791.0	11.0					10.0-47.5 ft Poorly graded gravel with sand, (gp), 65% gravel, fine to medium, subangular, medium hardness; 30% sand, fine, subrounded; 5% fines; maximum grain size = 2 inches, pale brown (5YR 5/2), no odor, moist, no HCl reaction	gp	
790.0	12.0							
789.0	13.0							
788.0	14.0							
787.0	15.0							
786.0	16.0							
785.0	17.0							
784.0	18.0							
783.0	19.0							
DATE STARTED: 4/7/10 DATE FINISHED: 4/10/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check						DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.		NOTES:
APPROVED BY: Daniel Bansah						DRILLER: J. Trish HELPER(S): B. Kuntz		DRILL RIG: T4-W 1250 HAMMER ID: NA

PROJECT NO. 10-4310

BORING NO. MW403 SHEET 2 OF 11

REV 1 Final Boring MW403

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS				
N. 340579.28 ft E. 2405542.37 ft GROUND SURFACE ELEVATION: 801.97 ft		DESCRIPTION												
761.0 41.0							10.0-47.5 ft Poorly graded gravel with sand, (gp), 65% gravel, fine to medium, subangular, medium hardness; 30% sand, fine, subrounded; 5% fines; maximum grain size = 2 inches, pale brown (5YR 5/2), no odor, moist, no HCl reaction		gp	Changed drilling rig, description continues on following page				
760.0 42.0														
759.0 43.0														
758.0 44.0														
757.0 45.0														
756.0 46.0														
755.0 47.0														
754.0 48.0							47.5-60.0 ft SHALE, moderately hard, silt sized particles, dusky yellow (5Y 6/4) to dusky yellowish brown (10YR 2/2), no odor, no reaction to HCl, dry to moist, pulverized by hammer							
753.0 49.0														
752.0 50.0														
751.0 51.0														
750.0 52.0														
749.0 53.0														
748.0 54.0														
747.0 55.0														
746.0 56.0														
745.0 57.0														
744.0 58.0														
743.0 59.0														
DATE STARTED: 4/7/10 DATE FINISHED: 4/10/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check							--- Bottom of Boring at 60.00 ft.----				NOTES:			
APPROVED BY: Daniel Bansah							DRILLER: J. Trish HELPER(S): B. Kuntz				DRILL RIG: T4-W 1250 HAMMER ID: NA			

Changed drilling rig,
description
continues on
following page

REV 1 Final Boring MW403

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						<p>N. 340579.28 ft E. 2405542.37 ft</p> <p>GROUND SURFACE ELEVATION: 801.97 ft</p>		
741.0	61.0	R-1	100% (67%)	FD5		60.0-63.0 ft SHALE, moderately soft, moderately weathered, medium dark gray (N4), no reaction to HCl		Continuation of MW403 boring log, see previous pages for description for 0-60.0 ft
740.0	62.0					61.5-61.8 ft Joint, R.D. = 85°; surface: slightly rough, planar; iron oxide staining. Fracture set #4, discontinuity # 1.		
739.0	63.0					61.6-61.7 ft Joint, R.D. = 60°; surface: slightly rough, planar; three fractures at a 60° angle running off of a nearly horizontal fracture, iron oxide staining. Fracture set #3, discontinuity # 2.		
738.0	64.0	R-2	95% (42%)	FD4		61.9-62 ft Joint, R.D. = 45°; surface: moderately rough, planar; iron oxide staining. Fracture set #2, discontinuity # 3.		
737.0	65.0					62.1- ft Joint, R.D. = 10°; surface: moderately rough, planar; iron oxide staining and trace clay infilling. Fracture set #1, discontinuity # 4.		
736.0	66.0					62.3- ft Joint, R.D. = 10°; surface: slightly rough, planar; minor iron oxide staining. Fracture set #1, discontinuity # 5.		
735.0	67.0	R-3	93% (58%)	FD7		63.0-69.0 ft SHALE, moderately soft, moderately to intensely weathered, medium dark gray (N4) and pale yellowish brown (10YR 6/2), no reaction to HCl		
734.0	68.0					63- ft Joint, R.D. = 10°; surface: slightly rough, planar; iron oxide staining. Fracture set #1, discontinuity # 6.		
733.0	69.0					63.2- ft Joint, R.D. = 10°; surface: slightly rough, planar; iron oxide staining. Fracture set #1, discontinuity # 7.		
732.0	70.0	R-4	100% (100%)	FD6		64- ft Joint, R.D. = 10°; surface: slightly rough, planar; minor iron oxide staining. Fracture set #1, discontinuity # 8.		
731.0	71.0					65.2-65.3 ft Joint, R.D. = 15°; surface: slightly rough, planar; iron oxide staining. Fracture set #1, discontinuity # 9.		
730.0	72.0					66-66.5 ft Fracture zone, R.D. = 30/85°, slightly open; surface: smooth, planar; three 30° fractures with a nearly horizontal fracture running between, iron oxide staining present. Fracture set #2/4, discontinuity # 10.		
729.0	73.0	R-5	93% (58%)	FD1		66.6-69 ft Fracture zone; intensely weathered, iron oxide staining and clay infilling present. discontinuity # 11.		
728.0	74.0					69.0-73.0 ft SHALE, moderately soft, moderately weathered, medium dark gray (N4), no reaction to HCl		
727.0	75.0					69-70.2 ft Fracture zone, R.D. = 75-85°, slightly open; surface: slightly rough, planar; iron oxide staining present, clay infilling at 70.2 ft bgs. Fracture set #4, discontinuity # 12.		
726.0	76.0	R-6	100% (100%)	FD0		71.7- ft Joint, R.D. = 10°; filling: totally healed, moderately thin calcite. Fracture set #1, discontinuity # 13.		
725.0	77.0					73.0-123.0 ft SHALE, calcareous, moderately hard, fresh, medium dark gray (N4), weak reaction to HCl, fossiliferous zones scattered throughout length of core to approximately 95.0 feet bgs, trace fossils from 95.0 - 123.0 feet bgs, sporadic pyrite nodules from 85.0 - 123.0 feet bgs		
724.0	78.0							
723.0	79.0							
DATE STARTED: 4/11/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: J. Malecki HELPER(S): F. Smith	DRILL RIG: CME-75 HAMMER ID: NA	

REV 1 Final Boring MW403

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 340579.28 ft E. 2405542.37 ft GROUND SURFACE ELEVATION: 801.97 ft		
721.0	81.0	R-4	100% (100%)			73.0-123.0 ft SHALE, calcareous, moderately hard, fresh, medium dark gray (N4), weak reaction to HCl, fossiliferous zones scattered throughout length of core to approximately 95.0 feet bgs, trace fossils from 95.0 - 123.0 feet bgs, sporadic pyrite nodules from 85.0 - 123.0 feet bgs		
720.0	82.0							
719.0	83.0	R-5	83% (83%)					
718.0	84.0							
717.0	85.0							
716.0	86.0							
715.0	87.0							
714.0	88.0	R-6	97% (97%)					
713.0	89.0							
712.0	90.0							
711.0	91.0							
710.0	92.0							
709.0	93.0							
708.0	94.0							
707.0	95.0							
706.0	96.0							
705.0	97.0	R-7	100% (100%)					
704.0	98.0							
703.0	99.0							
DATE STARTED: 4/11/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: J. Malecki HELPER(S): F. Smith	DRILL RIG: CME-75 HAMMER ID: NA	


REV 1 Final Boring MW403

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 801.97 ft						DESCRIPTION	
701.0	101.0	R-7	100% (100%)		FD0	73.0-123.0 ft SHALE, calcareous, moderately hard, fresh, medium dark gray (N4), weak reaction to HCl, fossiliferous zones scattered throughout length of core to approximately 95.0 feet bgs, trace fossils from 95.0 - 123.0 feet bgs, sporadic pyrite nodules from 85.0 - 123.0 feet bgs	
700.0	102.0						
699.0	103.0						
698.0	104.0						
697.0	105.0						
696.0	106.0	R-8	100% (100%)				
695.0	107.0						
694.0	108.0						
693.0	109.0						
692.0	110.0						
691.0	111.0	R-9	100% (100%)				
690.0	112.0						
689.0	113.0						
688.0	114.0						
687.0	115.0						
686.0	116.0						
685.0	117.0						
684.0	118.0						
683.0	119.0						
DATE STARTED: 4/11/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES:
APPROVED BY: Daniel Bansah						DRILLER: J. Malecki HELPER(S): F. Smith	DRILL RIG: CME-75 HAMMER ID: NA

REV 1 Final Boring MW403

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES N. 340579.28 ft E. 2405542.37 ft GROUND SURFACE ELEVATION: 801.97 ft		USCS SYMBOL	REMARKS						
		DESCRIPTION														
681.0	121.0		R-9	100% (100%)	FD0		73.0-123.0 ft SHALE, calcareous, moderately hard, fresh, medium dark gray (N4), weak reaction to HCl, fossiliferous zones scattered throughout length of core to approximately 95.0 feet bgs, trace fossils from 95.0 - 123.0 feet bgs, sporadic pyrite nodules from 85.0 - 123.0 feet bgs									
680.0	122.0															
679.0	123.0															
678.0	124.0															
677.0	125.0															
676.0	126.0															
675.0	127.0															
674.0	128.0	R-10	100% (100%)	123.0-173.0 ft SHALE, moderately hard, fresh, medium dark gray (N4), no reaction to HCl, fossils (calcite) sporadically throughout section of the core, trace pyrite												
673.0	129.0															
672.0	130.0															
671.0	131.0															
670.0	132.0															
669.0	133.0															
668.0	134.0	R-11	98% (98%)													
667.0	135.0															
666.0	136.0															
665.0	137.0															
664.0	138.0															
663.0	139.0															
DATE STARTED: 4/11/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check									DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES:					
APPROVED BY: Daniel Bansah									DRILLER: J. Malecki HELPER(S): F. Smith		DRILL RIG: CME-75 HAMMER ID: NA					

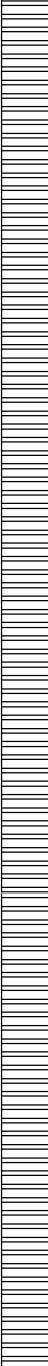
REV 1 Final Boring MW403

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS				
N. 340579.28 ft E. 2405542.37 ft GROUND SURFACE ELEVATION: 801.97 ft											
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION					
661.0	141.0	R-11	98% (98%)	FD0		123.0-173.0 ft SHALE, moderately hard, fresh, medium dark gray (N4), no reaction to HCl, fossils (calcite) sporadically throughout section of the core, trace pyrite					
660.0	142.0										
659.0	143.0										
658.0	144.0										
657.0	145.0										
656.0	146.0	R-12	100% (100%)								
655.0	147.0										
654.0	148.0										
653.0	149.0										
652.0	150.0										
651.0	151.0	R-13	100% (100%)								
650.0	152.0										
649.0	153.0										
648.0	154.0										
647.0	155.0										
646.0	156.0	R-14	100% (100%)								
645.0	157.0										
644.0	158.0										
643.0	159.0										
DATE STARTED: 4/11/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check								DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES:	
APPROVED BY: Daniel Bansah								DRILLER: J. Malecki HELPER(S): F. Smith			
								DRILL RIG: CME-75 HAMMER ID: NA			


REV 1 Final Boring MW403

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS						
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE								
GROUND SURFACE ELEVATION: 801.97 ft						DESCRIPTION							
641.0	161.0	R-14	100% (100%)	FD0		123.0-173.0 ft SHALE, moderately hard, fresh, medium dark gray (N4), no reaction to HCl, fossils (calcite) sporadically throughout section of the core, trace pyrite							
640.0	162.0												
639.0	163.0												
638.0	164.0												
637.0	165.0												
636.0	166.0	R-15	97% (97%)					173.0-218.0 ft SHALE, moderately hard, fresh, medium dark gray (N4), no reaction to HCl, trace pyrite and fossils (calcite) throughout section of the core					
635.0	167.0												
634.0	168.0												
633.0	169.0												
632.0	170.0												
631.0	171.0	R-16	100% (100%)										
630.0	172.0												
629.0	173.0												
628.0	174.0												
627.0	175.0												
626.0	176.0												
625.0	177.0												
624.0	178.0												
623.0	179.0												
DATE STARTED: 4/11/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES:					
APPROVED BY: Daniel Bansah						DRILLER: J. Malecki HELPER(S): F. Smith		DRILL RIG: CME-75 HAMMER ID: NA					

REV 1 Final Boring MW403

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 340579.28 ft E. 2405542.37 ft GROUND SURFACE ELEVATION: 801.97 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
621.0	181.0	R-16	100% (100%)	FD0		173.0-218.0 ft SHALE, moderately hard, fresh, medium dark gray (N4), no reaction to HCl, trace pyrite and fossils (calcite) throughout section of the core	
620.0	182.0						
619.0	183.0	R-17	100% (100%)				
618.0	184.0						
617.0	185.0						
616.0	186.0						
615.0	187.0	R-18	98% (98%)				
614.0	188.0						
613.0	189.0						
612.0	190.0						
611.0	191.0	R-19	100% (100%)				
610.0	192.0						
609.0	193.0						
608.0	194.0						
607.0	195.0	R-20	100% (100%)				
606.0	196.0						
605.0	197.0						
604.0	198.0						
603.0	199.0						
DATE STARTED: 4/11/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check							
APPROVED BY: Daniel Bansah						DRILL RIG: CME-75 HAMMER ID: NA	
DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.							
DRILLER: J. Malecki HELPER(S): F. Smith							

REV 1 Final Boring MW403

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)		SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS		
								N. 340579.28 ft E. 2405542.37 ft GROUND SURFACE ELEVATION: 801.97 ft				DESCRIPTION	
601.0 201.0				R-20	100% (100%)		FD0	173.0-218.0 ft SHALE, moderately hard, fresh, medium dark gray (N4), no reaction to HCl, trace pyrite and fossils (calcite) throughout section of the core					
600.0 202.0													
599.0 203.0													
598.0 204.0													
597.0 205.0													
596.0 206.0				R-21	98% (98%)		FD0						
595.0 207.0													
594.0 208.0													
593.0 209.0													
592.0 210.0													
591.0 211.0				R-22	100% (100%)		FD3	216.5- ft Joint, R.D. = 10°; filling: totally healed, calcite; surface: slightly rough, planar; width of joint is approximately 0.05 feet, infilling material (calcite) mixed with shale fragments. Fracture set #1, discontinuity # 14. 216.6-218 ft Fracture zone; filling: totally healed, calcite; various fracture angles, slightly offset (approx 0.01 feet), fracture width varies from very thin to nodules. discontinuity # 15. ---- Bottom of Boring at 218.00 ft.----					
590.0 212.0													
589.0 213.0													
588.0 214.0													
587.0 215.0													
586.0 216.0													
585.0 217.0													
584.0 218.0													
DATE STARTED: 4/11/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check								DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.				NOTES:	
APPROVED BY: Daniel Bansah								DRILLER: J. Malecki HELPER(S): F. Smith				DRILL RIG: CME-75 HAMMER ID: NA	




REV 1 Final Boring MW404

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)		SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
								N. 340170.50 ft E. 2404985.30 ft			
								DESCRIPTION			
735.0		1.0						0.0-11.0 ft Silty sand, (sm), 75% sand, fine to medium, subrounded; 15% fines; 10% gravel, fine, subangular; moderate yellowish brown (10YR 5/4) to dark yellowish orange (10YR 6/6), no odor, dry, no HCl reaction, trace organics		sm	0 - 33.5 ft. Destructive drilling, no samples taken, descriptions based on air hammer cuttings.
734.0		2.0									
733.0		3.0									
732.0		4.0									
731.0		5.0									
730.0		6.0									
729.0		7.0									
728.0		8.0									
727.0		9.0									
726.0		10.0									
725.0		11.0									
724.0		12.0						11.0-20.0 ft Clayey sand with gravel, (sc), 40% sand, fine, subrounded; 40% fines; 20% gravel, fine to medium, subrounded; moderate yellowish brown (10YR 5/4), no odor, dry, no HCl reaction		sc	
723.0		13.0									
722.0		14.0									
721.0		15.0									
720.0		16.0									
719.0		17.0									
718.0		18.0									
717.0		19.0									
716.0											
DATE STARTED: 4/13/10 DATE FINISHED: 4/13/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Mark Zatezalo								DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.			NOTES:
APPROVED BY: Daniel Bansah								DRILLER: J. Trish HELPER(S): B. Kuntz			DRILL RIG: T4-W 1250 HAMMER ID: NA

REV 1 Final Boring MW404

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 340170.50 ft E. 2404985.30 ft GROUND SURFACE ELEVATION: 735.42 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
715.0	21.0					20.0-26.0 ft Clayey sand with gravel, (sc), 60% sand, fine to medium, subrounded; 25% gravel, fine to medium, subangular; 15% fines; light olive gray (5Y 5/2), no odor, dry, no HCl reaction	sc	
714.0	22.0							
713.0	23.0							
712.0	24.0					26.0-30.0 ft Silty gravel with sand, (gm), 60% gravel, fine to medium, subangular; 20% sand, fine, subrounded; 20% fines; medium dark gray (N4), no odor, dry, no HCl reaction, rock fragments, weathered shale mixed with soil	gm	
711.0	25.0							
710.0	26.0							
709.0	27.0					30.0-31.0 ft SHALE, soft, medium gray (N5) to light olive gray (5Y 5/2), no odor, dry, weathered	Changed drilling rig, description continues on following page	
708.0	28.0					31.0-33.5 ft SHALE, moderately soft, dark gray (N3), no odor, no reaction to HCl, dry		
707.0	29.0							
706.0	30.0							
705.0	31.0							
704.0	32.0							
703.0	33.0							
702.0								
---- Bottom of Boring at 33.50 ft.----								
DATE STARTED: 4/13/10 DATE FINISHED: 4/13/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Mark Zatezalo						DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.		NOTES:
APPROVED BY: Daniel Bansah						DRILLER: J. Trish HELPER(S): B. Kuntz		DRILL RIG: T4-W 1250 HAMMER ID: NA

REV 1 Final Boring MW404

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
						N. 340170.50 ft	E. 2404985.30 ft		
						GROUND SURFACE ELEVATION: 735.42 ft			
						DESCRIPTION			
715.0	21.0					33.5-69.0 ft SHALE, moderately hard to moderately soft, very intensely to intensely weathered, dark gray (N3) to light olive gray (5Y 5/2), very closely fractured, iron oxide staining, quartz crystals growing in fracture, sand found in some fractures			Continuation of MW404 boring log, see previous page for description for 0-20.0 ft
714.0	22.0								
713.0	23.0								
712.0	24.0								
711.0	25.0								
710.0	26.0								
709.0	27.0								
708.0	28.0								
707.0	29.0								
706.0	30.0								
705.0	31.0								
704.0	32.0								
703.0	33.0								
702.0	34.0								
701.0	35.0								
700.0	36.0								
699.0	37.0	R-1	100% (9%)	FD9					
698.0	38.0								
697.0	39.0								
696.0									
DATE STARTED: 4/21/10 DATE FINISHED: 4/22/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES: Water used as fluid during coring operations	
APPROVED BY: Daniel Bansah						DRILLER: T. Growden HELPER(S): J. Bechtel		DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA	

REV 1 Final Boring MW404

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340170.50 ft E. 2404985.30 ft GROUND SURFACE ELEVATION: 735.42 ft DESCRIPTION		
695.0	41.0	R-1	100% (9%)			33.5-69.0 ft SHALE, moderately hard to moderately soft, very intensely to intensely weathered, dark gray (N3) to light olive gray (5Y 5/2), very closely fractured, iron oxide staining, quartz crystals growing in fracture, sand found in some fractures		
694.0	42.0							
693.0	43.0							
692.0	44.0							
691.0	45.0							
690.0	46.0	R-2	61% (0%)					
689.0	47.0							
688.0	48.0							
687.0	49.0							
686.0	50.0							
685.0	51.0			FD9				
684.0	52.0							
683.0	53.0							
682.0	54.0	R-3	92% (0%)					
681.0	55.0							
680.0	56.0							
679.0	57.0							
678.0	58.0	R-4	100% (20%)					
677.0	59.0							
676.0								
DATE STARTED: 4/21/10 DATE FINISHED: 4/22/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES: Water used as fluid during coring operations	
APPROVED BY: Daniel Bansah						DRILLER: T. Growden HELPER(S): J. Bechtel	DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA	

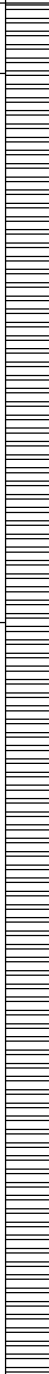
REV 1 Final Boring MW404

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW(Sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 340170.50 ft E. 2404985.30 ft		GROUND SURFACE ELEVATION: 735.42 ft								
							DESCRIPTION			
675.0			R-4	100% (20%)			33.5-69.0 ft SHALE, moderately hard to moderately soft, very intensely to intensely weathered, dark gray (N3) to light olive gray (5Y 5/2), very closely fractured, iron oxide staining, quartz crystals growing in fracture, sand found in some fractures			
61.0										
674.0										
62.0										
673.0			R-5	88% (19%)	FD9					
63.0										
672.0										
64.0										
671.0			R-6	80% (75%)	FD4		69.0-120.0 ft SHALE, fossiliferous, very hard, slightly weathered, clay sized particles, medium dark gray (N4) to dark gray (N3), thinly bedded, fossils are calcareous			
65.0										
670.0										
66.0										
669.0			R-7	96% (95%)	FD0					
67.0										
668.0										
68.0										
667.0										
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REV 1 Final Boring MW404

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS					
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE							
GROUND SURFACE ELEVATION: 735.42 ft						DESCRIPTION						
655.0		R-7	96% (95%)	FD0		69.0-120.0 ft SHALE, fossiliferous, very hard, slightly weathered, clay sized particles, medium dark gray (N4) to dark gray (N3), thinly bedded, fossils are calcareous		Iron oxide stained horizontal fracture				
81.0												
654.0												
82.0												
653.0												
83.0												
652.0												
84.0												
651.0		R-8	96% (94%)	FD1								Iron oxide stained horizontal fracture
85.0												
650.0												
86.0												
649.0												
87.0												
648.0												
88.0												
647.0												
89.0		R-9	95% (95%)									
646.0												
90.0												
645.0												
91.0												
644.0		R-10		FD0								
92.0												
643.0												
93.0												
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637.0												
99.0												
636.0												
DATE STARTED: 4/21/10 DATE FINISHED: 4/22/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES: Water used as fluid during coring operations				
APPROVED BY: Daniel Bansah						DRILLER: T. Growden HELPER(S): J. Bechtel		DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA				

REV 1 Final Boring MW404

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340170.50 ft E. 2404985.30 ft GROUND SURFACE ELEVATION: 735.42 ft		
						DESCRIPTION		
635.0		R-10				69.0-120.0 ft SHALE, fossiliferous, very hard, slightly weathered, clay sized particles, medium dark gray (N4) to dark gray (N3), thinly bedded, fossils are calcareous		
101.0								
634.0								
102.0								
633.0								
103.0								
632.0								
104.0								
631.0								
105.0								
630.0								
106.0		R-11	95% (95%)					
629.0								
107.0								
628.0								
108.0								
627.0								
109.0								
626.0								
110.0								
625.0								
111.0								
624.0								
112.0								
623.0								
113.0								
622.0								
114.0								
621.0								
115.0								
620.0		R-12	96% (96%)					
116.0								
619.0								
117.0								
618.0								
118.0								
617.0								
119.0								
616.0								
DATE STARTED: 4/21/10 DATE FINISHED: 4/22/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						--- Bottom of Boring at 120.00 ft. --- DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES: Water used as fluid during coring operations	
APPROVED BY: Daniel Bansah						DRILLER: T. Growden HELPER(S): J. Bechtel	DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA	

REV 1 Final Boring MW405

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339970.47 ft E. 2404646.35 ft GROUND SURFACE ELEVATION: 693.84 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
693.0	1.0					0.0-8.0 ft Poorly graded sand with silt and gravel, (sp-sm), 65% sand, fine to medium, subrounded; 25% gravel, fine to coarse, subangular, medium hardness; 10% fines; grayish yellow (5Y 8/4) to pale brown (5YR 5/2), no odor, moist, no HCl reaction, trace roots, trace sandstone fragments	sp-sm
692.0	2.0						
691.0	3.0						
690.0	4.0						
689.0	5.0						
688.0	6.0						
687.0	7.0						
686.0	8.0						
685.0	9.0					8.0-10.0 ft Poorly graded gravel with silt and sand, (gp-gm), 60% gravel, fine to coarse, subangular, medium hardness; 30% sand, fine to medium, subrounded; 10% fines; moderate brown (5YR 4/4), no odor, moist, no HCl reaction	gp-gm
684.0	10.0					10.0-18.0 ft Well graded sand with gravel, (sw), 80% sand, fine to medium, rounded; 15% gravel, fine to medium, subrounded, medium hardness; 5% fines; moderate yellowish brown (10YR 5/4), no odor, dry, no HCl reaction	sw
683.0	11.0						
682.0	12.0						
681.0	13.0						
680.0	14.0						
679.0	15.0						
678.0	16.0						
677.0	17.0						
676.0	18.0					18.0-28.0 ft Poorly graded gravel with silt and sand, (gp-gm), 65% gravel, fine to coarse, subrounded, medium hardness; 25% sand, fine, subrounded; 10% fines; light brown (5YR 6/4) to pale brown (5YR 5/2), no odor, dry, no HCl reaction	gp-gm
675.0	19.0						
674.0							
DATE STARTED: 4/8/10 DATE FINISHED: 4/8/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check						DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.	NOTES:
APPROVED BY: Daniel Bansah						DRILLER: J. Trish HELPER(S): B. Kuntz	DRILL RIG: T4-W 1250 HAMMER ID: NA

REV 1 Final Boring MW405

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 693.84 ft						gp-gm	
DESCRIPTION							
673.0	21.0					18.0-28.0 ft Poorly graded gravel with silt and sand, (gp-gm), 65% gravel, fine to coarse, subrounded, medium hardness; 25% sand, fine, subrounded; 10% fines; light brown (5YR 6/4) to pale brown (5YR 5/2), no odor, dry, no HCl reaction	
672.0	22.0						
671.0	23.0						
670.0	24.0						
669.0	25.0						
668.0	26.0						
667.0	27.0						
666.0	28.0						
665.0	29.0					28.0-29.0 ft Clayey sand with gravel, (sc), 45% sand, fine to medium, subrounded; 30% fines, medium plasticity, high toughness; 25% gravel, fine, subrounded; moderate brown (5YR 3/4), no odor, moist, no HCl reaction, trace shale fragments	sc
664.0	30.0					29.0-40.0 ft SHALE, moderately hard, silt sized particles, medium dark gray (N4) to olive black (5Y 2/1), no odor, no reaction to HCl, dry	
663.0	31.0						
662.0	32.0						
661.0	33.0						
660.0	34.0						
659.0	35.0						
658.0	36.0						
657.0	37.0						
656.0	38.0						
655.0	39.0						
654.0							
DATE STARTED: 4/8/10						NOTES:	
DATE FINISHED: 4/8/10							
FIELD GEOLOGIST: Eugene Tabacchi						DRILLING METHOD: Air Hammer, Destructive	
CHECKED BY: Dan Check						DRILLING CO. Eichelbergers, Inc.	
APPROVED BY: Daniel Bansah						DRILL RIG: T4-W 1250	
						HAMMER ID: NA	

Changed drilling rig,
description
continues on
following page

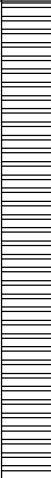
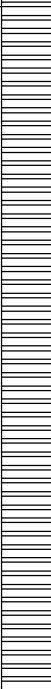
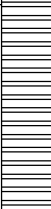
REV 1 Final Boring MW405

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 339970.47 ft E. 2404646.35 ft GROUND SURFACE ELEVATION: 693.84 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
653.0	41.0	R-1	69% (0%)	FD8		40.0-47.0 ft SHALE, moderately hard, intensely to very intensely weathered, medium dark gray (N4), thinly to moderately bedded, no reaction to HCl, wet, iron oxide staining		
652.0	42.0					40-47 ft Fracture zone, R.D. = 0 - 10°, moderately open; filling: very thin, moderately weathered, moderately hard; surface: rough, planar, moderately weathered, moderately hard; infilling with light brown (5YR 5/6) quartz crystals. Fracture set #1, discontinuity # 1.		
651.0	43.0							
650.0	44.0							
649.0	45.0							
648.0	46.0	R-2	91% (14%)	FD6		47.0-54.0 ft SHALE, hard, moderately to slightly weathered, pitted to vuggy, medium dark gray (N4), thinly to moderately bedded, no reaction to HCl, wet, iron oxide staining, highly weathered zone of moderate brown (5YR 3/4) to light olive gray (5Y 5/2.) clay at 50.0 - 50.2 ft. bgs		
647.0	47.0					47-52.5 ft Joint, R.D. = 0 - 10°, closely spaced, slightly open; surface: slightly rough, planar, hard. Fracture set #1, discontinuity # 2.		
646.0	48.0							
645.0	49.0							
644.0	50.0							
643.0	51.0	R-3	93% (73%)	FD3		52.5-54 ft Joint, R.D. = 45 - 60°, very closely spaced, slightly open; surface: slightly rough, planar, hard; iron oxide staining on fractured surface. Fracture set #2/#3, discontinuity # 3.		
642.0	52.0							
641.0	53.0							
640.0	54.0							
639.0	55.0					54.0-57.0 ft SHALE, hard, fresh, medium dark gray (N4) to dark gray (N3), moderately to thinly bedded, no reaction to HCl, calcareous (weak HCL reaction), flecks of pyrite, fossiliferous at 59.2 - 59.5 ft. bgs (shells)		
638.0	56.0	R-4	100% (100%)	FD0		54-54.6 ft Joint, R.D. = 45 - 60°, slightly open; filling: iron; surface: slightly rough, planar, moderately hard. Fracture set #2/#3, discontinuity # 4.		
637.0	57.0					55.8-56.2 ft Joint, R.D. = 0°, slightly open; surface: smooth, planar, hard; fractured surfaces exhibit iron oxide staining. Fracture set #1, discontinuity # 5.		
636.0	58.0							
635.0	59.0					57.0-87.0 ft SHALE, hard to very hard, fresh, medium dark gray (N4) to dark gray (N3), moderately to thinly bedded, some fossils and pyrite nodules, calcareous (weak reaction to HCL)		
634.0								
DATE STARTED: 4/12/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Daniel Bansah CHECKED BY: Dan Check						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES:
APPROVED BY: Daniel Bansah						DRILLER: T. Growden HELPER(S): J. Bechtel		

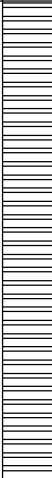
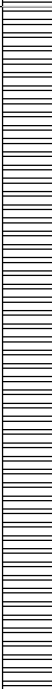

REV 1 Final Boring MW405

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 339970.47 ft E. 2404646.35 ft GROUND SURFACE ELEVATION: 693.84 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
633.0	61.0	R-4	100% (100%)	FD0		57.0-87.0 ft SHALE, hard to very hard, fresh, medium dark gray (N4) to dark gray (N3), moderately to thinly bedded, some fossils and pyrite nodules, calcareous (weak reaction to HCL)		
632.0	62.0							
631.0	63.0							
630.0	64.0							
629.0	65.0							
628.0	66.0							
627.0	67.0	R-5	100% (100%)	FD0				
626.0	68.0							
625.0	69.0							
624.0	70.0							
623.0	71.0							
622.0	72.0							
621.0	73.0	R-6	100% (100%)	FD0				
620.0	74.0							
619.0	75.0							
618.0	76.0							
617.0	77.0							
616.0	78.0							
615.0	79.0							
614.0								
DATE STARTED: 4/12/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Daniel Bansah CHECKED BY: Dan Check				DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES:		
APPROVED BY: Daniel Bansah				DRILLER: T. Growden HELPER(S): J. Bechtel		DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA		

REV 1 Final Boring MW405




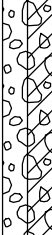










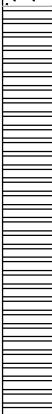

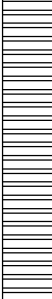
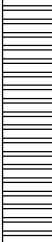
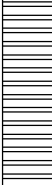
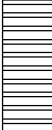
PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 339970.47 ft E. 2404646.35 ft GROUND SURFACE ELEVATION: 693.84 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
613.0	81.0	R-6	100% (100%)	FD0		57.0-87.0 ft SHALE, hard to very hard, fresh, medium dark gray (N4) to dark gray (N3), moderately to thinly bedded, some fossils and pyrite nodules, calcareous (weak reaction to HCL)		
612.0	82.0							
611.0	83.0							
610.0	84.0							
609.0	85.0							
608.0	86.0							
607.0	87.0	R-7	100% (100%)	FD0				
606.0	88.0							
605.0	89.0							
604.0	90.0							
603.0	91.0							
602.0	92.0							
601.0	93.0	R-8	100% (100%)	FD0				
600.0	94.0							
599.0	95.0							
598.0	96.0							
597.0	97.0							
596.0	98.0							
595.0	99.0							
594.0								
DATE STARTED: 4/12/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Daniel Bansah CHECKED BY: Dan Check						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES:
APPROVED BY: Daniel Bansah						DRILLER: T. Growden HELPER(S): J. Bechtel		DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA

REV 1 Final Boring MW405							PROJECT NO. 10-4310	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339970.47 ft E. 2404646.35 ft GROUND SURFACE ELEVATION: 693.84 ft		
						DESCRIPTION		
593.6		R-8		FD0		----		
						Bottom of Boring at 100.40 ft.----		
DATE STARTED: 4/12/10 DATE FINISHED: 4/12/10 FIELD GEOLOGIST: Daniel Bansah CHECKED BY: Dan Check						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES: DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA
APPROVED BY: Daniel Bansah						DRILLER: T. Growden HELPER(S): J. Bechtel		

REV 1 Final Boring MW406

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW(Sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 339710.35 ft E. 2404789.81 ft GROUND SURFACE ELEVATION: 712.51 ft										
DESCRIPTION										
712.0		1.0					0.0-6.0 ft Well graded gravel with clay and sand, (gw-gc), 50% gravel, fine to medium, subangular; 40% sand, fine to medium, subrounded; 10% fines; dark reddish brown (10R 3/4) to moderate brown (5YR 4/4), no odor, wet, no HCl reaction, trace rock fragments	gw-gc	Rainfall previous day topsoil saturated. 0 - 20.0 ft. Destructive drilling, no samples taken, descriptions based on air hammer cuttings.	
711.0		2.0								
710.0		3.0								
709.0		4.0								
708.0		5.0								
707.0		6.0								
706.0		7.0					6.0-13.0 ft Poorly graded gravel with silt and sand, (gp-gm), 60% gravel, fine to coarse, subangular, medium hardness; 30% sand, fine to medium, subrounded; 10% fines; moderate brown (5YR 3/4), no odor, moist, no HCl reaction, trace sandstone fragments	gp-gm		
705.0		8.0								
704.0		9.0								
703.0		10.0								
702.0		11.0								
701.0		12.0								
700.0		13.0					13.0-14.0 ft Poorly graded sand with gravel, (sp), 70% sand, fine to coarse, subrounded; 25% gravel, fine to medium, subrounded; 5% fines; light brown (5YR 6/4) to moderate yellowish brown (10YR 5/4), no odor, dry, no HCl reaction, rock fragments, weathered shale	sp		
699.0		14.0								
698.0		15.0					14.0-20.0 ft SHALE, moderately soft, silt sized particles, brownish black (5YR 2/1) to grayish black (N2), no odor, no reaction to HCl, dry		Changed drilling rig, description continues on following page	
697.0		16.0								
696.0		17.0								
695.0		18.0								
694.0		19.0								
693.0										
DATE STARTED: 4/9/10 DATE FINISHED: 4/9/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Mark Zatezalo							--- Bottom of Boring at 20.00 ft.--- DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.		NOTES:	
APPROVED BY: Daniel Bansah							DRILLER: J. Trish HELPER(S): B. Kuntz		DRILL RIG: T4-W 1250 HAMMER ID: NA	

REV 1 Final Boring MW406

PROJECT NO. 10-4310

						COORDINATES		USCS SYMBOL	REMARKS
						N. 339710.35 ft E. 2404789.81 ft GROUND SURFACE ELEVATION: 712.51 ft			
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION			
692.0	21.0	R-1	98% (58%)	FD5		20.0-65.5 ft SHALE, hard to very hard, moderately weathered, clay sized particles, vuggy, typical diameter: 0.5 in. medium dark gray (N4) to dark gray (N3), very widely fractured, weak reaction to HCl, iron oxide staining, iron oxide staining at 20.0, 21.3, and 24.5 ft along fractures, fossiliferous with crinoids and shells			Continuation of MW406 boring log, see previous page for description for 0-20.0 ft
691.0	22.0					20-21.2 ft R.D. = 0°, closely spaced, moderately open; dry but shows evidence of flow, filling: very thin iron oxide, slightly to intensely weathered, moderately soft; surface: slightly rough, planar, slightly weathered. Fracture set #1, discontinuity # 1.			
690.0	23.0					23-27 ft Joint, R.D. = 65°; filling: iron oxide; surface: moderately rough, planar. Fracture set #3, discontinuity # 2.			
689.0	24.0								
688.0	25.0								
687.0	26.0								
686.0	27.0	R-2	99% (68%)	FD5					Special care sample taken SC-1
685.0	28.0								
684.0	29.0								
683.0	30.0								
682.0	31.0								
681.0	32.0								
680.0	33.0	R-3	89% (56%)	FD5					
679.0	34.0					33-34.5 ft R.D. = 69°, closely spaced; filling: very thin iron oxide, moderately hard; surface: moderately rough, planar, moderately hard. Fracture set #3, discontinuity # 3.			
678.0	35.0								
677.0	36.0	R-4	100% (58%)	FD6					
676.0	37.0								
675.0	38.0								
674.0	39.0								
673.0									
DATE STARTED: 4/13/10 DATE FINISHED: 4/14/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: T. Growden HELPER(S): J. Bechtel		DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA	

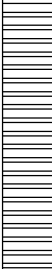

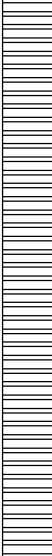

REV 1 Final Boring MW406

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 339710.35 ft E. 2404789.81 ft GROUND SURFACE ELEVATION: 712.51 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
672.0	41.0	R-4	100% (58%)	FD7		20.0-65.5 ft SHALE, hard to very hard, moderately weathered, clay sized particles, vuggy, typical diameter: 0.5 in. medium dark gray (N4) to dark gray (N3), very widely fractured, weak reaction to HCl, iron oxide staining, iron oxide staining at 20.0, 21.3, and 24.5 ft along fractures, fossiliferous with crinoids and shells		
671.0	42.0							
670.0	43.0							
669.0	44.0							
668.0	45.0							
667.0	46.0	R-5	96% (75%)	FD6		47.7-53.7 ft R.D. = 65°, widely to closely spaced, neither ends visible, open; dry but shows evidence of flow, filling: not healed, iron oxide; surface: moderately rough, intensely weathered, moderately soft. Fracture set #3, discontinuity # 4.		
666.0	47.0							
665.0	48.0							
664.0	49.0							
663.0	50.0							
662.0	51.0	R-6	100% (64%)			55.1-56 ft R.D. = 90°; filling: iron oxide; surface: undulating. Fracture set #4, discontinuity # 5.		
661.0	52.0							
660.0	53.0							
659.0	54.0							
658.0	55.0							
657.0	56.0	R-7I	100% (53%)			56.5-56.6 ft Joint, R.D. = 0°, closely spaced, neither ends visible, open; wet with seepage, filling: moderately thick iron oxide, intensely weathered, moderately soft; surface: slightly rough, undulating, intensely weathered, soft. Fracture set #1, discontinuity # 6.		
656.0	57.0							
655.0	58.0							
654.0	59.0							
653.0								
DATE STARTED: 4/13/10 DATE FINISHED: 4/14/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES:
APPROVED BY: Daniel Bansah						DRILLER: T. Growden HELPER(S): J. Bechtel		

REV 1 Final Boring MW406

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS		
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE				
GROUND SURFACE ELEVATION: 712.51 ft						DESCRIPTION			
652.0		R-7I	100% (53%)	FD6		20.0-65.5 ft SHALE, hard to very hard, moderately weathered, clay sized particles, vuggy, typical diameter: 0.5 in. medium dark gray (N4) to dark gray (N3), very widely fractured, weak reaction to HCl, iron oxide staining, iron oxide staining at 20.0, 21.3, and 24.5 ft along fractures, fossiliferous with crinoids and shells	Widely spaced healed fractures with calcite filling		
651.0	61.0								
650.0	62.0								
649.0	63.0								
648.0	64.0								
647.0	65.0	R-8	100% (65%)	FD5		65.5-95.0 ft SHALE, very hard, slightly to intensely weathered, clay sized particles, dark gray (N3) to medium dark gray (N4), R.D. = 45° to 60°, widely fractured			
646.0	66.0								
645.0	67.0								
644.0	68.0								
643.0	69.0								
642.0	70.0	R-9	100% (75%)	FD4					
641.0	71.0								
640.0	72.0								
639.0	73.0								
638.0	74.0								
637.0	75.0	R-10	100% (72%)						
636.0	76.0								
635.0	77.0								
634.0	78.0								
633.0	79.0								
DATE STARTED: 4/13/10 DATE FINISHED: 4/14/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.			
APPROVED BY: Daniel Bansah						DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA			
DRILLER: T. Growden HELPER(S): J. Bechtel									

REV 1 Final Boring MW406

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339710.35 ft E. 2404789.81 ft GROUND SURFACE ELEVATION: 712.51 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
632.0	81.0	R-10	100% (72%)	FD4		65.5-95.0 ft SHALE, very hard, slightly to intensely weathered, clay sized particles, dark gray (N3) to medium dark gray (N4), R.D. = 45° to 60°, widely fractured	
631.0	82.0	R-11	100% (96%)				
630.0	83.0						
629.0	84.0						
628.0	85.0						
627.0	86.0	R-12	98% (90%)	FD2			
626.0	87.0						
625.0	88.0						
624.0	89.0						
623.0	90.0						
622.0	91.0						
621.0	92.0						
620.0	93.0						
619.0	94.0	R-13	100% (54%)	FD6			
618.0	95.0						
617.0	96.0						
616.0	97.0						
615.0	98.0						
614.0	99.0						
613.0							
DATE STARTED: 4/13/10 DATE FINISHED: 4/14/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES:
APPROVED BY: Daniel Bansah						DRILLER: T. Growden HELPER(S): J. Bechtel	DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA

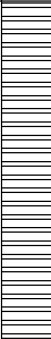
REV 1 Final Boring MW406

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339710.35 ft E. 2404789.81 ft GROUND SURFACE ELEVATION: 712.51 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
612.0		R-13	100% (54%)	FD6		95.0-103.0 ft SHALE, moderately weathered, clay sized particles, vuggy, typical diameter: 0.25 in. dark gray (N3) to medium dark gray (N4), R.D. = 0° to 60°, closely fractured, wet, several fractures filled with quartz as much as 0.5 inch thick, rock is broken and has thin quartz veins	
101.0							
611.0							
102.0							
610.0							
103.0		R-14	100% (98%)	FD1		103.0-125.0 ft SHALE, very hard, clay sized particles, dark gray (N3) to medium dark gray (N4), R.D. = 0°, rock is intact-to slightly broken	
609.0							
104.0							
608.0							
105.0							
607.0		R-15	100% (98%)				
106.0							
606.0							
107.0							
605.0							
108.0		R-16	100% (98%)				
604.0							
109.0							
603.0							
110.0							
602.0		R-17	100% (98%)				
111.0							
601.0							
112.0							
600.0							
113.0		R-18	100% (98%)				
599.0							
114.0							
598.0							
115.0							
597.0		R-19	100% (98%)				
116.0							
596.0							
117.0							
595.0							
118.0		R-20	100% (98%)				
594.0							
119.0							
593.0							
DATE STARTED: 4/13/10 DATE FINISHED: 4/14/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo					DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES:
APPROVED BY: Daniel Bansah					DRILLER: T. Growden HELPER(S): J. Bechtel		

REV 1 Final Boring MW406

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ftin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 712.51 ft							
DESCRIPTION							
592.0 121.0 591.0 122.0 590.0 123.0 589.0 124.0 588.0 125.0		R-15	100% (98%)	FD1		103.0-125.0 ft SHALE, very hard, clay sized particles, dark gray (N3) to medium dark gray (N4), R.D. = 0°, rock is intact-to slightly broken	
---- Bottom of Boring at 125.00 ft.----							
DATE STARTED: 4/13/10 DATE FINISHED: 4/14/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo				DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES:	
APPROVED BY: Daniel Bansah				DRILLER: T. Growden HELPER(S): J. Bechtel		DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA	

REV 1 Final Boring MW407

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS		
						N. 339784.93 ft	E. 2405144.25 ft				
						GROUND SURFACE ELEVATION: 734.76 ft					
						DESCRIPTION					
734.0	1.0					0.0-11.0 ft Well graded sand with clay and gravel, (sw-sc), 65% sand, fine to medium, subrounded; 25% gravel, fine to medium, subangular; 10% fines; moderate brown (5YR 4/4), no odor, moist, no HCl reaction		sw-sc	0 - 41.0 ft. Destructive drilling, no samples taken, descriptions based on air hammer cuttings.		
733.0	2.0										
732.0	3.0										
731.0	4.0										
730.0	5.0										
729.0	6.0										
728.0	7.0										
727.0	8.0										
726.0	9.0										
725.0	10.0										
724.0	11.0										
723.0	12.0					11.0-14.0 ft Poorly graded sand with silt and gravel, (sp-sm), 55% sand, fine to coarse, subrounded; 35% gravel, fine to coarse, subangular; 10% fines; moderate brown (5YR 3/4), no odor, moist, no HCl reaction		sp-sm			
722.0	13.0										
721.0	14.0					14.0-15.0 ft Poorly graded gravel with clay and sand, (gp-gc), 50% gravel, fine, subrounded; 40% sand, fine to medium, subrounded; 10% fines; pale brown (5YR 5/2), no odor, moist, no HCl reaction		gp-gc			
720.0	15.0					15.0-18.0 ft SHALE, soft, silt sized particles, dusky brown (5YR 2/2), no odor, no reaction to HCl, dry					
719.0	16.0										
718.0	17.0										
717.0	18.0					18.0-22.0 ft SHALE, dusky yellow (5Y 6/4), no odor, no reaction to HCl, dry, weathered shale					
716.0	19.0										
715.0											
DATE STARTED: 4/9/10 DATE FINISHED: 4/9/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check						DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.				NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: J. Trish HELPER(S): B. Kuntz				DRILL RIG: T4-W 1250 HAMMER ID: NA	

REV 1 Final Boring MW407

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339784.93 ft E. 2405144.25 ft							
GROUND SURFACE ELEVATION: 734.76 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
714.0	21.0					18.0-22.0 ft SHALE, dusky yellow (5Y 6/4), no odor, no reaction to HCl, dry, weathered shale	
713.0	22.0					22.0-37.0 ft SHALE, light olive brown (5Y 5/6) and grayish black (N2), no odor, no reaction to HCl, dry, mix of weathered and competent rock	
712.0	23.0						
711.0	24.0						
710.0	25.0						
709.0	26.0						
708.0	27.0						
707.0	28.0						
706.0	29.0						
705.0	30.0						
704.0	31.0						
703.0	32.0						
702.0	33.0						
701.0	34.0						
700.0	35.0						
699.0	36.0						
698.0	37.0					37.0-41.0 ft SHALE, moderately soft, grayish black (N2), no odor, no reaction to HCl, dry, pulverized	
697.0	38.0						
696.0	39.0						
695.0							
DATE STARTED: 4/9/10 DATE FINISHED: 4/9/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check					DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.		NOTES:
APPROVED BY: Daniel Bansah					DRILLER: J. Trish HELPER(S): B. Kuntz		DRILL RIG: T4-W 1250 HAMMER ID: NA

REV 1 Final Boring MW407

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						GROUND SURFACE ELEVATION: 734.76 ft		
						DESCRIPTION		
694.0	41.0					37.0-41.0 ft SHALE, moderately soft, grayish black (N2), no odor, no reaction to HCl, dry, pulverized		Changed drilling rig, description continues on following page
						---- Bottom of Boring at 41.00 ft.----		
DATE STARTED: 4/9/10 DATE FINISHED: 4/9/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check						DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.	NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: J. Trish HELPER(S): B. Kuntz	DRILL RIG: T4-W 1250 HAMMER ID: NA	

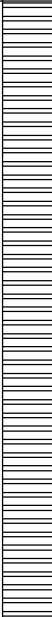
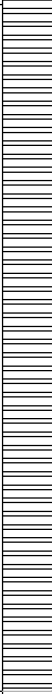
REV 1 Final Boring MW407

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 734.76 ft						DESCRIPTION	
694.0	41.0	R-1	94% (94%)	FD2		41.0-59.0 ft SHALE, moderately hard, fresh to slightly weathered, medium dark gray (N4), very weak HCl reaction, trace fossils	Continuation of MW407 boring log, see previous pages for description for 0-41.0 ft
693.0	42.0						
692.0	43.0						
691.0	44.0						
690.0	45.0						
689.0	46.0						
688.0	47.0						
687.0	48.0						
686.0	49.0						
685.0	50.0						
684.0	51.0	R-2	100% (100%)	FD1		46.3-46.4 ft Joint, R.D. = 45°; surface: slightly rough, planar; iron oxide staining. Fracture set #2, discontinuity # 1. 47.1-47.2 ft Joint, R.D. = 65°; surface: slightly rough, planar; slight iron oxide staining, fracture only extends partially through core. Fracture set #3, discontinuity # 2.	
683.0	52.0						
682.0	53.0						
681.0	54.0						
680.0	55.0						
679.0	56.0						
678.0	57.0						
677.0	58.0						
676.0	59.0						
675.0							R-3
DATE STARTED: 4/13/10 DATE FINISHED: 4/14/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check					DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES:
APPROVED BY: Daniel Bansah					DRILLER: J. Malecki HELPER(S): F. Smith		DRILL RIG: CME-75 HAMMER ID: NA

REV 1 Final Boring MW407

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES N. 339784.93 ft E. 2405144.25 ft GROUND SURFACE ELEVATION: 734.76 ft		USCS SYMBOL	REMARKS
		DESCRIPTION								
674.0	61.0	R-3	100% (100%)	FD1		<p>59.0-79.0 ft SHALE, moderately hard, fresh, medium dark gray (N4), no reaction to HCl, fossils scattered throughout length of core, trace pyrite</p> <p>63.4-63.6 ft Joint, R.D. = 45°; surface: smooth, planar; two fractures spaced approximately 0.1 ft apart, slight iron oxide staining. Fracture set #2, discontinuity # 3.</p> <p>71- ft Fracture zone, R.D. = 0-20°; surface: moderately rough, planar; weathered zone with slight iron oxide staining and abundant fossils in vicinity, vugs present near and within zone. Fracture set #1, discontinuity # 4.</p>				
673.0	62.0									
672.0	63.0									
671.0	64.0									
670.0	65.0									
669.0	66.0									
668.0	67.0									
667.0	68.0									
666.0	69.0									
665.0	70.0									
664.0	71.0	R-4	99% (99%)	FD1						
663.0	72.0									
662.0	73.0									
661.0	74.0									
660.0	75.0									
659.0	76.0									
658.0	77.0									
657.0	78.0									
656.0	79.0									
655.0										
DATE STARTED: 4/13/10 DATE FINISHED: 4/14/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.			NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: J. Malecki HELPER(S): F. Smith			DRILL RIG: CME-75 HAMMER ID: NA	

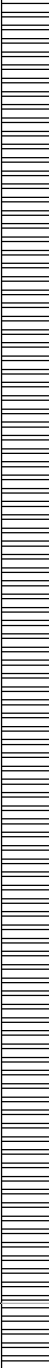
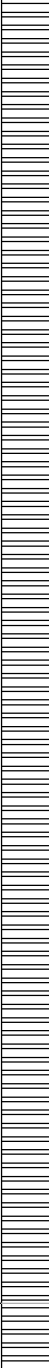
REV 1 Final Boring MW407

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339784.93 ft E. 2405144.25 ft GROUND SURFACE ELEVATION: 734.76 ft		
						DESCRIPTION		
654.0	81.0	R-6				79.0-99.0 ft SHALE, moderately hard, fresh to slightly weathered, medium dark gray (N4), no reaction to HCl, fossils and pyrite throughout length of core		
653.0	82.0							
652.0	83.0							
651.0	84.0							
650.0	85.0	R-6	100% (98%)					
649.0	86.0							
648.0	87.0							
647.0	88.0					87.3- ft Joint, R.D. = 10°; surface: moderately rough, planar; weathered zone, vugs present in the vicinity of the fracture, slight iron oxide staining, large shell fossil (approx. 0.1 ft diameter), smaller fossils present. Fracture set #1, discontinuity # 5.		
646.0	89.0					87.4-87.7 ft Joint, R.D. = 70°; surface: moderately rough, planar; heavy iron oxide staining, vugs present in and around fracture. Fracture set #3, discontinuity # 6.		
645.0	90.0			FD4		88.1-88.2 ft Joint, R.D. = 45°; surface: moderately rough, planar; light iron oxide staining, vugs present in and around fracture, large and small shell fragments present. Fracture set #2, discontinuity # 7.		
644.0	91.0							
643.0	92.0							
642.0	93.0							
641.0	94.0	R-7	100% (85%)					
640.0	95.0					94.2-94.4 ft Fracture zone; broken up/various fracture angles, slight iron oxide staining. discontinuity # 8.		
639.0	96.0					94.5-94.6 ft Joint, R.D. = 45°; iron oxide staining. Fracture set #2, discontinuity # 9.		
638.0	97.0							
637.0	98.0					97.4-97.6 ft Joint, R.D. = 45°; iron oxide staining. Fracture set #2, discontinuity # 10.		
636.0	99.0					98.2-98.3 ft Joint, R.D. = 60°; moderate iron oxide staining. Fracture set #3, discontinuity # 11.		
635.0		R-8	98% (94%)	FD5		98.8-99 ft Fracture zone; various fracture angles, heavy iron oxide staining, small amount of quartz infilling. discontinuity # 12.		
DATE STARTED: 4/13/10 DATE FINISHED: 4/14/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: J. Malecki HELPER(S): F. Smith	DRILL RIG: CME-75 HAMMER ID: NA	

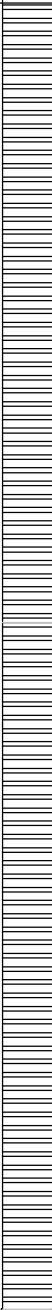
REV 1 Final Boring MW407

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
N. 339784.93 ft E. 2405144.25 ft GROUND SURFACE ELEVATION: 734.76 ft										
							DESCRIPTION			
634.0	101.0	R-8	98% (94%)		FD5		99-107 ft Joint, R.D. = 85°; filling: partly healed, quartz; surface: rough, planar; heavy iron oxide staining, fractures vary from quartz infilling to completely healed by quartz, variable fracture width from very thin to up to 0.05 feet. Fracture set #4, discontinuity # 13.			
633.0	102.0						99.0-119.0 ft SHALE, moderately hard to hard, fresh to slightly weathered, medium dark gray (N4), no reaction to HCl, quartz healed fractures make up a significant portion of the core from 116.0 to 119.0 feet bgs, broken up rock fragments mixed with quartz from 116.0 to 119.0 ft bgs, weathered dark gray clayey zone from 116.4 to 116.6 ft bgs			
632.0	103.0						103.3- ft Joint, R.D. = 5°; surface: slightly rough, planar; iron oxide staining. Fracture set #1, discontinuity # 14.			
631.0	104.0						104- ft Joint, R.D. = 5°; surface: slightly rough, planar; iron oxide staining. Fracture set #1, discontinuity # 15.			
630.0	105.0									
629.0	106.0						105.4-105.6 ft Joint, R.D. = 60°; filling: partly healed, very thin quartz. Fracture set #3, discontinuity # 16.			
628.0	107.0						105.5-107.8 ft Joint; filling: partly healed, quartz; surface: rough, planar; fracture angle orientation varies between near vertical and approximately 45°, fractures vary from partially to completely healed, iron oxide staining, small amount of clay infilling. discontinuity # 17.			
627.0	108.0									
626.0	109.0						108.6-110.6 ft Joint, R.D. = 85°; varies from tight to moderately open, visible iron oxide staining. Fracture set #4, discontinuity # 18.			
625.0	110.0						108.8- ft Joint, R.D. = 5°; surface: slightly rough, planar; iron oxide staining. Fracture set #1, discontinuity # 19.			
624.0	111.0	R-9	99% (90%)		FD5		109.8- ft Joint, R.D. = 5°; slight iron oxide staining. Fracture set #1, discontinuity # 20.			
623.0	112.0									
622.0	113.0						112.2-112.5 ft Joint, R.D. = 70°, moderately open; Fracture set #3, discontinuity # 21.			
621.0	114.0						112.4-112.5 ft Joint, R.D. = 45°; surface: slightly rough, undulating; small amount of quartz infilling. Fracture set #2, discontinuity # 22.			
620.0	115.0						112.5-112.7 ft Joint, R.D. = 60°; surface: slightly rough, undulating; small amount of quartz infilling. Fracture set #3, discontinuity # 23.			
619.0	116.0									
618.0	117.0						115.9-116 ft Joint, R.D. = 35°; surface: slightly rough, undulating. Fracture set #2, discontinuity # 24.			
617.0	118.0						116-116.2 ft Joint, R.D. = 45°; filling: totally healed, very thin quartz. Fracture set #2, discontinuity # 25.			
616.0	119.0						116.5-123.2 ft Fracture zone; filling: totally healed, quartz; heavy quartz infilling in zone, infilling thickness varies from thin to greater than 0.1 ft. discontinuity # 27.			
615.0							R-10			96% (96%)
DATE STARTED: 4/13/10 DATE FINISHED: 4/14/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check							DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES:		
APPROVED BY: Daniel Bansah							DRILLER: J. Malecki HELPER(S): F. Smith	DRILL RIG: CME-75 HAMMER ID: NA		

REV 1 Final Boring MW407

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS						
N. 339784.93 ft E. 2405144.25 ft GROUND SURFACE ELEVATION: 734.76 ft													
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION							
614.0	121.0	R-10	96% (96%)	FD1		119.0-129.0 ft SHALE, moderately hard to hard, fresh, medium dark gray (N4) to white (N9), no reaction to HCl, significant quartz infilling from 119.0 to 124.0 ft bgs, trace fossils throughout section							
613.0	122.0												
612.0	123.0												
611.0	124.0												
610.0	125.0												
609.0	126.0	R-11	92% (89%)			125.3-125.4 ft Joint, R.D. = 20°; filling: totally healed, moderately thin quartz. Fracture set #1, discontinuity # 28.							
608.0	127.0												
607.0	128.0					127.9-128.1 ft Joint, R.D. = 55°; surface: smooth, planar; trace quartz and pyrite infilling. Fracture set #3, discontinuity # 29.							
606.0	129.0												
605.0	130.0					129.0-139.0 ft SHALE, moderately hard, fresh, medium dark gray (N4), no reaction to HCl, trace of fossils and pyrite nodules throughout core section, large pyrite nodule (0.1 x 0.05 ft) noted at 132.3 feet bgs							
604.0	131.0												
603.0	132.0												
602.0	133.0												
601.0	134.0												
600.0	135.0												
599.0	136.0					135.6-137 ft Joint, R.D. = 80°; filling: totally healed, moderately thin quartz; three parallel fractures, approximately 0.05 ft apart. Fracture set #4, discontinuity # 30.							
598.0	137.0												
597.0	138.0												
596.0	139.0												
---- Bottom of Boring at 139.00 ft.----													
DATE STARTED: 4/13/10 DATE FINISHED: 4/14/10 FIELD GEOLOGIST: Dan Check CHECKED BY: Dan Check						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.			NOTES: DRILL RIG: CME-75 HAMMER ID: NA				
APPROVED BY: Daniel Bansah					DRILLER: J. Malecki HELPER(S): F. Smith								

REV 1 Final Boring MW408

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE		
GROUND SURFACE ELEVATION: 767.00 ft						SC	0 - 238.0 ft. Destructive drilling, no samples taken, descriptions based on air hammer cuttings.
DESCRIPTION							
766.0	1.0					0.0-5.0 ft Clayey sand with gravel, (sc), 60% sand, fine to coarse, subrounded; 25% gravel, fine to coarse, flat; 15% fines; dark yellowish brown (10YR 4/2), dry, no HCl reaction, some rock fragments	SC
765.0	2.0						
764.0	3.0						
763.0	4.0						
762.0	5.0						
761.0	6.0					5.0-11.0 ft Well graded sand with clay and gravel, (sw-sc), 70% sand, medium, subrounded; 20% gravel, fine to medium, subrounded, elongated; 10% fines; dark yellowish brown (10YR 4/2) to moderate brown (5YR 3/4), no odor, moist, no HCl reaction, trace organics	SW-SC
760.0	7.0						
759.0	8.0						
758.0	9.0						
757.0	10.0						
756.0	11.0					11.0-30.0 ft SHALE, soft, silt to fine sand sized particles, moderate yellowish brown (10YR 5/4), no odor, no reaction to HCl, dry, weathered	
755.0	12.0						
754.0	13.0						
753.0	14.0						
752.0	15.0						
751.0	16.0						
750.0	17.0						
749.0	18.0						
748.0	19.0						
DATE STARTED: 4/10/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check				DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.		NOTES:	
APPROVED BY: Daniel Bansah				DRILLER: J. Trish HELPER(S): B. Kuntz		DRILL RIG: T4-W 1250 HAMMER ID: NA	

REV 1 Final Boring MW408

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 340342.30 ft E. 2405819.88 ft							
GROUND SURFACE ELEVATION: 767.00 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
746.0	21.0					11.0-30.0 ft SHALE, soft, silt to fine sand sized particles, moderate yellowish brown (10YR 5/4), no odor, no reaction to HCl, dry, weathered	
745.0	22.0						
744.0	23.0						
743.0	24.0						
742.0	25.0						
741.0	26.0						
740.0	27.0						
739.0	28.0						
738.0	29.0						
737.0	30.0					30.0-44.0 ft SHALE, soft, slightly weathered, dark greenish gray (5GY 4/1), no odor, no reaction to HCl, dry	
736.0	31.0						
735.0	32.0						
734.0	33.0						
733.0	34.0						
732.0	35.0						
731.0	36.0						
730.0	37.0						
729.0	38.0						
728.0	39.0						
DATE STARTED: 4/10/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check						DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.	
APPROVED BY: Daniel Bansah						DRILLER: J. Trish HELPER(S): B. Kuntz	
						NOTES:	
						DRILL RIG: T4-W 1250 HAMMER ID: NA	

REV 1 Final Boring MW408

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 340342.30 ft E. 2405819.88 ft GROUND SURFACE ELEVATION: 767.00 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
726.0	41.0					30.0-44.0 ft SHALE, soft, slightly weathered, dark greenish gray (5GY 4/1), no odor, no reaction to HCl, dry	
725.0	42.0						
724.0	43.0						
723.0	44.0					44.0-53.0 ft SHALE, soft, dark yellowish brown (10YR 4/2), no odor, no reaction to HCl, dry, weathered	
722.0	45.0						
721.0	46.0						
720.0	47.0						
719.0	48.0						
718.0	49.0						
717.0	50.0						
716.0	51.0						
715.0	52.0						
714.0	53.0					53.0-73.0 ft SHALE, moderately soft, medium dark gray (N4), no odor, no reaction to HCl, dry	
713.0	54.0						
712.0	55.0						
711.0	56.0						
710.0	57.0						
709.0	58.0						
708.0	59.0						
DATE STARTED: 4/10/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check				DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.			NOTES:
APPROVED BY: Daniel Bansah				DRILLER: J. Trish HELPER(S): B. Kuntz			DRILL RIG: T4-W 1250 HAMMER ID: NA

REV 1 Final Boring MW408

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS		
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE				
GROUND SURFACE ELEVATION: 767.00 ft						DESCRIPTION			
DESCRIPTION									
706.0	61.0					53.0-73.0 ft SHALE, moderately soft, medium dark gray (N4), no odor, no reaction to HCl, dry	Driller remarks that zone is fractured, no change in cuttings		
705.0	62.0								
704.0	63.0								
703.0	64.0								
702.0	65.0								
701.0	66.0								
700.0	67.0								
699.0	68.0								
698.0	69.0								
697.0	70.0								
696.0	71.0								
695.0	72.0								
694.0	73.0								
693.0	74.0								
692.0	75.0								
691.0	76.0								
690.0	77.0								
689.0	78.0								
688.0	79.0								
73.0-98.0 ft SHALE, moderately soft, medium dark gray (N4), no odor, no reaction to HCl, dry									
DATE STARTED: 4/10/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check				DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.				NOTES:	
APPROVED BY: Daniel Bansah				DRILLER: J. Trish HELPER(S): B. Kuntz		DRILL RIG: T4-W 1250 HAMMER ID: NA			

REV 1 Final Boring MW408							PROJECT NO. 10-4310	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340342.30 ft E. 2405819.88 ft GROUND SURFACE ELEVATION: 767.00 ft		
						DESCRIPTION		
686.0	81.0					73.0-98.0 ft SHALE, moderately soft, medium dark gray (N4), no odor, no reaction to HCl, dry		
685.0	82.0							
684.0	83.0							
683.0	84.0							
682.0	85.0							
681.0	86.0							
680.0	87.0							
679.0	88.0							
678.0	89.0							
677.0	90.0							
676.0	91.0							
675.0	92.0							
674.0	93.0							
673.0	94.0							
672.0	95.0							
671.0	96.0							
670.0	97.0							
669.0	98.0					98.0-123.0 ft SHALE, moderately soft, medium dark gray (N4) to dark gray (N3), no odor, no reaction to HCl, dry		
668.0	99.0							
DATE STARTED: 4/10/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check						DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.		NOTES: DRILL RIG: T4-W 1250 HAMMER ID: NA
APPROVED BY: Daniel Bansah						DRILLER: J. Trish HELPER(S): B. Kuntz		

REV 1 Final Boring MW408

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS		
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			N. 340342.30 ft E. 2405819.88 ft GROUND SURFACE ELEVATION: 767.00 ft	
DESCRIPTION									
666.0	101.0					98.0-123.0 ft SHALE, moderately soft, medium dark gray (N4) to dark gray (N3), no odor, no reaction to HCl, dry			
665.0	102.0								
664.0	103.0								
663.0	104.0								
662.0	105.0								
661.0	106.0								
660.0	107.0								
659.0	108.0								
658.0	109.0								
657.0	110.0								
656.0	111.0								
655.0	112.0								
654.0	113.0								
653.0	114.0								
652.0	115.0								
651.0	116.0								
650.0	117.0								
649.0	118.0								
648.0	119.0								
DATE STARTED: 4/10/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check				DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.			NOTES: DRILL RIG: T4-W 1250 HAMMER ID: NA		
APPROVED BY: Daniel Bansah				DRILLER: J. Trish HELPER(S): B. Kuntz					

REV 1 Final Boring MW408

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
N. 340342.30 ft E. 2405819.88 ft GROUND SURFACE ELEVATION: 767.00 ft								
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION		
646.0	121.0					98.0-123.0 ft SHALE, moderately soft, medium dark gray (N4) to dark gray (N3), no odor, no reaction to HCl, dry	Small amount of water encountered, flow approximated at 1 gallon per minute	
645.0	122.0							
644.0	123.0							
643.0	124.0					123.0-148.0 ft SHALE, moderately soft, medium dark gray (N4) to dark gray (N3), no odor, no reaction to HCl, dry		
642.0	125.0							
641.0	126.0							
640.0	127.0							
639.0	128.0							
638.0	129.0							
637.0	130.0							
636.0	131.0							
635.0	132.0							
634.0	133.0							
633.0	134.0							
632.0	135.0							
631.0	136.0							
630.0	137.0							
629.0	138.0							
628.0	139.0							
DATE STARTED: 4/10/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check						DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.		NOTES:
APPROVED BY: Daniel Bansah						DRILLER: J. Trish HELPER(S): B. Kuntz		DRILL RIG: T4-W 1250 HAMMER ID: NA

REV 1 Final Boring MW408

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS	
N. 340342.30 ft E. 2405819.88 ft											
GROUND SURFACE ELEVATION: 767.00 ft		DESCRIPTION									
626.0 141.0		123.0-148.0 ft SHALE, moderately soft, medium dark gray (N4) to dark gray (N3), no odor, no reaction to HCl, dry									
625.0 142.0											
624.0 143.0											
623.0 144.0											
622.0 145.0											
621.0 146.0											
620.0 147.0											
619.0 148.0											
618.0 149.0											
617.0 150.0											
616.0 151.0		148.0-173.0 ft SHALE, moderately soft, medium dark gray (N4) to dark gray (N3), no odor, no reaction to HCl, dry									
615.0 152.0											
614.0 153.0											
613.0 154.0											
612.0 155.0											
611.0 156.0											
610.0 157.0											
609.0 158.0											
608.0 159.0											
DATE STARTED: 4/10/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check						DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.				NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: J. Trish HELPER(S): B. Kuntz				DRILL RIG: T4-W 1250 HAMMER ID: NA	

REV 1 Final Boring MW408

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 340342.30 ft E. 2405819.88 ft GROUND SURFACE ELEVATION: 767.00 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
606.0	161.0					148.0-173.0 ft SHALE, moderately soft, medium dark gray (N4) to dark gray (N3), no odor, no reaction to HCl, dry	
605.0	162.0						
604.0	163.0						
603.0	164.0						
602.0	165.0						
601.0	166.0						
600.0	167.0						
599.0	168.0						
598.0	169.0						
597.0	170.0						
596.0	171.0						
595.0	172.0						
594.0	173.0					173.0-198.0 ft SHALE, moderately soft, medium dark gray (N4) to dark gray (N3), no odor, no reaction to HCl, dry	
593.0	174.0						
592.0	175.0						
591.0	176.0						
590.0	177.0						
589.0	178.0						
588.0	179.0						
DATE STARTED: 4/10/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check						DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.	NOTES:
APPROVED BY: Daniel Bansah						DRILLER: J. Trish HELPER(S): B. Kuntz	DRILL RIG: T4-W 1250 HAMMER ID: NA

REV 1 Final Boring MW408

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340342.30 ft E. 2405819.88 ft GROUND SURFACE ELEVATION: 767.00 ft		
						DESCRIPTION		
586.0	181.0					173.0-198.0 ft SHALE, moderately soft, medium dark gray (N4) to dark gray (N3), no odor, no reaction to HCl, dry		
585.0	182.0							
584.0	183.0							
583.0	184.0							
582.0	185.0							
581.0	186.0							
580.0	187.0							
579.0	188.0							
578.0	189.0							
577.0	190.0							
576.0	191.0							
575.0	192.0							
574.0	193.0							
573.0	194.0							
572.0	195.0							
571.0	196.0							
570.0	197.0							
569.0	198.0					198.0-216.0 ft SHALE, moderately soft, dark gray (N3), no odor, no reaction to HCl, dry		
568.0	199.0							
DATE STARTED: 4/10/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check						DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.	NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: J. Trish HELPER(S): B. Kuntz	DRILL RIG: T4-W 1250 HAMMER ID: NA	

REV 1 Final Boring MW408

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
GROUND SURFACE ELEVATION: 767.00 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ftin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
566.0	201.0					198.0-216.0 ft SHALE, moderately soft, dark gray (N3), no odor, no reaction to HCl, dry	
565.0	202.0						
564.0	203.0						
563.0	204.0						
562.0	205.0						
561.0	206.0						
560.0	207.0						
559.0	208.0						
558.0	209.0						
557.0	210.0						
556.0	211.0						
555.0	212.0						
554.0	213.0						
553.0	214.0						
552.0	215.0						
551.0	216.0					216.0-238.0 ft SHALE, moderately soft, dark gray (N3), no odor, no reaction to HCl, dry	
550.0	217.0						
549.0	218.0						
548.0	219.0						
DATE STARTED: 4/10/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check				DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.			NOTES:
APPROVED BY: Daniel Bansah				DRILLER: J. Trish HELPER(S): B. Kuntz			DRILL RIG: T4-W 1250 HAMMER ID: NA



REV 1 Final Boring MW408

PROJECT NO. 10-4310

COORDINATES N. 340342.30 ft E. 2405819.88 ft GROUND SURFACE ELEVATION: 767.00 ft						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			DESCRIPTION
546.0	221.0					216.0-238.0 ft SHALE, moderately soft, dark gray (N3), no odor, no reaction to HCl, dry		
545.0	222.0							
544.0	223.0							
543.0	224.0							
542.0	225.0							
541.0	226.0							
540.0	227.0							
539.0	228.0							
538.0	229.0							
537.0	230.0							
536.0	231.0							
535.0	232.0							
534.0	233.0							
533.0	234.0							
532.0	235.0							
531.0	236.0							
530.0	237.0							
529.0	238.0							
DATE STARTED: 4/10/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check						DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.		NOTES:
APPROVED BY: Daniel Bansah						DRILLER: J. Trish HELPER(S): B. Kuntz		DRILL RIG: T4-W 1250 HAMMER ID: NA

REV 1 Final Boring MW409

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/sin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339760.65 ft E. 2405905.35 ft GROUND SURFACE ELEVATION: 720.79 ft DESCRIPTION		
720.0	1.0					0.0-1.0 ft Topsoil		0 - 7.5 ft. Destructive drilling, no samples taken, descriptions based on air hammer cuttings.
719.0	2.0					1.0-7.5 ft SHALE, moderately soft, dark gray (N3), no odor, weak reaction to HCl, dry, powdered cuttings had a weak reaction to 1N HCl		
718.0	3.0							Changed drilling rig, description continues on following page
717.0	4.0							
716.0	5.0							
715.0	6.0							
714.0	7.0					---- Bottom of Boring at 7.50 ft.----		
DATE STARTED: 4/9/10 DATE FINISHED: 4/9/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Mark Zatezalo						DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.	NOTES: 	
APPROVED BY:						DRILLER: J. Trish HELPER(S): B. Kuntz	DRILL RIG: T4-W 1250 HAMMER ID: NA	

REV 1 Final Boring MW409

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS	
GROUND SURFACE ELEVATION: 720.79 ft											
							DESCRIPTION				
720.0	1.0									Continuation of MW407 boring log, see previous page for description for 0-7.5 ft	
719.0	2.0										
718.0	3.0										
717.0	4.0										
716.0	5.0										
715.0	6.0										
714.0	7.0										
713.0	8.0	R-1	75% (0%)				7.5-32.0 ft SHALE, moderately hard to hard, very intensely weathered, medium dark gray (N4), R.D. = 0° to 65°, very closely fractured, weak reaction to HCl, dry, iron oxide staining, calcareous				
712.0	9.0										
711.0	10.0	R-2	91% (0%)								
710.0	11.0										
709.0	12.0										
708.0	13.0										
707.0	14.0	R-3	95% (0%)	FD6							
706.0	15.0										
705.0	16.0										
704.0	17.0	R-4	100% (0%)								
703.0	18.0										
702.0	19.0	R-5	100% (25%)								
701.0											
DATE STARTED: 4/14/10 DATE FINISHED: 4/21/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo							DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES: water used to drill		
APPROVED BY:							DRILLER: T. Growden HELPER(S): J. Bechtel		DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA		

REV 1 Final Boring MW409

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 720.79 ft						DESCRIPTION		
700.0	21.0	R-5	100% (25%)	FD6				7.5-32.0 ft SHALE, moderately hard to hard, very intensely weathered, medium dark gray (N4), R.D. = 0° to 65°, very closely fractured, weak reaction to HCl, dry, iron oxide staining, calcareous
699.0	22.0							
698.0	23.0							
697.0	24.0	R-6	89% (23%)					
696.0	25.0			FD6				
695.0	26.0	R-7	100% (0%)					
694.0	27.0							
693.0	28.0							
692.0	29.0	R-8	98% (51%)	FD1				
691.0	30.0							
690.0	31.0							
689.0	32.0							
688.0	33.0			FD1				
687.0	34.0	R-9	100% (98%)					
686.0	35.0							
685.0	36.0							
684.0	37.0			FD1				
683.0	38.0	R-10	100% (62%)					
682.0	39.0							
681.0								
DATE STARTED: 4/14/10 DATE FINISHED: 4/21/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES: water used to drill
APPROVED BY:						DRILLER: T. Growden HELPER(S): J. Bechtel		DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA

REV 1 Final Boring MW409

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS									
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE											
GROUND SURFACE ELEVATION: 720.79 ft						DESCRIPTION										
DESCRIPTION																
680.0	41.0	R-10	100% (62%)			32.0-75.5 ft SHALE, calcareous, very hard, fresh to slightly weathered, clay sized particles, dark gray (N3) to medium dark gray (N4), R.D. = 0° to 75°, very widely fractured, weak reaction to HCl, fossiliferous		some fractures are near vertical, drilling is difficult								
679.0	42.0															
678.0	43.0															
677.0	44.0															
676.0	45.0	R-11	90% (67%)	FD1												
675.0	46.0															
674.0	47.0															
673.0	48.0															
672.0	49.0	R-12	100% (91%)													
671.0	50.0															
670.0	51.0															
669.0	52.0															
668.0	53.0	R-13	99% (76%)	FD1												
667.0	54.0															
666.0	55.0															
665.0	56.0															
664.0	57.0								DATE STARTED: 4/14/10 DATE FINISHED: 4/21/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo		DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES: water used to drill			
663.0	58.0															
662.0	59.0															
661.0																
APPROVED BY:						DRILLER: T. Growden HELPER(S): J. Bechtel		DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA								

REV 1 Final Boring MW409

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 720.79 ft						DESCRIPTION		
660.0	61.0	R-13	99% (76%)			32.0-75.5 ft SHALE, calcareous, very hard, fresh to slightly weathered, clay sized particles, dark gray (N3) to medium dark gray (N4), R.D. = 0° to 75°, very widely fractured, weak reaction to HCl, fossiliferous		
659.0	62.0							
658.0	63.0							
657.0	64.0	R-14	71% (67%)					
656.0	65.0							
655.0	66.0							
654.0	67.0	R-15	100% (100%)	FD1				
653.0	68.0							
652.0	69.0							
651.0	70.0	R-16	83% (82%)					
650.0	71.0							
649.0	72.0							
648.0	73.0	R-17						
647.0	74.0							
646.0	75.0							
645.0	76.0	R-18		FD5		75.5-97.0 ft SHALE, very hard, fresh to slightly weathered, clay sized particles, grayish black (N2) to dark gray (N3), iron oxide staining		
644.0	77.0							
643.0	78.0							
642.0	79.0	R-19						
641.0	80.0							
DATE STARTED: 4/14/10 DATE FINISHED: 4/21/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES: water used to drill
APPROVED BY:						DRILLER: T. Growden HELPER(S): J. Bechtel		DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA

REV 1 Final Boring MW409

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 720.79 ft						DESCRIPTION		
640.0	81.0	R-16	83% (82%)	FD5		75.5-97.0 ft SHALE, very hard, fresh to slightly weathered, clay sized particles, grayish black (N2) to dark gray (N3), iron oxide staining		
639.0	82.0							
638.0	83.0							
637.0	84.0	R-17	98% (82%)					
636.0	85.0			FD1			Vertical fracture with iron oxide staining infilling	
635.0	86.0							
634.0	87.0							
633.0	88.0							
632.0	89.0	R-18	98% (89%)					
631.0	90.0							
630.0	91.0							
629.0	92.0							
628.0	93.0			FD1				
627.0	94.0	R-19	100% (98%)					
626.0	95.0							
625.0	96.0							
624.0	97.0					97.0-116.0 ft SHALE, very hard to moderately hard, fresh to slightly weathered, clay sized particles, grayish black (N2) to dark gray (N3), thinly bedded, R.D. = 0° to 90°, widely to extremely widely fractured		
623.0	98.0	R-20	96% (94%)					
622.0	99.0							
621.0								
DATE STARTED: 4/14/10 DATE FINISHED: 4/21/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.		NOTES: water used to drill
APPROVED BY:						DRILLER: T. Growden HELPER(S): J. Bechtel		DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA

REV 1 Final Boring MW409

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339760.65 ft E. 2405905.35 ft GROUND SURFACE ELEVATION: 720.79 ft		
						DESCRIPTION		
620.0	101.0	R-20	96% (94%)			97.0-116.0 ft SHALE, very hard to moderately hard, fresh to slightly weathered, clay sized particles, grayish black (N2) to dark gray (N3), thinly bedded, R.D. = 0° to 90°, widely to extremely widely fractured		
619.0	102.0							
618.0	103.0							
617.0	104.0	R-21	100% (100%)	FD1				
616.0	105.0							
615.0	106.0							
614.0	107.0	R-22	95% (50%)					
613.0	108.0							
612.0	109.0							
611.0	110.0							
610.0	111.0			FD5		116.0-134.0 ft SHALE, very hard to moderately hard, fresh to slightly weathered, clay sized particles, grayish black (N2) to dark gray (N3), thinly bedded, R.D. = 0° to 90°, intact		
609.0	112.0	R-23	99% (50%)					
608.0	113.0							
607.0	114.0							
606.0	115.0							
605.0	116.0							
604.0	117.0							
603.0	118.0	R-24	100% (100%)	FD0				
602.0	119.0							
601.0								
DATE STARTED: 4/14/10 DATE FINISHED: 4/21/10 FIELD GEOLOGIST: Mark Zatezalo CHECKED BY: Mark Zatezalo						DRILLING METHOD: NQ DRILLING CO. Eichelbergers, Inc.	NOTES: water used to drill	
APPROVED BY:						DRILLER: T. Growden HELPER(S): J. Bechtel	DRILL RIG: Diedrich D-120 (Truck) HAMMER ID: NA	

REV 1 Final Boring MW409

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS
N. 339760.65 ft E. 2405905.35 ft GROUND SURFACE ELEVATION: 720.79 ft							
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ftin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	DESCRIPTION	
600.0 121.0 599.0 122.0 598.0 123.0 597.0 124.0 596.0 125.0 595.0 126.0 594.0 127.0 593.0 128.0 592.0 129.0 591.0 130.0 590.0 131.0 589.0 132.0 588.0 133.0 587.0 134.0		R-24	100% (100%)			116.0-134.0 ft SHALE, very hard to moderately hard, fresh to slightly weathered, clay sized particles, grayish black (N2) to dark gray (N3), thinly bedded, R.D. = 0° to 90°, intact	
				FD0			
		R-25	93% (93%)				

REV 1 Final Boring MW410

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 339662.11 ft E. 2406412.50 ft GROUND SURFACE ELEVATION: 679.04 ft		
678.0	1.0					0.0-3.0 ft Poorly graded sand with clay, (sp-sc), 80% sand, fine to coarse, rounded; 10% gravel, fine, subrounded; 10% fines; grayish brown (5YR 3/2) to dark yellowish brown (10YR 4/2), no odor, moist, no HCl reaction, trace roots	sp-sc	0 - 39.0 ft. Destructive drilling, no samples taken, descriptions based on air hammer cuttings.
677.0	2.0							
676.0	3.0					3.0-6.0 ft Sandy silt, (ml), 60% fines, medium plasticity, medium dry strength, medium toughness; 30% sand, fine to medium, subangular; 10% gravel, fine, subrounded; light brown (5YR 5/6) to moderate yellowish brown (10YR 5/4), no odor, moist, no HCl reaction	ml	
675.0	4.0							
674.0	5.0							
673.0	6.0					6.0-11.0 ft Poorly graded sand, (sp), 85% sand, fine to coarse, subrounded; 10% gravel, fine, subangular; 5% fines; moderate brown (5YR 3/4), no odor, moist, no HCl reaction	sp	
672.0	7.0							
671.0	8.0							
670.0	9.0							
669.0	10.0							
668.0	11.0					11.0-26.0 ft Silty sand with gravel, (sm), 55% sand, fine to medium, subrounded; 25% gravel, fine to coarse, subrounded, elongated; 20% fines; dark yellowish brown (10YR 4/2), no odor, wet, no HCl reaction	sm	
667.0	12.0							
666.0	13.0							
665.0	14.0							
664.0	15.0							
663.0	16.0							
662.0	17.0							
661.0	18.0							
660.0	19.0							
DATE STARTED: 4/11/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check						DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.	NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: J. Trish HELPER(S): B. Kuntz	DRILL RIG: T4-W 1250 HAMMER ID: NA	


REV 1 Final Boring MW410

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 339662.11 ft E. 2406412.50 ft GROUND SURFACE ELEVATION: 679.04 ft		
658.0	21.0					11.0-26.0 ft Silty sand with gravel, (sm), 55% sand, fine to medium, subrounded; 25% gravel, fine to coarse, subrounded, elongated; 20% fines; dark yellowish brown (10YR 4/2), no odor, wet, no HCl reaction	sm	
657.0	22.0							
656.0	23.0							
655.0	24.0							
654.0	25.0							
653.0	26.0					26.0-36.0 ft Poorly graded gravel with silt and sand, (gp-gm), 60% gravel, fine to coarse, subrounded, elongated; 30% sand, fine to medium, subrounded; 10% fines; dusky yellowish brown (10YR 2/2), wet, no HCl reaction, trace Cobbles	gp-gm	
652.0	27.0							
651.0	28.0							
650.0	29.0							
649.0	30.0							
648.0	31.0							
647.0	32.0							
646.0	33.0							
645.0	34.0							
644.0	35.0							
643.0	36.0					36.0-39.0 ft SHALE, moderately soft, grayish black (N2), no odor, no reaction to HCl, moist		
642.0	37.0							
641.0	38.0							
	39.0					--- Bottom of Boring at 39.00 ft.---		
DATE STARTED: 4/11/10 DATE FINISHED: 4/11/10 FIELD GEOLOGIST: Eugene Tabacchi CHECKED BY: Dan Check						DRILLING METHOD: Air Hammer, Destructive DRILLING CO. Eichelbergers, Inc.	NOTES:	
APPROVED BY: Daniel Bansah						DRILLER: J. Trish HELPER(S): B. Kuntz	DRILL RIG: T4-W 1250 HAMMER ID: NA	

REV 1 Final Boring PMT-401

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS
						N. 340151.69 ft	E. 2405219.62 ft		
						GROUND SURFACE ELEVATION: 759.09 ft			
						DESCRIPTION			
758.0	1.0	R-1				0.0-17.5 ft Interval not sampled			
757.0	2.0								
756.0	3.0								
755.0	4.0								
754.0	5.0								
753.0	6.0								
752.0	7.0								
751.0	8.0								
750.0	9.0								
749.0	10.0								
748.0	11.0								
747.0	12.0								
746.0	13.0								
745.0	14.0								
744.0	15.0								
743.0	16.0								
742.0	17.0								
741.0	18.0	57% (0%)	FD6		17.5-34.8 ft SHALE, moderately soft to moderately hard, intensely weathered, moderate yellow (5Y 7/6) and dark gray (N3), very closely to closely fractured, no reaction to HCl				
740.0	19.0			17.5-44.8 ft Bedding plane separation, R.D. = 11-25°, closely to widely spaced; filling: not healed, clay, slightly weathered, very soft; surface: moderately rough, planar, slightly weathered; vertical fractures in the run as					
DATE STARTED: 6/9/10 DATE FINISHED: 6/10/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	




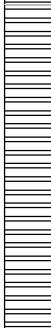

REV 1 Final Boring PMT-401

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 340151.69 ft E. 2405219.62 ft GROUND SURFACE ELEVATION: 759.09 ft		
738.0	21.0	R-1	57% (0%)			well as joint and bedding plane fractures. Fracture set #F-1. 17.5-34.8 ft SHALE, moderately soft to moderately hard, intensely weathered, moderate yellow (5Y 7/6) and dark gray (N3), very closely to closely fractured, no reaction to HCl		
737.0	22.0							
736.0	23.0	R-2	100% (0%)					
735.0	24.0							
734.0	25.0							
733.0	26.0							
732.0	27.0	R-3	100% (0%)		FD6			
731.0	28.0							
730.0	29.0							
729.0	30.0							
728.0	31.0							
727.0	32.0	R-4	100% (12%)					
726.0	33.0							
725.0	34.0							
724.0	35.0					34.8-48.1 ft SHALE, horizontal, moderately hard, moderately weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl		
723.0	36.0							
722.0	37.0	R-5	100% (26%)		FD6			
721.0	38.0							
720.0	39.0							
		R-6						
DATE STARTED: 6/9/10 DATE FINISHED: 6/10/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring PMT-401

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 340151.69 ft E. 2405219.62 ft GROUND SURFACE ELEVATION: 759.09 ft		
718.0	41.0	R-6	100% (40%)	FD6		34.8-48.1 ft SHALE, horizontal, moderately hard, moderately weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl		
717.0	42.0					42.2 ft Fresh to slightly weathered		
716.0	43.0							
715.0	44.0							
714.0	45.0	R-7	100% (39%)			44.8-56.8 ft Bedding plane separation, R.D. = 15°, closely spaced; filling: not healed; surface: slightly rough, planar; iron oxide staining on the fracture faces, also joint fractures at a 60° angle at 54.2 ft. Fracture set #F-2.		
713.0	46.0							
712.0	47.0							
711.0	48.0							
710.0	49.0	R-8	100% (47%)			48.1-51.1 ft SHALE, horizontal, moderately hard, fresh to slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl		
709.0	50.0							
708.0	51.0							
707.0	52.0							
706.0	53.0	R-9	100% (24%)	FD5		51.1-54.8 ft SHALE, horizontal, moderately hard, fresh to slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl		
705.0	54.0							
704.0	55.0							
703.0	56.0							
702.0	57.0	R-10	100% (48%)			54.8-59.8 ft SHALE, horizontal, moderately hard, fresh to slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining		
701.0	58.0							
700.0	59.0							
		R-11						
DATE STARTED: 6/9/10 DATE FINISHED: 6/10/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring PMT-401

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 759.09 ft						DESCRIPTION		
DESCRIPTION								
698.0	61.0	R-11	100% (44%)			59.8-81 ft Bedding plane separation, R.D. = 15°, closely spaced; filling: not healed; surface: slightly rough, planar; iron oxide staining on the fracture face. Fracture set #F-4.		
697.0	62.0					59.8-64.8 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl		
696.0	63.0							
695.0	64.0							
694.0	65.0	R-12	90% (0%)	FD5		64.8-69.8 ft SHALE, horizontal, moderately hard to moderately soft, slightly to moderately weathered, dark gray (N3) and moderate brown (5YR 4/4), closely to moderately fractured, no reaction to HCl, trace quartz crystals throughout		
693.0	66.0							
692.0	67.0							
691.0	68.0							
690.0	69.0	R-13	90% (0%)	FD7		69.8-74.8 ft SHALE, horizontal, moderately hard, slightly to moderately weathered, dark gray (N3) and moderate brown (5YR 4/4), very closely to closely fractured, no reaction to HCl		
689.0	70.0							
688.0	71.0							
687.0	72.0							
686.0	73.0	R-14	100% (33%)	FD5		74.8-81.0 ft SHALE, horizontal, moderately hard, slightly to moderately weathered, dark gray (N3) and moderate brown (5YR 4/4), very closely to moderately fractured, no reaction to HCl		
685.0	74.0							
684.0	75.0							
683.0	76.0							
682.0	77.0	R-15						
681.0	78.0							
680.0	79.0							
DATE STARTED: 6/9/10 DATE FINISHED: 6/10/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon		NOTES:
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle		DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931

REV 1 Final Boring PMT-401

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340151.69 ft E. 2405219.62 ft GROUND SURFACE ELEVATION: 759.09 ft		
						DESCRIPTION		
678.0	81.0	R-15	75% (0%)	FD5		81.0-86.0 ft SHALE, moderately soft to moderately hard, moderately to intensely weathered, dark gray (N3) and moderate brown (5YR 4/4), very closely to moderately fractured, no reaction to HCl, iron oxide staining, quartz crystals filling fractures		
677.0	82.0							
676.0	83.0	R-16	90% (0%)			86.0-89.8 ft SHALE, moderately soft to moderately hard, moderately to intensely weathered, dark gray (N3) and moderate brown (5YR 4/4), closely to moderately fractured, no reaction to HCl, iron oxide staining, quartz crystals filling fractures		
675.0	84.0							
674.0	85.0					89.8-94.8 ft SHALE, moderately soft to moderately hard, moderately to intensely weathered, dark gray (N3) and moderate brown (5YR 4/4), closely to moderately fractured, no reaction to HCl, iron oxide staining, quartz crystals filling fractures		
673.0	86.0							
672.0	87.0	R-17	92% (38%)	FD6		94.8-99.8 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), very closely to widely fractured, no reaction to HCl, calcite healed fractures		
671.0	88.0							
670.0	89.0							
669.0	90.0							
668.0	91.0	R-18	100% (40%)					
667.0	92.0							
666.0	93.0							
665.0	94.0							
664.0	95.0	R-19	100% (100%)	FD1				
663.0	96.0							
662.0	97.0							
661.0	98.0							
660.0	99.0							
		R-20						
DATE STARTED: 6/9/10 DATE FINISHED: 6/10/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring PMT-401

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						<p>N. 340151.69 ft E. 2405219.62 ft</p> <p>GROUND SURFACE ELEVATION: 759.09 ft</p>		
658.0	101.0	R-20	100% (84%)	FD1		99.8-104.8 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), very closely to widely fractured, no reaction to HCl, calcite healed fractures		
657.0	102.0					102.2-109.8 ft Bedding plane separation, R.D. = 19°, closely spaced; filling: not healed, calcite; surface: slightly rough, planar. Fracture set #F-5.		
656.0	103.0							
655.0	104.0							
654.0	105.0	R-21	100% (100%)	FD1		104.8-114.8 ft SHALE, horizontal, moderately hard, slightly weathered, dark gray (N3), closely to widely fractured, no reaction to HCl, calcite healed fractures		
653.0	106.0					104.8-107 ft Joint, R.D. = 61°, closely spaced; filling: totally healed, moderately thin calcite, fresh, moderately soft; surface: fresh. Fracture set #F-6.		
652.0	107.0							
651.0	108.0							
650.0	109.0	R-22	100% (100%)	FD0				
649.0	110.0							
648.0	111.0							
647.0	112.0							
646.0	113.0							
645.0	114.0							
						--- Bottom of Boring at 114.80 ft.---		
DATE STARTED: 6/9/10 DATE FINISHED: 6/10/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Adrianna Semione						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring PMT-402							PROJECT NO. 10-4310	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/lin & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340053.75 ft E. 2405001.22 ft GROUND SURFACE ELEVATION: 729.82 ft		
						DESCRIPTION		
729.0	1.0					0.0-28.0 ft Interval not sampled		
728.0	2.0							
727.0	3.0							
726.0	4.0							
725.0	5.0							
724.0	6.0							
723.0	7.0							
722.0	8.0							
721.0	9.0							
720.0	10.0							
719.0	11.0							
718.0	12.0							
717.0	13.0							
716.0	14.0							
715.0	15.0							
714.0	16.0							
713.0	17.0							
712.0	18.0							
711.0	19.0							
710.0								
DATE STARTED: 6/10/10 DATE FINISHED: 6/10/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 340665	






REV 1 Final Boring PMT-402

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340053.75 ft E. 2405001.22 ft GROUND SURFACE ELEVATION: 729.82 ft DESCRIPTION		
709.0	21.0					0.0-28.0 ft Interval not sampled		
708.0	22.0							
707.0	23.0							
706.0	24.0							
705.0	25.0							
704.0	26.0							
703.0	27.0							
702.0	28.0							
701.0	29.0	R-1	90% (13%)	FD6		28.0-31.0 ft SHALE, moderately hard, fresh to moderately weathered, dark gray (N3), closely to widely fractured, no reaction to HCl, iron oxide staining 28-37.5 ft Joint, R.D. = 25-50°, very closely to closely spaced, moderately open; surface: slightly rough, planar, moderately hard. Fracture set #F-1.		
700.0	30.0							
699.0	31.0							
698.0	32.0					31.0-35.0 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), closely to moderately fractured, no reaction to HCl, iron oxide staining		
697.0	33.0	R-2	98% (68%)	FD4				
696.0	34.0							
695.0	35.0							
694.0	36.0					35.0-40.0 ft SHALE, moderately hard, fresh to moderately weathered, dark gray (N3) to yellowish gray (5Y 7/2), closely to widely fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite		
693.0	37.0							
692.0	38.0	R-3	100% (24%)	FD7		37.5-45 ft Bedding plane separation, R.D. = 10°, very closely to closely spaced, slightly open; surface: slightly rough, planar, moderately hard; moderately spaced fractures, 70 °, slightly rough, undulating, slightly weathered walls 39.3-41.2 ft. Fracture set #F-2.		
691.0	39.0							
690.0								
DATE STARTED: 6/10/10 DATE FINISHED: 6/10/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 340665	

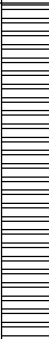
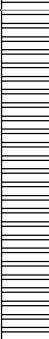

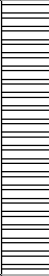
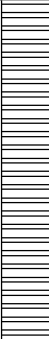
REV 1 Final Boring PMT-402

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						<p>N. 340053.75 ft E. 2405001.22 ft</p> <p>GROUND SURFACE ELEVATION: 729.82 ft</p>		
689.0	41.0	R-4	100% (40%)	FD6		40.0-45.0 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), very closely to moderately fractured, no reaction to HCl, iron oxide staining, moderately weathered 44.3-44.5 ft., yellowish gray (5Y 7/2)		
688.0	42.0							
687.0	43.0							
686.0	44.0							
685.0	45.0	R-5	100% (20%)	FD7		45.0-50.0 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), very closely to moderately fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite		
684.0	46.0					45-47.8 ft R.D. = 70°, moderately spaced; surface: slightly rough, undulating, moderately hard. Fracture set #F-3.		
683.0	47.0							
682.0	48.0					48-48.8 ft R.D. = 10°, very closely to closely spaced, slightly open; surface: slightly rough, planar, moderately hard. Fracture set #F-4.		
681.0	49.0	R-6	100% (40%)	FD5		50.0-51.0 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), moderately fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite		
680.0	50.0							
679.0	51.0	R-7	100% (18%)	FD6		50.3-55.8 ft Joint, R.D. = 25-70°, closely spaced, moderately open; surface: slightly rough, undulating, moderately weathered, moderately hard. Fracture set #F-5.		
678.0	52.0					51.0-55.0 ft SHALE, moderately hard, fresh to slightly weathered, dark gray (N3), very closely to moderately fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite		
677.0	53.0							
676.0	54.0							
675.0	55.0	R-8	100% (20%)	FD7		55.0-60.0 ft SHALE, moderately hard, fresh to moderately weathered, dark gray (N3) and yellowish gray (5Y 7/2), very closely to moderately fractured, no reaction to HCl, iron oxide staining		
674.0	56.0					55.8-71 ft Joint, R.D. = 35°, very closely to closely spaced, slightly open; surface: slightly rough, planar, moderately weathered, moderately hard; 80° fracture, slightly to moderately weathered, slightly rough planar, moderately open, 60.1-61.0 ft and 63.1-63.8 ft. Fracture set #F-6.		
673.0	57.0							
672.0	58.0							
671.0	59.0							
670.0								
DATE STARTED: 6/10/10 DATE FINISHED: 6/10/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 340665	


REV 1 Final Boring PMT-402

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS				
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE						
GROUND SURFACE ELEVATION: 729.82 ft						DESCRIPTION					
669.0	61.0	R-9	100% (16%)	FD7		60.0-65.0 ft SHALE, moderately soft to moderately hard, fresh to moderately weathered, dark gray (N3) with yellowish gray (5Y 7/2), closely fractured, no reaction to HCl, iron oxide staining					
668.0	62.0										
667.0	63.0										
666.0	64.0										
665.0	65.0										
664.0	66.0	R-10	100% (20%)	FD7		65.0-70.0 ft SHALE, moderately soft to moderately hard, fresh to moderately weathered, dark gray (N3) and yellowish gray (5Y 7/2), closely fractured, no reaction to HCl, iron oxide staining					
663.0	67.0										
662.0	68.0										
661.0	69.0										
660.0	70.0										
659.0	71.0	R-11	100% (50%)	FD6		70.0-71.0 ft SHALE, moderately soft to moderately hard, fresh to moderately weathered, dark gray (N3) and yellowish gray (5Y 7/2), closely fractured, no reaction to HCl, iron oxide staining					
658.0	72.0										
657.0	73.0	R-12	90% (53%)	FD6		71.0-75.0 ft SHALE, moderately soft to moderately hard, fresh to moderately weathered, dark gray (N3) and yellowish gray (5Y 7/2), closely to moderately fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite					
656.0	74.0										
655.0	75.0										
654.0	76.0	R-13	92% (38%)	FD5		75.0-80.0 ft SHALE, moderately hard, fresh to moderately weathered, dark gray (N3) with yellowish gray (5Y 7/2), closely to moderately fractured, no reaction to HCl, iron oxide staining, trace fossils and pyrite					
653.0	77.0					76-77.2 ft Joint, R.D. = 50°, moderately open; surface: smooth, planar, moderately weathered, moderately hard; quartz infilling 76.8-77.2 ft. Fracture set #F-8.					
652.0	78.0					77.2-78.2 ft Bedding plane separation, R.D. = 10°, very closely spaced, slightly open; surface: smooth, planar, moderately hard. Fracture set #F-9.					
651.0	79.0					78.4-86 ft Joint, R.D. = 10-70°, closely to moderately spaced; filling: totally healed, very thin calcite, fresh, moderately hard; surface: slightly rough, planar, fresh, moderately hard. Fracture set #F-10.					
650.0											
DATE STARTED: 6/10/10 DATE FINISHED: 6/10/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:				
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 340665				





REV 1 Final Boring PMT-402

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 340053.75 ft E. 2405001.22 ft GROUND SURFACE ELEVATION: 729.82 ft DESCRIPTION		
649.0 648.0 647.0 646.0 645.0 644.0	81.0 82.0 83.0 84.0 85.0 86.0	R-14 R-15	98% (94%) 75% (75%)	FD3 .		80.0-86.0 ft SHALE, moderately hard, fresh, dark gray (N3), very thickly to massive, closely to widely fractured, no reaction to HCl, trace fossils and pyrite		
						---- Bottom of Boring at 86.00 ft.----		
DATE STARTED: 6/10/10 DATE FINISHED: 6/10/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: S. Silverman HELPER(S): J. Tousley	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 340665	










REV 1 Final Boring W-5

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339124.92 ft E. 2404761.41 ft GROUND SURFACE ELEVATION: 658.18 ft DESCRIPTION		
658.0	1.0	S-1	2-2-3 (5) 93%			0.0-1.5 ft Clayey sand, (sc), 75% sand, fine to medium, subrounded, soft hardness; 25% fines, low plasticity, no dry strength, no dilatancy, low toughness; 0% gravel; light brown (5YR 5/6) and moderate brown (5YR 4/4), moist, no HCl reaction, medium dense	sc	
657.0	2.0					1.5-5.0 ft Interval not sampled		
656.0	3.0							
655.0	4.0							
654.0	5.0							
653.0	6.0	S-2	22-13-12 (25) 87%			5.0-6.5 ft Poorly graded sand with silt and gravel, (sp-sm), 45% gravel, medium to coarse, subangular, flat and elongated, medium hardness; 45% sand, fine, subrounded, very soft hardness; 10% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.1 inches, moderate reddish brown (10R 4/6) and moderate brown (5YR 4/4), moist, no HCl reaction, dense to very loose, changes from gravel back to silty sand	sp-sm	
652.0	7.0					6.5-10.0 ft Interval not sampled		
651.0	8.0							
650.0	9.0							
649.0	10.0							
648.0	11.0	S-3	19-50/4 100%			10.0-10.83 ft Clayey sand with gravel, (sc), 60% sand, fine to medium, subrounded, soft hardness; 20% gravel, medium to coarse, subangular, flat and elongated, medium hardness; 20% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.04 inches, grayish brown (5YR 3/2), moist, no HCl reaction, medium dense	sc	
647.0	12.0					10.83-15.0 ft Interval not sampled		
646.0	13.0							
645.0	14.0							
644.0	15.0							
643.0	16.0	S-4	23-27-22 (49) 67%			15.0-16.5 ft Clayey sand with gravel, (sc), 40% gravel, medium to coarse, subangular, flat and elongated, medium hardness; 40% sand, fine to medium, subangular, soft hardness; 20% fines, low plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.1 inches, moderate brown (5YR 4/4) and dark gray (N3), moist, no HCl reaction, medium dense	sc	
642.0	17.0					16.5-20.0 ft Interval not sampled		
641.0	18.0							
640.0	19.0							
639.0								
DATE STARTED: 6/7/10 DATE FINISHED: 6/8/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jesse Merkel						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	




REV 1 Final Boring W-5

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/6in & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			
GROUND SURFACE ELEVATION: 658.18 ft						DESCRIPTION		
DESCRIPTION								
638.0		S-5	23-50/5 67%			20.0-20.9 ft Poorly graded gravel with silt and sand, (gp-gm), 60% gravel, fine to coarse, subangular, flat and elongated, medium hardness; 30% sand, fine to medium, subangular, soft hardness; 10% fines, medium plasticity, no dry strength, no dilatancy, low toughness; maximum grain size = 0.1 inches, moderate brown (5YR 4/4) and dark gray (N3), moist, no HCl reaction, dense	gp-gm	
637.0	21.0	R-1	73% (0%)			21.0-24.0 ft OVERBURDEN, (boulders), horizontal, moderately hard, slightly to moderately weathered, dark gray (N3) and dusky red (5R 3/4), no reaction to HCl, iron oxide staining, mechanically broken, overburden material		
636.0	22.0					24.0-29.0 ft OVERBURDEN, (boulders), moderately hard, slightly to moderately weathered, light gray (N7) and dusky red (5R 3/4), no reaction to HCl, iron oxide staining, overburden material, mechanically broken		
635.0	23.0							
634.0	24.0	R-2	26% (0%)					
633.0	25.0							
632.0	26.0							
631.0	27.0	R-3	64% (8%)					
630.0	28.0							
629.0	29.0							
628.0	30.0					29.0-34.0 ft OVERBURDEN, (boulders), moderately hard, fresh to slightly weathered, medium light gray (N6) and very light gray (N8), no reaction to HCl, iron oxide staining, quartz, and shale material, overburden material, mechanically broken		
627.0	31.0							
626.0	32.0							
625.0	33.0							
624.0	34.0							
623.0	35.0							
622.0	36.0							
621.0	37.0							
620.0	38.0							
619.0	39.0	S-6	24-31-27 (58) 47%			34.0-37.5 ft Interval not sampled		
						37.5-39.0 ft Poorly graded gravel with clay and sand, (gp-gc), 70% gravel, medium to coarse, angular, flat and elongated, medium hardness; 20% sand, fine to coarse, subangular, flat and elongated, soft hardness; 10% fines, non plastic, no dry strength, no dilatancy, no toughness; maximum grain size = 0.1 inches, moderate brown (5YR 4/4), moist, no HCl reaction, medium dense	gp-gc	
DATE STARTED: 6/7/10 DATE FINISHED: 6/8/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jesse Merkel						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring W-5

PROJECT NO. 10-4310

COORDINATES						USCS SYMBOL	REMARKS	
ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/ft (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE			N. 339124.92 ft E. 2404761.41 ft
								GROUND SURFACE ELEVATION: 658.18 ft
DESCRIPTION								
618.0		S-7	50/2 100%			40.0-40.25 ft Poorly graded gravel, (gp), 100% gravel, medium to coarse, angular, flat and elongated, hard hardness; maximum grain size = 0.1 inches, medium light gray (N6) and dark reddish brown (10R 3/4), dry, no HCl reaction, dense, blocky, sandstone		
617.0	41.0					40.25-44.3 ft Interval not sampled		
616.0	42.0							
615.0	43.0							
614.0	44.0							
613.0	45.0	R-4	88% (88%)			44.3-51.0 ft SHALE, horizontal, moderately hard, fresh, dark gray (N3), moderately to widely fractured, no reaction to HCl		
612.0	46.0							
611.0	47.0							
610.0	48.0							
609.0	49.0	R-5	100% (100%)					
608.0	50.0							
	51.0					---- Bottom of Boring at 51.00 ft.----		
DATE STARTED: 6/7/10 DATE FINISHED: 6/8/10 FIELD GEOLOGIST: Jason Lucey CHECKED BY: Jesse Merkel						DRILLING METHOD: 6" Solid Flight Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	





REV 1 Final Boring W-9A

PROJECT NO. 10-4310

ELEVATION (Feet)		DEPTH (Feet)		SAMPLE OR RUN NO.	BLOW(SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES		USCS SYMBOL	REMARKS	
								N. 339407.90 ft E. 2407287.39 ft				
								GROUND SURFACE ELEVATION: 670.01 ft				
								DESCRIPTION				
669.0	1.0	S-1	2-2-2 (4) 100%					0.0-1.5 ft Silty sand, (sm), 80% sand, fine; 20% fines, low plasticity, low toughness; dark yellowish orange (10YR 6/6), moist, no HCl reaction, very loose		sm	Switch to casing advancer	
668.0	2.0							1.5-5.0 ft Interval not sampled		sc		
667.0	3.0											
666.0	4.0	S-2	12-14-17 (31) 67%					5.0-6.5 ft Clayey sand, (sc), 70% sand, fine to coarse; 25% fines, medium plasticity, low toughness; 5% gravel, fine, angular, hard hardness; maximum grain size = 0.25 inches, pale brown (5YR 5/2) and moderate red (5R 5/4), dry, no HCl reaction, dense		sc		
665.0	5.0											
664.0	6.0									6.5-10.0 ft Interval not sampled		
663.0	7.0											
662.0	8.0											
661.0	9.0	S-3	24-19-26 (45) 53%					10.0-11.5 ft Poorly graded gravel with silt and sand, (gp-gm), 60% gravel, fine to medium, subangular, hard hardness; 30% sand, fine to coarse; 10% fines, low plasticity, low toughness; maximum grain size = 0.5 inches, light olive gray (5Y 5/2) and moderate yellowish brown (10YR 5/4), wet, dense, gravel stuck in driving shoe, N value may be affected		gp-gm		
660.0	10.0											
659.0	11.0									11.5-15.0 ft Interval not sampled		
658.0	12.0											
657.0	13.0											
656.0	14.0	S-4	19-24-16 (40) 47%					15.0-16.5 ft Clayey sand with gravel, (sc), 50% sand, fine to coarse; 30% gravel, fine, subangular, hard hardness; 20% fines, low plasticity, low toughness; maximum grain size = 0.25 inches, medium dark gray (N4) and dark yellowish brown (10YR 4/2), wet, no HCl reaction, dense		sc		
655.0	15.0											
654.0	16.0									16.5-20.0 ft Interval not sampled		
653.0	17.0											
652.0	18.0											
651.0	19.0											
DATE STARTED: 6/5/10 DATE FINISHED: 6/5/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon				NOTES:		
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle				DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931		

REV 1 Final Boring W-9A

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/SIN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						DESCRIPTION		
						N. 339407.90 ft E. 2407287.39 ft GROUND SURFACE ELEVATION: 670.01 ft		
649.0	21.0	S-5	15-10-11 (21) 47%			20.0-21.5 ft Clayey sand with gravel, (sc), 50% sand, fine to coarse; 30% gravel, fine, angular, flat and elongated, hard hardness; 20% fines, medium plasticity, low toughness; maximum grain size = 0.25 inches, moderate brown (5YR 4/4) and dark greenish gray (5GY 4/1), wet, no HCl reaction, medium dense	sc	
648.0	22.0					21.5-25.0 ft Interval not sampled		
647.0	23.0							
646.0	24.0							
645.0	25.0							
644.0	26.0	S-6	11-10-10 (20) 57%			25.0-26.5 ft Poorly graded sand with silt and gravel, (sp-sm), 50% sand, fine to coarse; 40% gravel, fine to medium, subrounded, hard hardness; 10% fines, low plasticity, low toughness; maximum grain size = 0.5 inches, moderate yellowish brown (10YR 5/4) and medium dark gray (N4), wet, no HCl reaction, medium dense	sp-sm	
643.0	27.0					26.5-30.0 ft Interval not sampled		
642.0	28.0							
641.0	29.0							
640.0	30.0							
639.0	31.0	S-7	23-17-23 (40) 33%			30.0-31.5 ft Silty sand, (sm), 75% sand, fine to coarse; 20% gravel, fine, subangular, flat and elongated, hard hardness; 5% fines, low plasticity, low toughness; maximum grain size = 0.1 inches, medium dark gray (N4) and greenish gray (5GY 6/1), wet, no HCl reaction, dense	sm	
638.0	32.0					31.5-35.0 ft Interval not sampled		
637.0	33.0							
636.0	34.0							
635.0	35.0							
634.0	36.0	S-8	22-13-17 (30) 60%			35.0-36.5 ft Silty sand with gravel, (sm), 60% sand, fine to coarse; 20% gravel, fine, flat, medium hardness; 20% fines, medium plasticity, low toughness; maximum grain size = 0.2 inches, dark gray (N3) and grayish red (5R 4/2), wet, no HCl reaction, medium dense	sm	
633.0	37.0					36.5-40.0 ft Interval not sampled		
632.0	38.0							
631.0	39.0							
DATE STARTED: 6/5/10 DATE FINISHED: 6/5/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	

REV 1 Final Boring W-9A

PROJECT NO. 10-4310

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE OR RUN NO.	BLOW/IN & (N) OR %REC & (RQD)	FRACTURE DENSITY	PROFILE	COORDINATES	USCS SYMBOL	REMARKS
						N. 339407.90 ft E. 2407287.39 ft GROUND SURFACE ELEVATION: 670.01 ft		
						DESCRIPTION		
629.0	41.0	S-9	50/2 100%			40.0-40.17 ft Silty sand, (sm), dark gray (N3), wet, no HCl reaction, very dense, shale	sm	
628.0	42.0	R-1	100% (100%)	FD0		40.17-44.17 ft SHALE, moderately hard, fresh, dark gray (N3), massive, very widely to widely fractured, no reaction to HCl, trace fossils and pyrite		
627.0	43.0							
626.0	44.0							
625.0	45.0					44.17-49.17 ft SHALE, moderately hard, fresh, dark gray (N3), massive, moderately to very widely fractured, no reaction to HCl, trace fossils and pyrite		
624.0	46.0					44.55-46.4 ft R.D. = 60°, moderately spaced, slightly open; surface: smooth, planar, moderately hard. Fracture set #F-1.		
623.0	47.0	R-2	100% (89%)	FD2				
622.0	48.0							
621.0	49.0							
620.0	50.0	R-3	100% (100%)	FD0		49.17-50.17 ft SHALE, moderately hard, fresh, dark gray (N3), massive, moderately fractured, no reaction to HCl, trace fossils and pyrite		
						---- Bottom of Boring at 50.17 ft.----		
DATE STARTED: 6/5/10 DATE FINISHED: 6/5/10 FIELD GEOLOGIST: Jesse Merkel CHECKED BY: Adrianna Semione						DRILLING METHOD: 4-1/4" I.D. Hollow Stem Auger, NQ DRILLING CO. Terracon	NOTES:	
APPROVED BY: Rolando Benitez						DRILLER: J. Williams HELPER(S): R. Hinkle	DRILL RIG: Diedrich D-120 (ATV) HAMMER ID: 931	