Structure Geotechnical Report

F.A.I. Route 74
Section 81-1HB-1
Rock Island County
Job No. P-92-032-01
Contract No. 64C08
PTB No. N/A
I-74 Over 12th Avenue Bridges
Structure Nos. 081-0182 (WB) and 081-0183 (EB)

May 2011 / Revised April 2012

Prepared for:
Illinois Department of
Transportation, District 2
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1. Project Description

This report provides geotechnical data and recommendations for the proposed I-74 Over 12th Avenue Bridges, which are part of the Central Section of the I-74 over the Mississippi River Project. The project includes reconstruction of I-74 between 14th Avenue in Moline, Illinois and Lincoln Road in Bettendorf, Iowa. The bridges covered by this structure geotechnical report will be replacements for the existing structures carrying I-74 over 12th Avenue.

Nearby project features that have an impact on the design or construction of the proposed bridges include the north abutment retaining wall (IL-RW11, S.N. 081-6017), the south abutment retaining wall (IL-RW13, S.N. 081-6020), the I-74 median retaining walls (IL-RW10 and IL-RW12), the EB I-74 noise wall (Noise Wall 8), the I-74 roadway, and the 12th Avenue roadway. Geotechnical recommendations for Retaining Walls IL-RW11 and IL-RW13 are presented in separate structure geotechnical reports prepared by Hanson Professional Services Inc. (Hanson). The geotechnical data and recommendations for Retaining Walls IL-RW10 and IL-RW12 are presented in structure geotechnical reports prepared by CH2M HILL in September 2009. Geotechnical data and recommendations for Noise Wall 8 will be contained in a structural geotechnical report to be prepared by Hanson. Geotechnical recommendations for the interstate and street will be contained in soil survey reports prepared by Hanson.

This report supersedes the structure geotechnical report prepared by CH2M HILL in September 2009.

2. Location

The proposed I-74 Over 12th Avenue Bridges are located in the north central portion of Rock Island County, within Section 4 of Township 17 North, Range 1 West and Section 33 of Township 18 North, Range 1 West. They are located at I-74 Sta. 71+28.30. Structure Number 081-0182 carries Westbound (Northbound) I-74 and Ramp 7th-A over 12th Avenue, while Structure Number 081-0183 carries Eastbound (Southbound) I-74.

3. Existing Structures

The existing structures, S.N. 081-0101 (Eastbound I-74) and S.N. 081-0102 (Westbound I-74), were constructed in 1973. They are single-span bridges with closed abutments. The abutment walls span the 50 feet wide median between the bridges. The profile grade line of the eastbound bridge is approximately 7 feet higher than the westbound bridge. Due to the steep grade of 12th Avenue, the overall height of the eastbound bridge abutment is actually shorter than the height of the westbound bridge abutment. A considerable portion of the abutment wall is buried under a 1:2 spill slope. The exposed height of the abutment wall is approximately 10 to 12 feet. A semi-gravity retaining wall extends the east wingwall for more than 330 feet along the shoulder of WB I-74. Portions of the existing structure plans are included in the Appendix for reference.

The structures are supported on vertical and batter piles. Concrete piles with a 90 kip allowable capacity were used under the south abutment of the eastbound bridge, both abutments of the westbound bridge, and the first 26 feet of the east wingwall. Timber piles with a 48 kip allowable capacity were used for the remainder of the structure. Based on the estimated lengths shown on the existing structure plans, the pile tips are located in very stiff to hard clay (glacial till) at Elev. 611 to Elev. 635 for the concrete piles and Elev. 619 to Elev. 644 for the timber piles.

4. Proposed Structure

The general structure type was determined by a previous value engineering study. The proposed grade separation will be a single-span bridge with stub abutments supported on mechanically stabilized earth (MSE) walls. The MSE walls have U-shaped configurations in plan, which is typical for Illinois Department of Transportation (IDOT) structures. The walls terminate in the existing abutment cones at three of the four corners. At the northeast corner, IL-RW11 continues along the outside shoulder of WB I-74 for 360'-9" beyond the corner point. This portion of the wall will replace the existing semi-gravity retaining wall. The face of the proposed abutment walls are approximately 15 feet in front of the existing abutment faces. The wings are in the same location as the existing wingwalls. The portion of the wall along the east side of I-74 gradually flares to approximately 10 feet in front of the existing wall.

The bridge and wall geometry are configured for a mixed abutment, where the vertical bridge loads are supported by piles passing through the reinforced soil mass. Noise Wall 8 will be attached to the outside of the EB bridge as it crosses 12th Avenue. Based on information provided by the structure designer, a factored vertical load of approximately 1,500 kips will be applied to the piles at each abutment. A service lateral load of approximately 1.3 kips per foot width will be applied by the superstructure to the abutments. The MSE walls will be designed to resist the lateral loads.

The proposed bridges will be constructed in stages in order to allow traffic on I-74 and 12th Avenue throughout the construction period. The middle portion of the each bridge, located in the current I-74 median, will be constructed first, followed by the east side (WB I-74), then the west side (EB I-74). The MSE walls beneath the bridges will follow a similar sequence.

5. Site Investigation

The project site is located in the steeply sloping terrain of the bluffs along the Mississippi River. North of 12th Avenue, existing I-74 is located on two terraces constructed on a former hillside. South of 12th Avenue, I-74 is on an embankment. The height from the toe of embankment to the roadway grade is approximately 40 feet along the east side (WB I-74) and 15 feet along the west side (EB I-74). Presently, 12th Avenue slopes down to the east at approximately 8% grade, while I-74 slopes down to the north at approximately 3% grade.

The field exploration that was completed for the proposed structure was accomplished in three phases. The first two phases were completed in December 2005 and October 2007 by another consultant. IDOT provided the data collected from those two phases. The third phase was completed in June 2010 by Hanson. The primary purpose of the third phase was to collect additional samples of the shallow, softer soils for strength and consolidation testing. A representative from Hanson logged the boring and performed a general site reconnaissance during the third phase.

Four borings were drilled in the first two phases and three borings were drilled in the third phase. Locations of the borings were selected to avoid the numerous obstructions currently occupying the site. The maximum spacing between borings was approximately 125 feet. Standard Penetration Test samples were collected at 2.5 ft. to 10.0 ft. intervals in all borings. Several Shelby tube samples were collected at representative locations in cohesive strata. The boring depths ranged from 7.0 ft. to 99.25 ft.

The boring locations are shown on the Boring Location Plan included in the Appendix. Boring logs are included in the Appendix.

6. Laboratory Investigation

Soil samples from the first and second phase borings were tested by others. The testing of samples collected from the first and second phase borings does not meet IDOT's current minimum requirements for structure borings. Unconfined strength and moisture content tests were completed on a small fraction of the samples. Index testing was completed on representative samples from two borings. Triaxial strength data from one sample was included in a summary of laboratory test results.

The soil samples obtained from the third phase borings were delivered to Hanson's soils laboratory and subjected to a testing program. Natural moisture content and visual classification tests were competed on all samples. Unconfined compressive strength tests, using a Rimac spring tester, were also completed when possible. Two unconfined compression tests and one consolidation test were performed on Shelby tube samples.

The locations of the index tests, triaxial tests, and consolidation tests are indicated on the subsurface data profile.

7. Subsurface Profile

A subsurface data profile is presented in the Appendix for use by the structure designer. The data profile includes all of the borings that were recently drilled near the proposed structure.

The subsurface profile consists of deposits of fill material, loessial soils, and gumbotil overlying glacial till. The till was encountered in all of the borings between Elev. 657.1 and Elev. 635.8 or 8 to 16 ft below grade in front of the highway embankment. Borings PB1001 and RW801 encountered shale bedrock at Elev. 558.5 and Elev. 562.0, respectively.

Fill was encountered at the northwest corner of the site in Boring RW701. It extended from the ground surface to the top of the till stratum. The fill material was random, consisting of layers of stiff silty clay, loose sand with gravel, soft to stiff silty clay with debris.

The loessial soils were encountered in the other borings. Although similar in origin, these soils were quite variable in classification and consistency. Typically, they were soft to stiff silty clays, clayey silts, or silts. Unconfined strengths ranged from 0.5 to 4.0 tsf, with an average of 1.2 tsf.

The till stratum is typically very stiff, gray, sandy lean clay. Typical unconfined strengths were between 2.5 and 3.5 tsf. Standard Penetration Test (SPT) values were typically between 13 and 18 blows per foot. Natural moisture contents ranged from 11 to 15 percent.

The groundwater conditions encountered in the borings were not consistent across the site. The groundwater elevations recorded on the boring logs are summarized in Table 7.1. Stabilized readings were not taken in any of the borings. The groundwater, where it was encountered, was typically located near the top of the till stratum, which could indicate a localized, perched condition. For comparison, the water level in the Mississippi River, approximately 0.9 miles to the north of the site, is usually about Elev. 561.0.

Table 7.1 Groundwater Elevations

Boring No.	During Drilling	At End of Boring	24-hour Reading
PB1001	647.5	-	-
RW601	655.2	-	-
RW701	-	-	-
RW801	-	-	-
RW11-1	dry	-	-
RW13-1	dry	-	-
RW13-1A	-	647.1	-

The Illinois State Geological Survey Directory of Coal Mines does not list any mines in the immediate vicinity of the site.

8. Geotechnical Evaluations

Slope stability analyses of the abutments were completed as part of the geotechnical evaluations of Retaining Walls IL-RW11 and IL-RW13. Both abutments will meet AASHTO requirements for slope stability if the aggregate column ground improvement (ACGI) recommendations in the retaining wall SGR's are followed.

Although the upper native soils are relatively weak, they are overconsolidated and exhibit fairly low compressibility. The estimated total settlement under the weight of the proposed walls is up to 2.0 inches. Approximately one-half of this settlement is due to consolidation of the weaker layer immediately below the MSE wall. The remainder of the settlement is due to recompression of the glacial till stratum. The settlement of the upper layer will occur very quickly, especially when the influence of the aggregate columns is considered. The settlement of the till could take up to 200 months to be 90 percent complete. The magnitude and duration of settlement would not preclude construction of the bridge and MSE walls.

Some differential settlement is anticipated near the proposed stage lines. Theoretically, the subgrade soils within approximately 5' of the edge of a stage will consolidate 25% to 33% less than the central portion. When the adjacent stage is placed, the edge of the previous stage will settle to a level approximately equal to the central portion. This would affect pavement constructed on top of the first stage and may be visible in the panel joints on the face of the MSE wall. It could also open some small gaps between the base of the pile-supported abutment cap and the underlying fill. Due to the relatively small settlement magnitude, this is not expected to be a serious concern for this structure.

9. Design Recommendations

The proposed stub abutments should be supported on piles driven into the very stiff to hard glacial till. Table 9.1 lists design parameters for several pile types. Settlement of the softer soils between the bottom of the retaining wall and the glacial till could result in large drag loads on the portion of the piles embedded in the reinforced soil mass. It is estimated that the geotechnical losses on piles installed prior to placing the retaining wall fill would be more than 60 percent of the piles' factored resistance available. To avoid these significant losses, the piles should be driven through oversized sleeves after the softer soils have consolidated.

The sleeves should be sized to provide at least 1.5 inches of clearance around the pile and should extend from the bottom of the abutment to the bottom of reinforced soil mass or base of ACGI working platform, whichever is lower. The piles should be driven after the ACGI-treated soil layer has reached 90 percent of primary

consolidation. This should be specified in the retaining wall plans as a performance requirement for the ACGI design.

Table 9.1 Pile Design Parameters

Location	Cutoff Elevation (ft)	Pile Type	Factored Resistance Available, R_F (kips)	Geotechnical Losses, R_{Sdd} (kips)	Nominal Required Bearing, R_N (kips)	Estimated Pile Length (ft)
081-0182 (WB) North Abutment	669.7	HP 10x42	93 - 184	0	169 - 335	51 - 87
		HP 12x53	114 - 230	0	207 - 418	51 - 88
		HP 12x63	115 - 273	0	209 - 497	51 - 98
		HP 14x73	138 - 318	0	252 - 578	51 - 97
		12″φ x 0.25″ MS	132 - 195	0	240 - 353	51 - 67
		14″φ x 0.25″ MS	156 - 227	0	283 - 413	51 - 67
		14″ precast	146	0	265	43
081-0182 (WB) South Abutment	671.7	HP 10x42	113 - 184	0	206 - 335	52 - 82
		HP 12x53	140 - 230	0	255 - 418	52 - 83
		HP 12x63	142 - 273	0	258 - 497	52 -97
		HP 14x73	172 - 318	0	313 - 578	52 - 95
		12″φ x 0.25″ MS	158 - 195	0	287 - 353	52 - 62
		14″φ x 0.25″ MS	187 - 227	0	341 - 413	52 - 61
		14″ precast	146	0	265	40
081-0183 (EB) North Abutment	676.1	HP 10x42	86 - 184	0	156 - 335	49 - 89
		HP 12x53	106 - 230	0	192 - 418	49 - 92
		HP 12x63	107 - 273	0	194 - 497	49 - 107
		HP 14x73	149 - 318	0	271 - 578	54 - 104
		12″φ x 0.25″ MS	122 - 195	0	221 - 353	49 - 68
		14″φ x 0.25″ MS	144 - 227	0	262 - 413	49 - 67
		14″ precast	146	0	265	41
081-0183 (EB) South Abutment	677.9	HP 10x42	76 - 184	0	138 - 335	48 - 98
		HP 12x53	94 - 230	0	171 - 418	48 - 100
		HP 12x63	95 - 273	0	173 - 497	48 - 117
		HP 14x73	115 - 318	0	209 - 578	48 -114
		12″φ x 0.25″ MS	107 - 195	0	195 - 353	48 - 73
		14″φ x 0.25″ MS	127 - 227	0	231 - 413	48 -73
		14″ precast	146	0	265	45

Note: Where a range of values is shown, pile lengths and capacities may be interpolated between the values given.

A test pile should be required at each abutment. All four test piles may be driven during the first phase of construction. Pile shoes and precoring are not necessary.

The piles should be assumed to provide no lateral resistance. All lateral loads applied to the abutment should be resisted by soil reinforcement attached to the abutment cap. The estimated lateral forces applied by the superstructure and by the backfill should be shown on the plans so that the MSE supplier can design the reinforcement.

The bridge is located in a region of relatively low seismic loading. The subsurface profile to a depth of 100 feet consists of less than 15 feet of soft to stiff clay, overlying very stiff clay and shale bedrock. This profile is indicative of Site Class C. Seismic design parameters for a 1,000-year return period earthquake are listed in Table 9.2. Based on these seismic parameters, the bridge should be assigned to Seismic Performance Zone 1. The soils found at the site are not liquefaction-susceptible for the design earthquake.

Table 9.2 Seismic Design Parameters

PGA =	0.034	F_{pga} =	1.20	A_S =	0.041
S_S =	0.079	F_a =	1.20	S_{DS} =	0.095
S_1 =	0.036	F_v =	1.70	S_{D1} =	0.061

The approach slab support should be according to the current IDOT standard. The approach footing will bear on compacted embankment material. No special subgrade treatment is required.

In areas where the footprint of the proposed MSE wall overlaps the existing abutment wall or the semi-gravity wall between the abutments, the existing structure must be removed. It is recommended that the tops of the existing piles be cut off at least one foot below the base of the wall or the base of the contractor's working platform in areas with ground improvement. Pile holes should be backfilled with compacted native material.

10. Construction Considerations

The first stage of construction will require top-down shoring for near-vertical cuts along the inside shoulders of EB and WB I-74. The height of this shoring exceeds the maximum values in the Bridge Manual's Design Guide 3.13.1 – Temporary Sheet Piling Design. The existing abutment's large pile cap will have a significant impact on the design of the shoring. A contractor-designed temporary wall is recommended. Guide Bridge Special Provision No. 44, Temporary Soil Retention System (Revised: May 11, 2009), should be included in the construction documents.

Although metal shell and precast piles are well-suited for the conditions found at this site, these pile types are more susceptible to obstructions and misalignment during driving. The oversized sleeves provide little room for adjustment if the piles cannot be driven at their plan locations. Piles may be driven prior to placing the reinforced soil mass if oversized sleeves are used and the piles are retapped after the required consolidation period. The piles should be re-driven at least two inches with the same hammer used for the initial drive. This will relieve drag loads that may have developed as the soil settled around the piles.

The removal of the existing structure must be coordinated with the work on the retaining walls. Subsurface portions of the existing structures will affect the constructability and performance of the new structures. It is recommended that the existing pile caps be completely removed to reduce the potential for differential settlement. The tops of the existing piles should be cut off at least one foot below the base of the wall or the base of the contractor's working platform in areas with ground improvement. Pile holes should be backfilled with compacted native material.

References

American Association of State Highway and Transportation Officials (2010). *ASHTO LRFD Bridge Design Specifications, 4th Edition.*

CH2M HILL (2009, September). Structure Geotechnical Report Ramp 7th-A Retaining Wall Structure Number IL-RW10.

CH2M HILL (2009, September). Structure Geotechnical Report Ramp 7th-A Retaining Wall Structure Number IL-RW12.

CH2M HILL (2009, September). Structure Geotechnical Report 12th Avenue Bridge Structure Nos. 081-0182 (WB) and 081-0183 (EB).

CH2M HILL (2009, September). Structure Geotechnical Report 12th Avenue Retaining Wall Structure Number 081-6017.

CH2M HILL (2009, September). Structure Geotechnical Report 12th Avenue Retaining Wall Structure Number 081-6020.

Hanson Professional Services Inc. (2011, May). Structure Geotechnical Report, Retaining Wall IL-RW11, Structure Number. 081-6017.

Hanson Professional Services Inc. (2011, May). Structure Geotechnical Report, Retaining Wall IL-RW13, Structure Number. 081-6020.

Illinois Department of Transportation (2012). *Bridge Manual*.

Illinois Department of Transportation (1999). *Geotechnical Manual*.

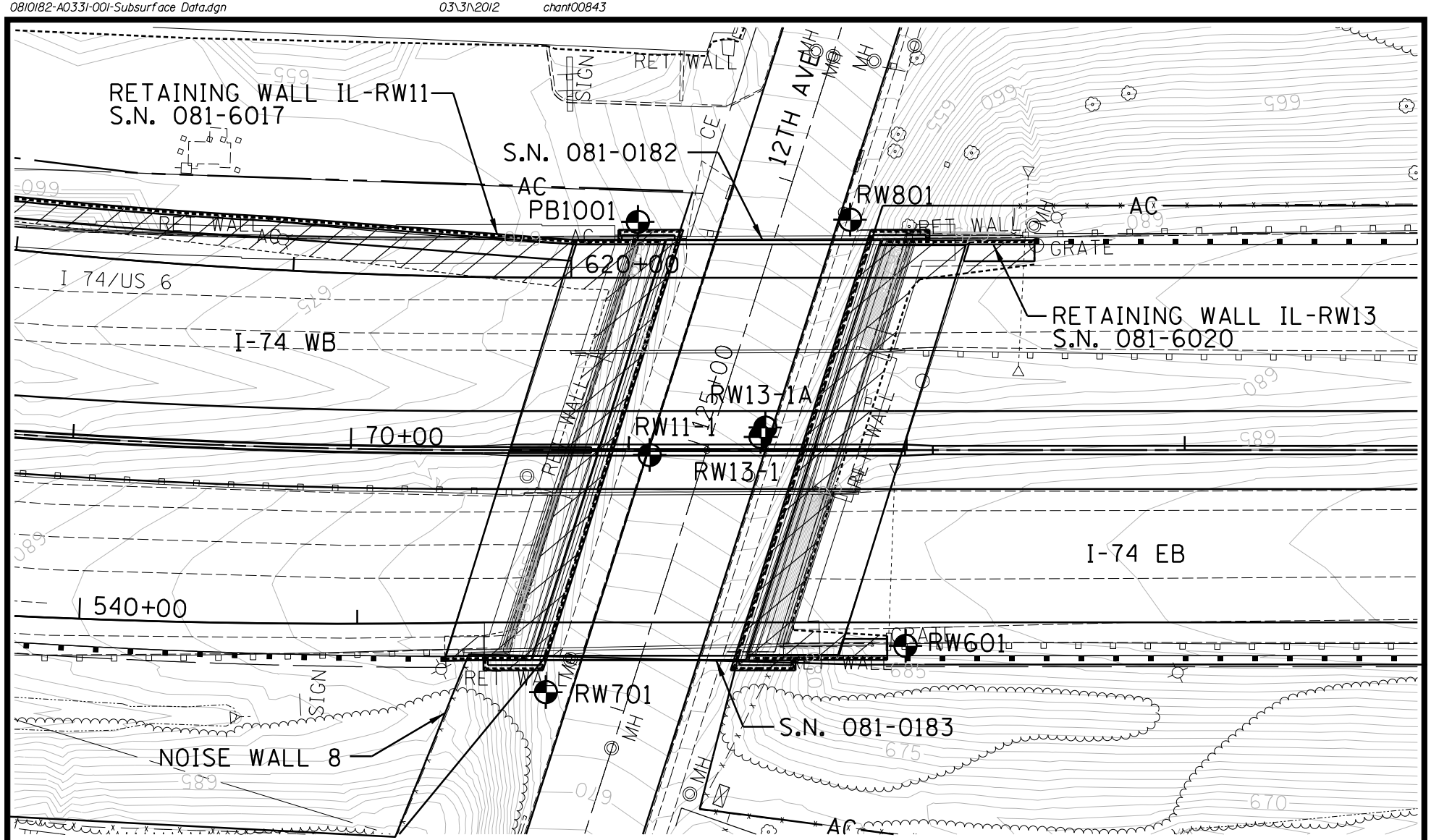
Illinois Department of Transportation (2012). *Standard Specifications for Road and Bridge Construction*.

Illinois State Geological Survey, Rock Island County coal data, Retrieved July 30, 2010 from http://www.isgs.illinois.edu/maps-data-pub/coal-maps/counties/rockisland.shtml.

Appendix

Boring Location Plan
Subsurface Data Profile
Boring Logs

0810182-A0331-001-Subsurface Data.dgn 03\31\2012 chant00843



LEGEND

RW600 BORING LOCATION

0 50 100
SCALE IN FEET

N

HANSON

BORING LOCATION PLAN

I-74 OVER 12TH AVENUE
S.N. 081-0182 & 081-0183
ROCK ISLAND COUNTY, ILLINOIS

08H0120E REV. 3/30/12

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

RW701
Sta. 70+70, 87' RT

	N	Qu	w%	
669.09				
668.59				Topsoil - Grass root matter. Hole offset to bottom of slope adjacent to existing manhole gps point #48
667.59	20			
	6			Silty Clay (CL-ML) - Gray brown, stiff, dry, fine to coarse, rounded-subrounded gravel, fill
	5			
	2			Poorly Graded Sand With Gravel (SP) - Brown, dry, fine to coarse, fine to medium rounded-subrounded gravel, fill
659.09	2			Soft silty clay with wood piece in shoe followed by dark reddish brown sand and clay and old concrete pieces, fill
657.09	3	1.3P		Silty Clay (CL-ML) - Gray moist/wet, soft, high plasticity, fine to coarse, subangular-angular gravel, fill
	10	1.3P		
	20	4.5P		Piece of coarse gravel in toe, possibly caused poor recovery. Stop for day at 3:30pm. Start on 12/14/05 at 8:30am, start mud rotary at 20' after sampling
	12	1.5P		
				No recovery, possibly pounded on gravel
	14			
620.00				
	7	2.5P		
	10	2.0P		
	15			
				Gray, unweathered glacial clay
	16	2.5P		
	17	2.5P		
	23	2.5P		
	20	2.5P		
572.09	24	2.3P		

Bottom of hole = 97.0 feet

RW11-1
Sta. 71+08, 2' RT

	N	Qu	w%	
659.90				
659.70				ASPHALT
659.10				CONCRETE
	9	0.96S	20	Gray with brown mottles, moist, stiff, silty CLAY
656.90		2.13S	20	
		0.55S	19	Brown with gray mottles, moist, stiff, silty CLAY with trace very-fine grained sand
653.90				
652.65	17	1.77B	17	Brown, moist, very stiff, silty CLAY with trace sand
652.40		0.42S	21 [C]	Brown, wet, very stiff, sandy clayey SILT with trace sand and gravel
		2.00P	19	
		1.12S	18	Brown, slightly moist, very stiff, SILT with trace sand and clay
648.40	29	3.44S	13	Gray, slightly moist, very stiff, silty CLAY with trace sand and gravel
	33	5.01B	10	
644.90				

Bottom of hole = 15.0 feet

PB1001
Sta. 71+03, 82' LT

	N	Qu	w%	
655.49				
654.49				Asphalt - 2.5 inches of asphalt followed by gravel-base. Hole offset 9' east of abutment wall
	6			
652.49				Silty Clay (CL) - Light grayish brown, moist, stiff, low plasticity, with iron oxide staining and small metal and miscellaneous fill material, possibly fill
	13	4.5P		
650.49				
	DD 26	2.0P		Sandy Lean Clay, Trace Gravel (CL) - Reddish brown, moist, hard, low plasticity, fine sand with fine to coarse, subrounded-subangular gravel, embedded throughout, possibly fill
647.5 ▽	18	0.3P		
646.49				
	13	<0.25-4.5+		Silty Clay (CL) - Reddish brown, moist/dry, stiff, some gravel, possibly loess
	20	4.5P		Reddish brown, wet, soft, trace very fine sand, loess, Power auger to 7', start HSA
	17	3.0P		
				Sandy Lean Clay, Trace Gravel (CL) - Brown to dark gray, moist, fine rounded-subrounded gravel embedded throughout, hard, glacial till Dark gray
	11	2.5P		
				600.00
				20 2.8P
	13	2.3P		
				20 2.3P
	16	3.5P		
				19 2.5P
	17	4.0P		
				22 2.0P
	22	2.0P		
				26 3.0P
	22	2.5P		
				26 3.5P
	16	3.0P		
600.00				
				76/9" 4.5P Fine sand in shoe
				50/6" Poorly graded sand seam, gray, wet, very dense, fine to medium sand, rapid dilatancy, estimated 50% fines, this seam extends to about 93'
				50/2" 3.8P
558.49				Shale - Dark gray/black, moderately weathered, weak rock, Possible bedrock at 97'
				50/3"
556.24				

Bottom of hole = 99.25 feet

LEGEND

N	Standard Penetration Test N (blows/ft)
Qu	Unconfined Strength (tsf)
w%	Natural Moisture Content (%)
[Q]	Unconsolidated Undrained Triaxial Test
[R]	Consolidated Undrained Triaxial Test
[C]	Consolidation Test
DD ▽ 558.10	Water Surface Elevation Encountered in Boring DD = during drilling 24h = 24 hours after completion

SUBSURFACE DATA PROFILE
STRUCTURE NO. 081-0182 (WB)
STRUCTURE NO. 081-0183 (EB)

PROFESSIONAL DESIGN FIRM LICENSE #184-001084

HANSON
Hanson Professional Services Inc.

JOB NO. 08H0120E
DATE 5/31/11
SHEET NO. 1
3 SHEETS

F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
74	81-1HB-1	ROCK ISLAND	-	
		CONTRACT NO. 64C08		
FED. ROAD DIST. NO. -	ILLINOIS	FED. AID PROJECT		

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

RW601
Sta. 72+00, 70' RT

	N	Qu	w%	
687.16				
686.16				Asphalt Cement Concrete - 1' asphalt cement concrete. Hole offset to shoulder of I-74 Eastbound gps point #49
	10	4.5P		Silty Clay (CL) - Greenish gray, moist, stiff, low plasticity, with fine rounded to subrounded gravel, fill, Power auger for 1ft, HSA to 40ft Possibly pounded on gravel, no recovery
	9	0.8P		
	4			Brown, moist, soft, medium plasticity, fine rounded-subrounded gravel, fill
	3			Soil frozen until 5'
	5			[R] Brown, dark gray, trace organics, faint
18.0				[C] organic odor, no gravel, fill
	10			Dark gray, soft, moist, with brick pieces, fill (LL=28, PI=14)
				Grayish brown, moist, stiff, low plasticity, fine to coarse, subrounded-subangular gravel, fill
	12			Brown, moist, stiff, low plasticity, fine to coarse, subrounded-subangular gravel, fill
	3			Brick pieces, dry
DD				
655.16	8			Brown silty clay, moist, wet at 32', sandy at 31.5', trace organics, medium plasticity, fill
				Sandy Lean Clay Trace Gravel (CL) - Reddish brown, stiff, dry, low plasticity, fine to coarse, subangular-angular gravel, fill-rubble till Possible water at 32' while drilling
	19			
	20			Brown, moist, very stiff, low plasticity, fine to coarse, rounded-subrounded gravel embedded throughout, weathered till Start mud rotary at 40' after sampling
	18			
	22			
	20			Grayish brown, unweathered glacial clay Switch to 10' sampling frequency at 55'
	19			
612.00				

RW13-1
Sta. 71+47, 5' LT

	N	Qu	w%	
658.50				
658.30				ASPHALT
657.60				CONCRETE
	6	0.50P	22	
		1.80P	19	Dark brown, moist, medium stiff, silty CLAY with trace gravel
655.00		1.30P	19	
			14	
		2.00P	15	Brown, moist, sandy CLAY
652.50		2.00P		Brown, moist, silty CLAY
651.50				Hole terminated due to equipment problems. Deformed auger tooth caused sample disturbance. Bottom of hole = 7.0 feet

RW13-1A
Sta. 71+49, 8' LT

	N	Qu	w%	
658.10				
657.90				ASPHALT
657.20				CONCRETE
	8	0.56B	11	
		1.75B	15	Brown and gray, moist, medium stiff, silty CLAY with trace sand
		2.17S	13	
652.10		3.10B	15	
		4.60S	15	Brown, moist, very stiff, clayey SILT with trace sand and gravel
	50/5"		20	
648.10				
647.10				Gray, moist, hard, silty CLAY with trace sand and gravel
Oh	25	4.50P	11	
	30	3.55B	11	
643.10				Bottom of hole = 15.0 feet

612.00				
	21			
	18			
	17			
590.16				Bottom of hole = 97.0 feet

LEGEND

N	Standard Penetration Test N (blows/ft)
Qu	Unconfined Strength (tsf)
w%	Natural Moisture Content (%)
[Q]	Unconsolidated Undrained Triaxial Test
[R]	Consolidated Undrained Triaxial Test
[C]	Consolidation Test
DD	Water Surface Elevation Encountered in Boring
558.10 ▽	DD = during drilling 24h = 24 hours after completion Oh = upon completion

SUBSURFACE DATA PROFILE
STRUCTURE NO. 081-0182 (WB)
STRUCTURE NO. 081-0183 (EB)

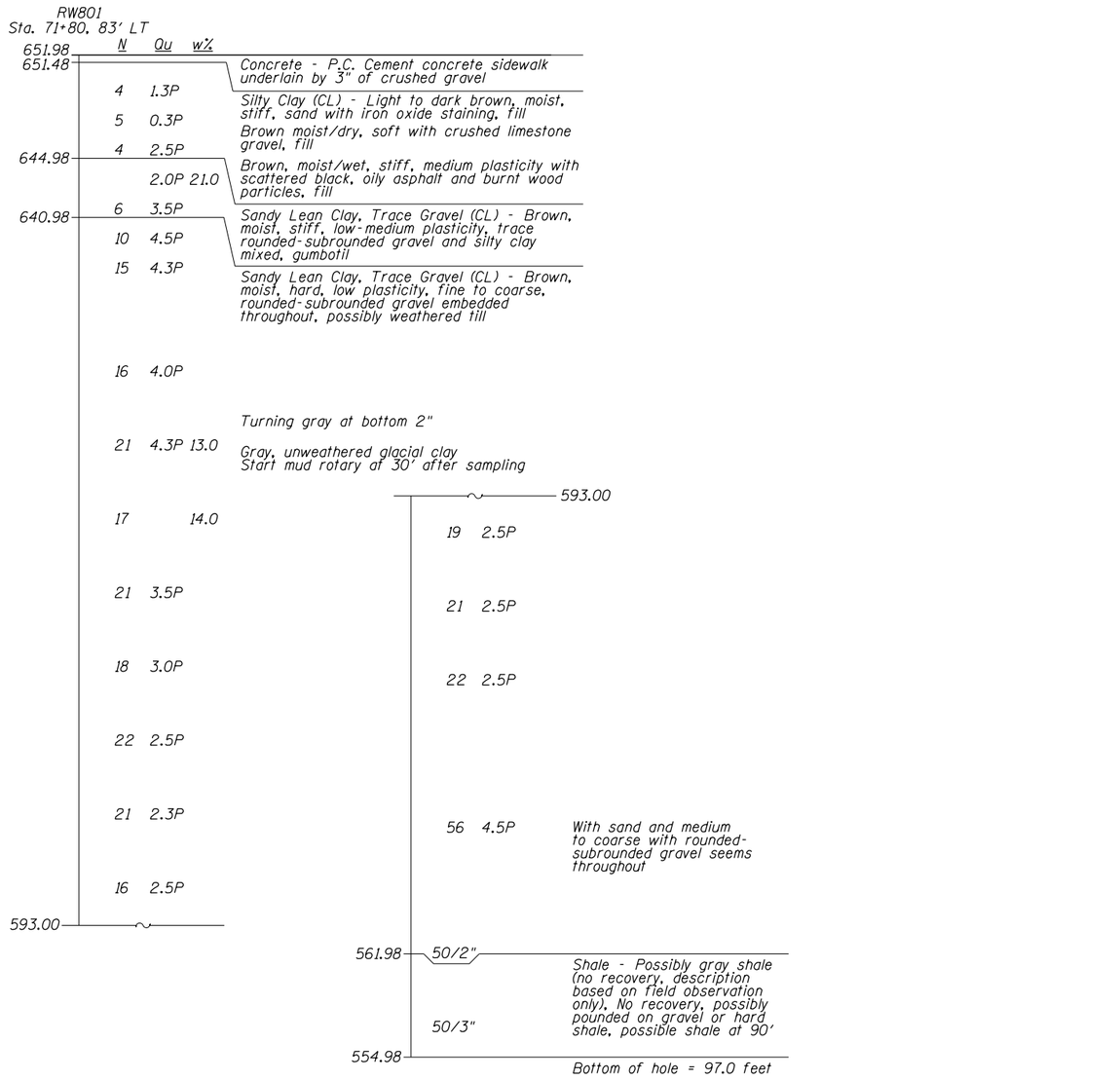
PROFESSIONAL DESIGN FIRM LICENSE #184-001084

HANSON
Hanson Professional Services Inc.

JOB NO. 08H0120E
DATE 5/31/11
SHEET NO. 2
3 SHEETS

F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
74	81-1HB-1	ROCK ISLAND	_	
		CONTRACT NO. 64C08		
FED. ROAD DIST. NO. _	ILLINOIS	FED. AID PROJECT		

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION



LEGEND

N	Standard Penetration Test N (blows/ft)
Qu	Unconfined Strength (tsf)
w%	Natural Moisture Content (%)
Q	Unconsolidated Undrained Triaxial Test
R	Consolidated Undrained Triaxial Test
C	Consolidation Test
DD ▽ 558.10	Water Surface Elevation Encountered in Boring DD = during drilling 24h = 24 hours after completion 0h = upon completion

PROFESSIONAL DESIGN FIRM LICENSE #184-001084

HANSON
Hanson Professional Services Inc.

JOB NO. 08H0120E
DATE 5/31/11
SHEET NO. 3
3 SHEETS

F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
74	81-1HB-1	ROCK ISLAND	_	
		CONTRACT NO. 64C08		
FED. ROAD DIST. NO. _	ILLINOIS	FED. AID PROJECT		

SUBSURFACE DATA PROFILE
STRUCTURE NO. 081-0182 (WB)
STRUCTURE NO. 081-0183 (EB)

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 12/6/05

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** B. Karnik

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=560798.355, E=2459947.258), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. PB1001
Station _____
Offset _____
Ground Surface Elev. 655.49 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter 647.5 ft ▼
Upon Completion _____ ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Asphalt
				2.5 inches of asphalt followed by gravel sub-base□Hole offset 9' east of abutment wall
654.49	2			
	3			**Silty Clay (CL)**
	3			Light grayish brown, moist, stiff, low plasticity, with iron oxide staining and small metal and miscellaneous fill material, possibly fill
652.49	4			
	2			
	8	4.5 P		**Sandy Lean Clay, Trace Gravel (CL)**
	5			Reddish brown, moist, hard, low plasticity, fine sand with fine to coarse, subrounded-subangular gravel embedded throughout, possibly fill
650.49 -5	10			
	5			
	12	2.0 P		**Silty Clay (CL)**
	14			Reddish brown, moist/dry, stiff, some gravel, possibly loess
	15			
	4			
▼	9	0.3 P		Reddish brown, wet, soft, trace very fine sand, loess
	9			
646.49	8			Power auger to 7', start HSA
	4			
-10	6	<0.25-4.5+ P		**Sandy Lean Clay, Trace Gravel (CL)**
	7			Brown to dark gray, moist, fine rounded-subrounded gravel embedded throughout, hard, glacial till
	8			Dark gray
	4			
	8	4.5 P		
	12			
	13			
	4			
	8	3.0 P		
	9			
-15	9			
-20				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
	2			**Sandy Lean Clay, Trace Gravel (CL)**
	5	2.5 P		Brown to dark gray, moist, fine rounded-subrounded gravel embedded throughout, hard, glacial till *(continued)*
	6			
	7			
-25				
	4			
	6	2.3 P		
	7			
	9			
-30				
	5			
	7	3.5 P		
	9			
	10			
-35				
	6			
	7	4.0 P		
	10			
	10			
-40				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 12/6/05

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** B. Karnik

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=560798.355, E=2459947.258), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. PB1001
Station _____
Offset _____
Ground Surface Elev. 655.49 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter 647.5 ft ▼
Upon Completion _____ ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
	7			**Sandy Lean Clay, Trace Gravel (CL)** Brown to dark gray, moist, fine rounded-subrounded gravel embedded throughout, hard, glacial till *(continued)*
	10	2.0		
	12	P		
	13			
-45	7			
	8	2.5		
	14	P		
	12			
-50	6			
	7	3.0		
	9	P		
	11			
-55	6			
	9	2.8		
	11	P		
	13			
-60				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
	6			**Sandy Lean Clay, Trace Gravel (CL)** Brown to dark gray, moist, fine rounded-subrounded gravel embedded throughout, hard, glacial till *(continued)*
	9	2.3		
	11	P		
	13			
-65	6			
	8	2.5		
	11	P		
	12			
-70	6			
	7	2.0		
	15	P		
	14			
-75	6			
	10	3.0		
	16	P		
	14			
-80				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 12/6/05

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** B. Karnik

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=560798.355, E=2459947.258), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. PB1001
Station _____
Offset _____
Ground Surface Elev. 655.49 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter 647.5 ft ▼
Upon Completion _____ ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Sandy Lean Clay, Trace Gravel (CL)	6		
Brown to dark gray, moist, fine rounded-subrounded gravel embedded throughout, hard, glacial till *(continued)*	10 16 24	3.5 P	
-85			
Fine sand in shoe	14		
	26 50/3	4.5 P	
-90			
Poorly graded sand seam, gray, wet, very dense, fine to medium sand, rapid dilatancy, estimated 50% fines, this seam extends to about 93'	50/6		
-95	36		
	50/2	3.8 P	
558.49			
Shale Dark gray/black, moderately weathered, weak rock□Possible bedrock at 97'	28		
556.24	50/3		
End of Boring -100			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 12/15/05

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** B. Karnik

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=560656.718, E=2459835.618), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. RW601
Station _____
Offset _____
Ground Surface Elev. 687.16 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter 655.2 ft ▼
Upon Completion _____ ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Asphalt Cement Concrete
				1' asphalt cement concrete□Hole offset to shoulder of I-74 Eastbound gps point #49
				686.16
	4			
	5	4.5		**Silty Clay (CL)**
	5	P		Greenish gray, moist, stiff, low plasticity, with fine rounded to subrounded gravel, fill□Power auger for 1ft, HSA to 40ft
	4			
	6			
	5	0.8		Possibly pounded on gravel, no recovery
	4	P		
-5	3			
	2			Brown, moist, soft, medium plasticity, fine rounded-subrounded gravel, fill
	2			Soil frozen until 5'
	2			
	3			
	WOH			Brown, dark gray, trace organics, faint organic odor, no gravel, fill
	WOH			
	3			
	4			
	WOH			Dark gray, soft, moist, with brick pieces, fill
-10	2			
	3			
	4			
			18.0	
	2			Grayish brown, moist, stiff, low plasticity, fine to coarse, subrounded-subangular gravel, fill
	4			
	6			
-15	8			
-20				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
	4			**Silty Clay (CL)**
	5			Greenish gray, moist, stiff, low plasticity, with fine rounded to subrounded gravel, fill□Power auger for 1ft, HSA to 40ft
	7			
	8			
				(continued)
				Brown, moist, stiff, low plasticity, fine to coarse, subrounded-subangular gravel, fill
-25				
	1			Brick pieces, dry
	2			
	1			
	2			
-30				
	3			Brown silty clay, moist, wet at 32', sandy at 31.5', trace organics, medium plasticity, fill
	3			
	5			
	5			655.16 ▼
				Sandy Lean Clay Trace Gravel (CL)
				Reddish brown, stiff, dry, low plasticity, fine to coarse, subangular-angular gravel, fill-rubble till□Possible water at 32' while drilling
-35				
	7			
	9			
	10			
	11			
-40				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 12/15/05

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** B. Karnik

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=560656.718, E=2459835.618), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. RW601
Station _____
Offset _____
Ground Surface Elev. 687.16 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter 655.2 ft ▼
Upon Completion _____ ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
	5		
	8		
	12		
	13		
-45	5		
	7		
	11		
	12		
-50	7		
	9		
	13		
	15		
-55	5		
	8		
	12		
	14		
-60			

Sandy Lean Clay Trace Gravel (CL)
Reddish brown, stiff, dry, low plasticity, fine to coarse, subangular-angular gravel, fill-rubble till□Possible water at 32' while drilling *(continued)*
Brown, moist, very stiff, low plasticity, fine to coarse, rounded-subrounded gravel embedded throughout, weathered till
Start mud rotary at 40' after sampling
Grayish brown, unweathered glacial clay
Switch to 10' sampling frequency at 55'

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
-65	6		
	7		
	12		
	14		
-70			
-75	6		
	9		
	12		
	16		
-80			

Sandy Lean Clay Trace Gravel (CL)
Reddish brown, stiff, dry, low plasticity, fine to coarse, subangular-angular gravel, fill-rubble till□Possible water at 32' while drilling *(continued)*

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 12/15/05

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** B. Karnik

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=560656.718, E=2459835.618), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. RW601
Station _____
Offset _____
Ground Surface Elev. 687.16 **ft**

Surface Water Elev. _____ **ft**
Stream Bed Elev. _____ **ft**

Groundwater Elev.:
First Encounter 655.2 **ft** ▼
Upon Completion _____ **ft**
After _____ **Hrs.** _____ **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Sandy Lean Clay Trace Gravel (CL) Reddish brown, stiff, dry, low plasticity, fine to coarse, subangular-angular gravel, fill-rubble till□Possible water at 32' while drilling *(continued)*			
-85	6		
	8 10 13		
-90			
-95	5		
	7 10 12		
590.16			
End of Boring			
-100			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 12/13/05

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** B. Karnik

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=560773.1, E=2459776.703), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. RW701
Station _____
Offset _____
Ground Surface Elev. 669.09 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter _____ ft
Upon Completion _____ ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Topsoil 668.59 Grass root matter□Hole offset to bottom of slope adjacent to existing manhole gps point #48 667.59	6 10 10 6			**Sandy Lean Clay Trace Gravel (CL)** Gray, moist, soft/stiff, medium plasticity, fine to medium, rounded-subrounded gravel, till *(continued)* Piece of coarse gravel in toe, possibly caused poor recovery Stop for day at 3:30 pm, Start on 12/14/05 at 8:30 am, start mud rotary at 20' after sampling	4 8 12 14	 4.5 P	
Silty Clay (CL-ML) Gray brown, stiff, dry, fine to coarse, rounded-subrounded gravel, fill	4 4 2 6						
Poorly Graded Sand With Gravel (SP) Brown, dry, fine to coarse, fine to medium rounded-subrounded gravel, fill	2 -5 2 3 2			-25	4		
	3 1 1 2				5 7 7	1.5 P	
Soft silty clay with wood piece in shoe followed by dark reddish brown sand and silty clay and old concrete pieces, fill 659.09	2 1 1 -10 6			-30	4		
Silty Clay (CL-ML) Gray, moist/wet, soft, high plasticity, fine to coarse, subangular-angular gravel, fill 657.09	3 1 2 3	1.3 P		No recovery, possibly pounded on gravel	6 8 10		
Sandy Lean Clay Trace Gravel (CL) Gray, moist, soft/stiff, medium plasticity, fine to medium, rounded-subrounded gravel, till	3 4 6 6	1.3 P					
-15				-35	2		
					2 5 6	2.5 P	
-20				-40			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 12/13/05

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** B. Karnik

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=560773.1, E=2459776.703), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. RW701
Station _____
Offset _____
Ground Surface Elev. 669.09 **ft**

Surface Water Elev. _____ **ft**
Stream Bed Elev. _____ **ft**

Groundwater Elev.:
First Encounter _____ **ft**
Upon Completion _____ **ft**
After _____ **Hrs.** _____ **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
	3		
	3	2.0	
	7	P	
	8		
-45			
	4		
	6		
	9		
	11		
-50			
-55			
	5		
	6	2.5	
	10	P	
	11		
-60			

Sandy Lean Clay Trace Gravel (CL)
Gray, moist, soft/stiff, medium plasticity, fine to medium, rounded-subrounded gravel, till *(continued)*

Gray, unweathered glacial clay

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
-65	5		
	7	2.5	
	10	P	
	12		
-70			
-75	6		
	9	2.5	
	14	P	
	15		
-80			

Sandy Lean Clay Trace Gravel (CL)
Gray, moist, soft/stiff, medium plasticity, fine to medium, rounded-subrounded gravel, till *(continued)*

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 12/13/05

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** B. Karnik

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=560773.1, E=2459776.703), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. RW701
Station _____
Offset _____
Ground Surface Elev. 669.09 **ft**

Surface Water Elev. _____ **ft**
Stream Bed Elev. _____ **ft**

Groundwater Elev.:
First Encounter _____ **ft**
Upon Completion _____ **ft**
After _____ **Hrs.** _____ **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
				Sandy Lean Clay Trace Gravel (CL) Gray, moist, soft/stiff, medium plasticity, fine to medium, rounded-subrounded gravel, till *(continued)*
-85	6			
	9 11 13	2.5 P		
-90				
-95	6			
	10 14 15	2.3 P		
572.09				
				End of Boring
-100				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 12/8/05

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** B. Karnik

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=560683.901, E=2459983.026), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. RW801
Station _____
Offset _____
Ground Surface Elev. 651.98 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter _____ ft
Upon Completion _____ ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
651.48				**Concrete** P.C. Cement concrete sidewalk underlain by 3" of crushed gravel
	4			**Silty Clay (CL)** Light to dark brown, moist, stiff, sand with iron oxide staining, fill
	2	1.3		
	2	P		
	1			
	4			Brown, moist/dry, soft, with crushed limestone gravel, fill
	3	0.3		
	2	P		
-5	3			
	2			Brown, moist/wet, stiff, medium plasticity with scattered black, oily asphalt and burnt wood particles, fill
	2	2.5		
	2	P		
644.98	3			
				Sandy Lean Clay, Trace Gravel (CL)
		2.0	21.0	Brown, moist, stiff, low-medium plasticity, trace rounded-subrounded gravel and silty clay mixed, gumbotil
		P		
	3			
-10	3	3.5		
	3	P		
640.98	4			
	4			**Sandy Lean Clay, Trace Gravel (CL)**
	4	4.5		Brown, moist, hard, low plasticity, fine to coarse, rounded-subrounded gravel embedded throughout, possibly weathered till
	6	P		
	9			
	5			
	6	4.3		
	9	P		
-15	9			
-20				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
	5			**Sandy Lean Clay, Trace Gravel (CL)**
	7	4.0		Brown, moist, hard, low plasticity, fine to coarse, rounded-subrounded gravel embedded throughout, possibly weathered till *(continued)*
	9	P		
	11			
-25				Turning gray at bottom 2"
	7			
	9	4.3	13.0	
	12	P		
	13			
-30				Gray, unweathered glacial clay
	6			Start mud rotary at 30' after sampling
	7		14.0	
	10			
	10			
-35				
	6			
	9	3.5		
	12	P		
	14			
-40				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 12/8/05

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** B. Karnik

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=560683.901, E=2459983.026), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. RW801
Station _____
Offset _____
Ground Surface Elev. 651.98 **ft**

Surface Water Elev. _____ **ft**
Stream Bed Elev. _____ **ft**

Groundwater Elev.:
First Encounter _____ **ft**
Upon Completion _____ **ft**
After _____ **Hrs.** _____ **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Sandy Lean Clay, Trace Gravel (CL) Brown, moist, hard, low plasticity, fine to coarse, rounded-subrounded gravel embedded throughout, possibly weathered till *(continued)*	5			**Sandy Lean Clay, Trace Gravel (CL)** Brown, moist, hard, low plasticity, fine to coarse, rounded-subrounded gravel embedded throughout, possibly weathered till *(continued)*	5		
	7 11 13	3.0 P			7 12 14	2.5 P	
-45	5			-65	5		
	9 13 15	2.5 P			9 12 15	2.5 P	
-50	5			-70	6		
	9 12 14	2.3 P			9 13 14	2.5 P	
-55	5			-75			
	7 9 12	2.5 P					
-60				-80			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
CH2M HILL

SOIL BORING LOG

Date 12/8/05

ROUTE I-74 **DESCRIPTION** New I-74 Bridge Over Mississippi River - Illinois Approach **LOGGED BY** B. Karnik

SECTION I-74 Bridge over Mississippi River **LOCATION** (N=560683.901, E=2459983.026), **SEC.** 32, **TWP.** 18N, **RNG.** 1W, 4th **PM**

COUNTY Rock Island **DRILLING METHOD** HSA, CME 55 **HAMMER TYPE** CME AUTOMATIC

STRUCT. NO. _____
Station _____

BORING NO. RW801
Station _____
Offset _____
Ground Surface Elev. 651.98 **ft**

Surface Water Elev. _____ **ft**
Stream Bed Elev. _____ **ft**

Groundwater Elev.:
First Encounter _____ **ft**
Upon Completion _____ **ft**
After _____ **Hrs.** _____ **ft**

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Sandy Lean Clay, Trace Gravel (CL) Brown, moist, hard, low plasticity, fine to coarse, rounded-subrounded gravel embedded throughout, possibly weathered till *(continued)* With sand and medium to coarse with rounded-subrounded gravel seams throughout		18		
		29 27 36	4.5 P	
	-85			
	561.98 -90	50/2		
Shale Possibly gray shale (no recovery description based on field observation only)□No recovery, possibly pounded on gravel or hard shale, possible shale at 90'	-95	50/3		
	554.98			
End of Boring	-100			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

HANSON

SOIL BORING LOG

Date 6/24/10

ROUTE F.A.I. 74 **DESCRIPTION** I-74 Over Mississippi River **LOGGED BY** JMB

SECTION 81-1-2 **LOCATION** SW¼ of SEC. 33, TWP. 18N, RNG. 1W, 4th P.M.

COUNTY Rock Island **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** Auto

STRUCT. NO. 081-6017
Station
BORING NO. RW 11-1
Station 71+08
Offset 2' Rt.
Ground Surface Elev. 659.9 ft

Surface Water Elev.
Stream Bed Elev.

Groundwater Elev.:
First Encounter NE ft
Upon Completion ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
ASPHALT 659.70 / CONCRETE 659.10				
Gray with brown mottles, moist, stiff, silty CLAY	2	4 4 5	0.96S	20
656.90				
Brown with gray mottles, moist, stiff, silty CLAY with trace very-fine grained sand	4		2.13S	20
			1.10S	19
653.90	6	5 7 10	1.77B	17
652.65				
Brown, wet, very stiff, sandy clayey SILT with trace sand and gravel 652.40	8		0.42S	21
Brown, slightly moist, very stiff, SILT with trace sand and clay			2.00P	19
			2.24S	18
	10			
648.40		10 13 16	3.44S	13
Gray, slightly moist, very stiff, silty CLAY with trace sand and gravel	12			
	14	7 15 18	5.01B	10
644.90				
End of Boring				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

HANSON

SOIL BORING LOG

Date 6/24/10

ROUTE F.A.I. 74 **DESCRIPTION** I-74 Over Mississippi River **LOGGED BY** JMB

SECTION 81-1-2 **LOCATION** NW¼ of SEC. 4, TWP. 17N, RNG. 1W, 4th P.M.

COUNTY Rock Island **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** Auto

STRUCT. NO. 081-6020
Station
BORING NO. RW 13-1
Station 71+47
Offset 5' Lt.
Ground Surface Elev. 658.5 ft

Surface Water Elev.
Stream Bed Elev.

Groundwater Elev.:
First Encounter NE ft
Upon Completion ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
ASPHALT 658.30				
CONCRETE 657.60				
Dark brown, moist, medium stiff, silty CLAY with trace gravel	2	2 3 3	0.50P	22
655.00			1.80P	19
Brown, moist, sandy CLAY	4		1.30P	19
			2.00P	14
			2.00P	15
652.50	6			
Brown, moist, silty CLAY				
651.50				
Hole terminated due to equipment problems. Deformed auger tooth caused sample disturbance. End of Boring				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

HANSON

SOIL BORING LOG

Date 6/24/10

ROUTE F.A.I. 74 **DESCRIPTION** I-74 Over Mississippi River **LOGGED BY** JMB

SECTION 81-1-2 **LOCATION** NW¼ of SEC. 4, TWP. 17N, RNG. 1W, 4th P.M.

COUNTY Rock Island **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** Auto

STRUCT. NO. 081-6020
Station
BORING NO. RW 13-1A
Station 71+49
Offset 8' Lt.
Ground Surface Elev. 658.1 ft

Surface Water Elev.
Stream Bed Elev.

Groundwater Elev.:
First Encounter ft
Upon Completion 647.1 ft ▽
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
ASPHALT 657.90 / CONCRETE 657.20			
Brown and gray, moist, medium stiff, silty CLAY with trace sand	3 4 4	0.56B	11
2			
		1.75B	15
		2.17S	13
4			
652.10			
6 Brown, moist, very stiff, clayey SILT with trace sand and gravel		3.10B	15
		4.60S	15
8			
	50/5"		20
648.10			
10 Gray, moist,hard, silty CLAY with trace sand and gravel ▽			
	8 12 13	4.50P	11
12			
	7 12 18	3.55B	11
14			
643.10			
End of Boring			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)