

Original Report Date: <u>2-22-2013</u>	Proposed SN: <u>027-0103</u>	Route: <u>IL 54 (FAP 71)</u>
Revised Date: <u>4-12-2013</u>	Existing SN: <u>027-0077</u>	Section: <u>(115BR) BR</u>
Geotechnical Engineer: <u>Terry McCleary, McCleary Engineering</u>	County: <u>Ford</u>	
Structural Engineer: <u>Joseph Lowrance, Farnsworth Group</u>	Contract: <u>66943</u>	

Indicate the proposed structure type, substructure types, and foundation locations (attach plan and elevation drawing): **Single span structure, 91.6 ft. in total length from back to back of abutments. The superstructure will be supported by integral abutments with no piers. Six piling are estimated for each abutment. Because of the differing soil strengths found in the two sets of borings a test pile is strongly recommended for each abutment. Abutment loadings are anticipated to be near 1600 kips and the foundation width near 35 ft.**

Discuss the existing boring data, existing plans foundation information, new subsurface exploration and need for any additional exploration to be provided with SGR Technical Memo (attach all data and subsurface profile plot): **Two borings were taken for the existing structure in 1980. Two new borings were taken for the proposed structure in 2009. Both sets of borings show stiff to hard cohesive soils however the 2009 borings show higher unconfined compressive strength. The existing structure is a single span with driven metal shell supported abutments. See the attached boring logs and test pile data.**

Provide the location and maximum height of any new soil fill or magnitude of footing bearing pressure. Estimate the amount and time of the expected settlement. Indicate if further testing, analysis, and/or ground improvement/treatment is necessary: **Approximately 2 ft. of fill is to be placed at the abutments. The estimated additional wt. of 240 psf from this fill is not expected to have an adverse effect on existing soils as they are of relatively high shear strength and moderate moisture content. Using a strength limit state analysis, the resulting factored footing pressures are approx. 6.0 tsf using a $\phi = 0.5$. Should a spread footing be desired a more detailed analysis is recommended during the design phase of the project where the size of footing is known and a service limit analysis can be performed.**

Identify any new cuts or fill slope angles and heights. Estimate the factor of safety against slope failure. Indicate if further testing, analysis or ground improvement/treatment is necessary. **Two feet of new fill and pavement will be added to the current grade while maintaining a 2:1 (H:V) end slope on the stream side of the abutments. The factor of safety of the proposed end slope is 4.9 for short term undrained conditions. Long term, drained conditions resulted in a factor of safety of near 1.5. A small fraction of the undrained cohesion is required to obtain this value. The existing slopes are currently considered to be in a drained condition and show no signs of any problems.**

Indicate at each substructure, the 100-year and 500-year total scour depths in the Hydraulics report, the non-granular scour depth reduction, the proposed ground surface, and the recommended foundation design scour elevations. **No scour was accounted for at the abutments per policy. Scour depths are presumed to be at the bottom of the proposed abutments, 748.42 ft. Elev at the south abutment and 748.45 ft. Elev at the north abutment.**

Determining the seismic soil site class, the seismic performance zone, the 0.2 and 1.0 second design spectral accelerations and indicate if that the soils are liquefiable. **Using the 2009 borings the seismic site class is C with an SPZ=1, SDs=0.146 and SD1=0.084. Liquefaction is not a concern in a site performance zone, SPZ = 1.**

Confirm feasibility of the proposed foundation or wall type and provide design parameters. Attach a pile design table indicating feasible pile types, various nominal required bearings, factored resistances available and corresponding estimated lengths at locations where piles will be used. Provide factored bearing resistance and unit sliding resistance at various elevations and confirm no ground improvement/treatment is necessary where spread footings are proposed. Estimated top of rock elevations as well as preliminary skin friction and end bearing values shall be indicated when drilled shafts are proposed. **After discussing with BBS and reviewing the pile driving data of the existing structure, the author believes a metal shell pile may be the most appropriate pile type for this project. The high Q_u values at relatively shallow depth were initially a concern but the N-values are relatively low and the existing structure is supported on driven metal shell piling. Because the pile driving records of the existing structure show the metal shells were driven safely, without damage to the pile, the author recommends a Metal Shell be used. See attached estimated pile length design table. Per ABD 12.3, the MS 14 and H-piling are allowed for integral abutments. Assumptions include: Bottom of Abutment elevation = 748.42 for the South Abutment and 748.45 for the North Abutment.; no geotechnical losses accounted for; and a 2.0 ft. pile embedment into the abutment is presumed.**

Calculate the estimated water surface elevation and determine the need for cofferdam(s) and seal coat: **There will be no need for a cofferdam as there will be no in stream pier work.**

Assess the need for sheeting/soil retention versus using a temporary construction slope and provide recommendation for the most feasible option. **At this time the author anticipates the structure to be constructed under closed road conditions therefore no sheet piling will be needed at a stage line. There will be no piers and therefore no in stream work is anticipated.**

McCleary
Engineering

May 11, 2013

Mr. Paul Loete
Illinois Department of Transportation
Attn: Steve Ferguson
700 East Norris Drive
Ottawa, IL 61350

RE: Geotechnical Memorandum
IL 54 (FAP 71)
Section (115BR)BR
Ford County
SN027-0103 (Proposed)

Mr. Ferguson:

Please find attached the revised Pile Length table resulting from the possible need to pre-core the piling at the north abutment to facilitate the use of an integral abutment at this structure. Using the 1980 boring logs and pile driving data this extra effort is not needed and was not included in the original approved SGR. However, using the 2009 boring logs the north abutment soils are characterized to be very stiff to hard with unconfined compressive strengths by RIMAC method between 3.0 tsf and 5.8 tsf.

We estimate the expansion of the bridge to be in the realm of 0.3 inch. The Bridge Office requested the SGR to recommend metal shell piles. With this recommendation the only metal shell pile that should be used is the 14 inch diameter. With this size of pile and the limited sizes of commonly available augers to drill the pre-core holes we recommend the pre-core hole to be 18 inch diameter. The depth of pre-core was presumed to be 10 ft. below the bottom of the abutment elevation. The resulting bottom of the pre-core elevation is 738.42 ft.

This pre-core is only required at the north abutment. At this time the Bureau of Bridges and Structures asks that the pre-core holes be filled with bentonite and not loose sand. This can occur prior to or after driving the piles. If this is done after the piles are driven the bentonite may be placed in flowable slurry or in dry form. If the dry form is chosen the bentonite should be in a fine powder form.

With this change to the pile table we took the opportunity to modify the soil profile, shifting the logs down relating the elevations of the bottom of the abutment with the top of boring elevations.

If you have any questions please don't hesitate to contact me at (815) 780-8486 or via email at terry@mcclarengineering.com . It has been a pleasure working with you on this work project.

Sincerely,



Terrence L. McCleary
McCleary Engineering

PILE LENGTH TABLE

North Abutment, Using Boring B-1 (2009) Pre-core**			South Abutment, Using Boring B-2 (2009)		
Nominal Required Bearing (KIPS)	Factored Resistance Available (KIPS)	Estimated Pile Length (Ft.)	Nominal Required Bearing (KIPS)	Factored Resistance Available (KIPS)	Estimated Pile Length (Ft.)
MS 14 with 0.25" wall			MS 14 with 0.25"		
233	128	28	222	122	24
258	142	33	305	168	29
385	212	39	334	184	33
413	227	48	413	227	39
MS 14 with 0.312" wall			MS 14 with 0.312" wall		
364	200	41	329	181	31
364	200	46	365	201	36
454	250	51	425	234	41
513	282	56	513	283	47
HP 10x42			HP 10x42		
211	116	46	205	113	33
272	150	51	240	132	38
308	170	56	273	150	43
335	184	62	335	185	49
HP 12x53			HP 12x53		
220	121	36	117	97	24
219	121	41	240	132	29
240	132	44	257	141	33
326	179	48	299	165	38
364	200	53	339	187	43
418	229	62	418	229	49
HP 12x63			HP 12x63		
368	202	53	323	178	41
413	227	58	372	204	46
461	253	65	430	237	51
497	273	71*	497	273	57
HP 14x73			HP 14x73		
295	162	44	291	160	29
408	224	48	318	175	33
429	236	51	368	203	38
481	265	56	415	228	43
503	276	60	487	268	48
578	318	67	578	318	54
HP 14x89			HP 14x89		
435	239	51	457	251	46
509	280	60	530	292	51
606	334	70	595	328	56
705	387	80*	705	387	60

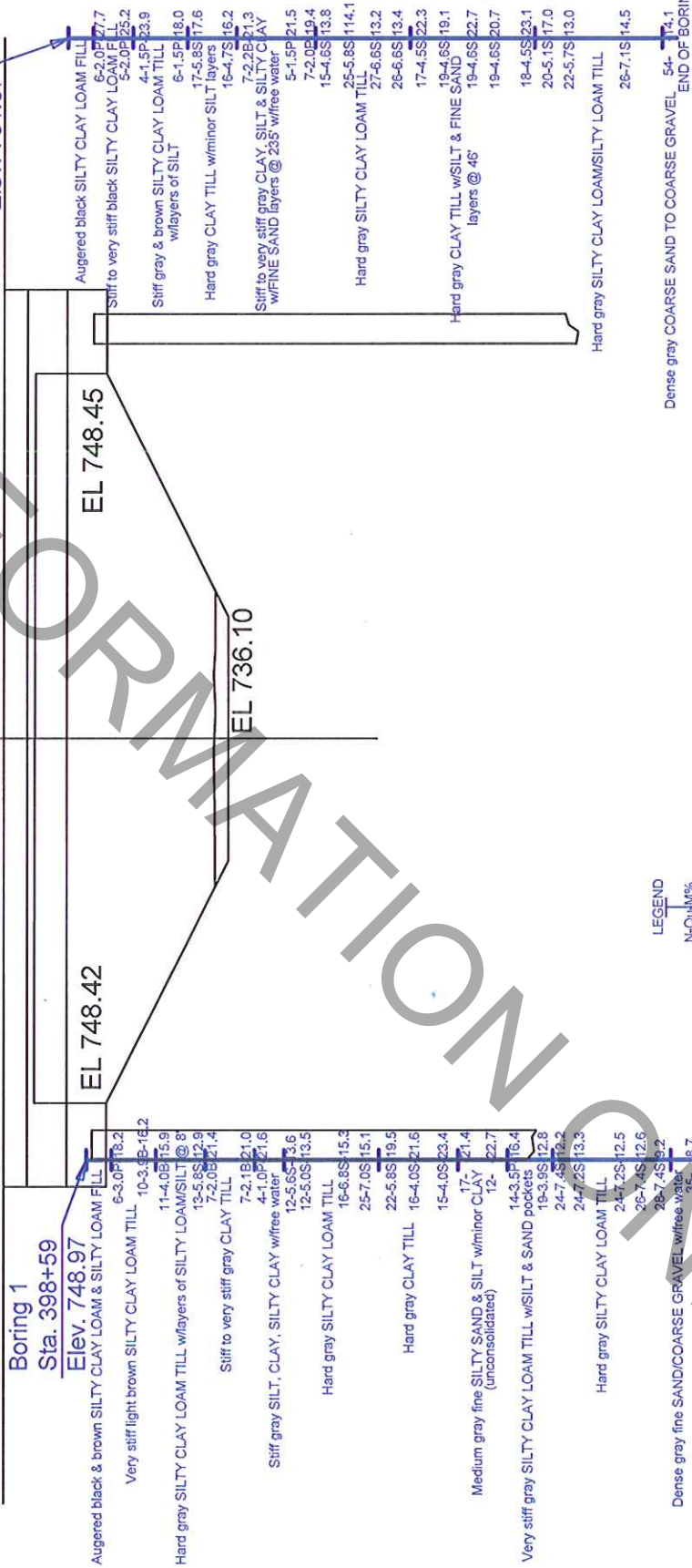
*Beyond the end of the boring.

**North Abutment is to be pre-cored to an elevation of 738.42 ft. The diameter of pre-core is 18 in.

FOR INFORMATION ONLY

Bridge Omission Sta. =
398+56.24-399+45.76

Boring 2
Sta. 399+71
Elev. 751.07



EL 748.45

EL 736.10

EL 748.42

Designed by:		Date:	Boring soil map		Route	Section	County
Drawn by:		Date: 5/9/2013	Scale =	Sheet 1 of 1	FAP 71	(115 BR)BR	FORD
Checked by:		Date:	Sta. _____	to Sta. _____	Bridge number: 06 027-007 / new 027-0103		

McClary Engineering



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Google earth

Google earth

feet
meters



IMMATION ONLY

WATERWAY INFORMATION

Pond	Existing Low Grade Elev.		Proposed Low Grade Elev.		St. No.	Elev.
	Top	Bottom	Top	Bottom		
1	2.00	5.98	6.67	7.48.4	0.1	7.49.5
2	2.50	6.51	7.24	8.05	0.2	8.07
3	3.00	6.91	7.64	8.18	0.3	8.21
4	3.50	7.31	8.04	8.51	0.4	8.54
5	4.00	7.71	8.44	8.91	0.5	8.94
6	4.50	8.11	8.84	9.31	0.6	9.34
7	5.00	8.51	9.24	9.71	0.7	9.74
8	5.50	8.91	9.64	10.11	0.8	10.14
9	6.00	9.31	10.04	10.51	0.9	10.54
10	6.50	9.71	10.44	10.91	1.0	10.94

DESIGN SCOUR ELEVATION TABLE

Design Scour Elevations (ft.)	W. Abut.	S. Abut.
0100	748.42	748.45
0500	748.42	748.45

HIGHWAY CLASSIFICATION

F.A.P. Route 71 (R. 54) Major Arterial
 Functional Class: Class II Truck Route
 A.D.T.: 100 (2013), 2400 (2033)
 A.D.T.F.: 172
 Design Speed: 55 M.P.H.
 Design Life: 20 Years
 Directional Distribution: 50/50
LOADING HL-93
 Allow 50# sq. ft. for future wearing surface.

DESIGN SPECIFICATIONS

ASHTO LRFD Bridge U.S. Units.
 Design Specifications, Customary U.S. Units,
 6th Edition, with 2012 Interims

DESIGN STRESSES

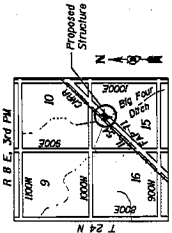
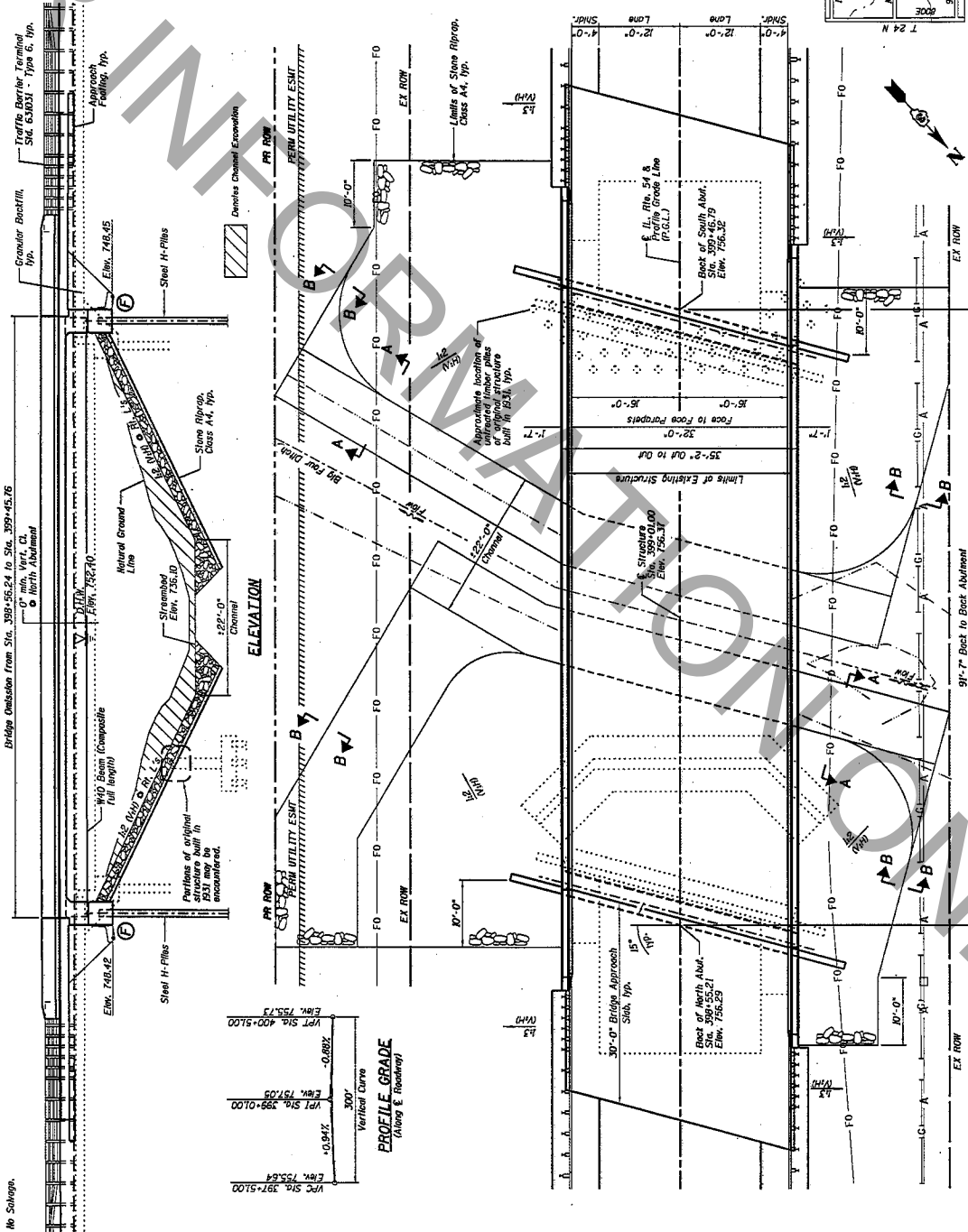
FIELD UNITS
 $f'_c = 4,500$ psi (Reinforcement)
 $f_y = 60,000$ psi (AASHTO M270 Grade 50W)
 $f_y = 50,000$ psi (AASHTO M270 Grade 50W)

SEISMIC DATA

Seismic Performance Zone (SPZ) = 1
 Design Spectral Acceleration of 1.0 sec. (SD1) = 0.084
 Design Spectral Acceleration of 0.2 sec. (SD2) = 0.146
 Soil Site Class = C

GENERAL PLAN
 ILL. ROUTE 54 OVER
 BIG FISH DITCH
 E.A.P. 71 - SECTION 015 BRBR
 FORD COUNTY
 STATION 399+01.00
 STRUCTURE NO. 027-0103

Background: Observed "C" on Northwest Abutment of Railroad Bridge, West of Ill. Route 54 S.N. 027-0077, Sta. 398+51.55, 82.21' W. Elev. = 756.87
 Existing Structure: Structure No. 027-0077 was constructed in 1986 as F.A.P. 71 Section 115 BR. In 2006, the two westernmost beams were replaced as F.A.P. 71 Section 115 BR. The structure consists of open concrete abutments supported by precast concrete piles. The back-to-back of abutment length is 84'-14", and the out-to-out width is 33'-0". The span length is 80'-0" (center-to-center of bearing) with a 15'-0" overhang. Traffic will be detoured during construction.



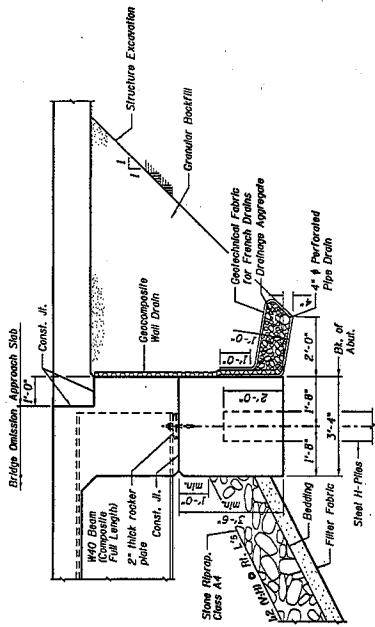
LOCATION SKETCH

PLAN

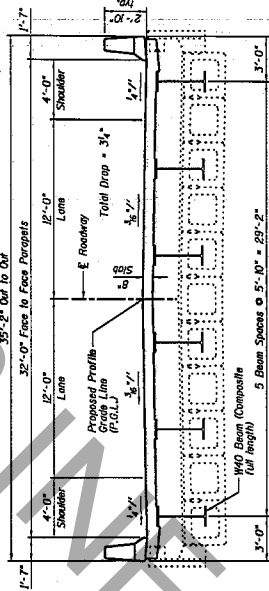
STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION

F.A.P. R.F.E. 11	SECTION 015 BRBR	COUNTY FORD	CONTRACT NO. 60943	TOTAL SHEET NO.
DESIGNED - ICR	CHECKED - JMK	REVISIONS	DATE - 02/22/13	24-8829
DIAGN - JMK	CHECKED - MSH			

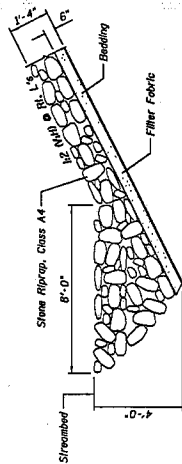
Fainsworth
 2700 W. 111th St.
 Mokena, IL 60449-1074



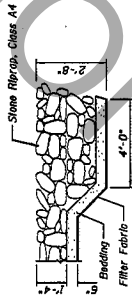
SECTION THRU ABUTMENT
(horiz. dimensions @ R/L 1/2)



CROSS SECTION
(Looking South)



SECTION A-A

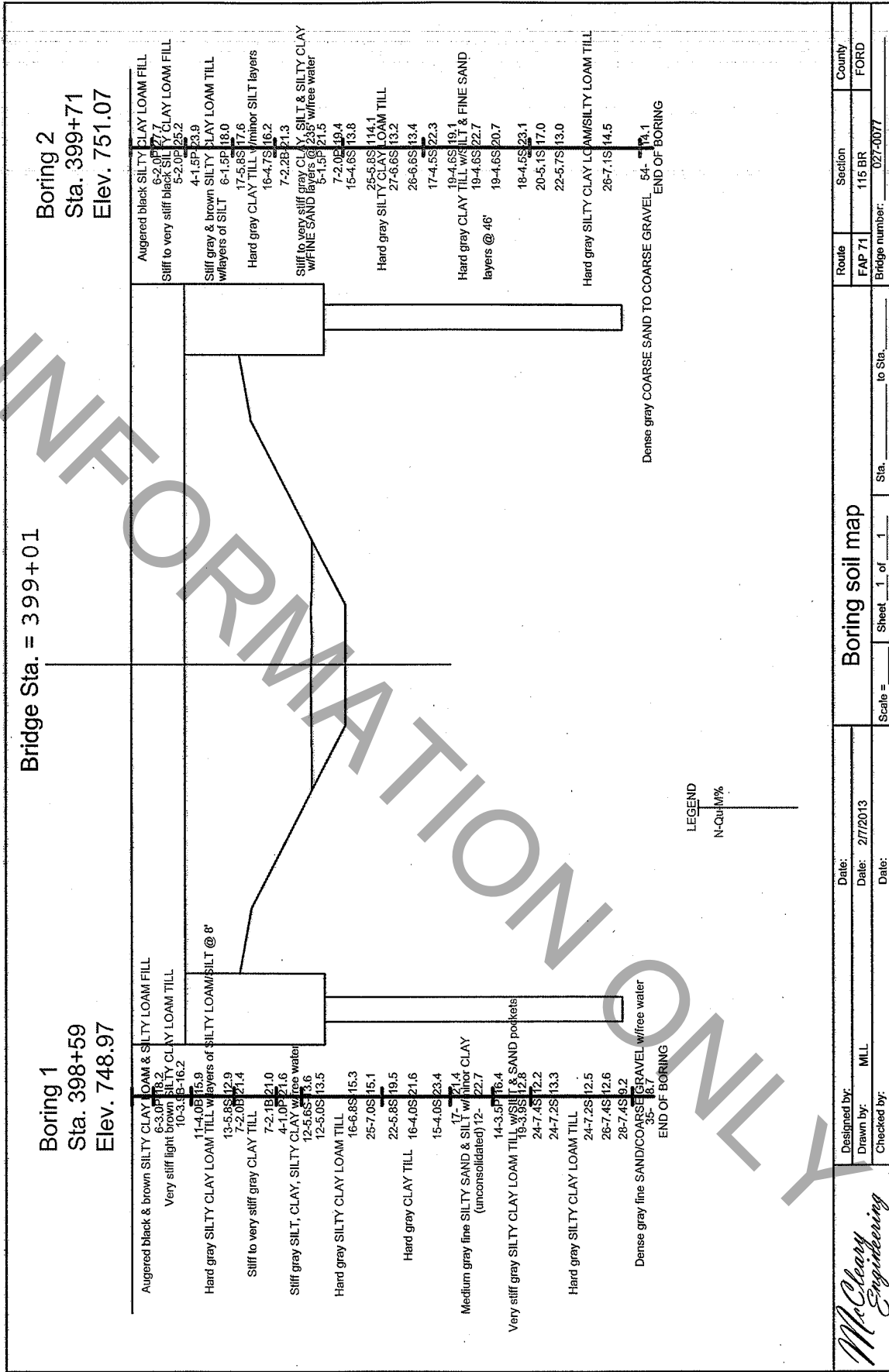


SECTION B-B

DETAILS
STRUCTURE NO. 027-0103

Fairsworth 2750 N. Lincoln Ave. Chicago, Illinois 60641 312-291-1111	DESIGNED - TCR CHECKED - JMK DRAWN - JMK CHECKED - MSW	REVISIONS REVISION REVISION REVISION	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	SHEET NO. OF SHEETS 24-8829
	DATE - 10/22/13	F.P.A. FILE NO. DIS. ORDER ILLINOIS STATE PROJECT	SECTION NO. CONTRACT NO. 66843	TOTAL SHEETS 2

FOR INFORMATION ONLY



Designed by:		Date:		Sheet		Section		County	
MIL		2/7/2013		1 of 1		115 BR		FORD	
Checked by:		Date:		Scale =		Bridge number:		027-0077	

LEGEND
N-QuiM%

McClary
Engineering

Table 1: PILE LENGTH TABLE 027-0103

North Abutment, Using Boring B-1 (2009)			South Abutment, Using Boring B-2 (2009)		
Nominal Required Bearing (KIPS)	Factored Resistance Available (KIPS)	Estimated Pile Length (Ft.)	Nominal Required Bearing (KIPS)	Factored Resistance Available (KIPS)	Estimated Pile Length (Ft.)
MS 14 with 0.25" wall			MS 14 with 0.25"		
220	121	22	222	122	24
294	162	27	305	168	29
342	188	32	334	184	33
413	227	38	413	227	39
MS 14 with 0.312" wall			MS 14 with 0.312" wall		
342	188	32	329	181	31
378	208	37	365	201	36
458	252	42	425	234	41
513	282	48	513	283	47
HP 10x42			HP 10x42		
228	126	37	205	113	33
232	127	42	240	132	38
264	145	47	273	150	43
335	184	53	335	185	49
HP 12x53			HP 12x53		
227	125	27	117	97	24
269	148	32	240	132	29
284	156	37	257	141	33
284	156	42	299	165	38
327	180	47	339	187	43
418	229	53	418	229	49
HP 12x63			HP 12x63		
330	182	47	323	178	41
412	227	52	372	204	46
456	251	57	430	237	51
497	274	62*	497	273	57
HP 14x73			HP 14x73		
311	171	29	291	160	29
326	179	34	318	175	33
342	188	42	368	203	38
399	220	47	415	228	43
505	278	52	487	268	48
578	318	58	578	318	54
HP 14x89			HP 14x89		
512	281	52	457	251	46
565	311	57	530	292	51
586	322	61	595	328	56
705	387	70*	705	387	60

*Beyond the end of the boring.

PILE DRIVING DIAGRAM

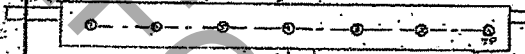
OFF FILE

H582

BY RF DATE 8-17-88
 CKD. BY DATE
 SHEET NO. 2 OF 2
 ROUTE STATE
 SECTION 1482
 PROJECT 1482-1
 COUNTY 1482
 JOB NO. C-43-02487
 LOCATION N. AB
STA 398+61.66

027-0071 (new)
 027-0070 (old)

Rec'd. Br. Off
 Aug. 24, 1989



PILE NO.	LENGTH FURNISHED	LENGTH CUT OFF	LENGTH IN STRUCTURE	BEARING
1	TEST			
2	40.1	88	31.3	42.6
3	40.1	78	32.3	47.1
4	40.1	48	35.3	47.1
5	40.3+15.4	86	42.3	45.3
6	40.1+16.1	60	52.2	46.6
7	40.3+17.2	11	50.4	53.2
TOTAL	291.9	571	215.4	

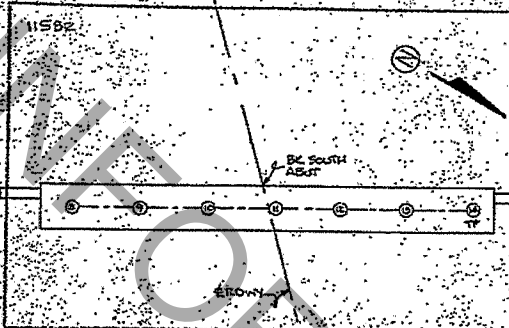
TYPE PILE METAL SHELL
 WEIGHT N/A LBS
 RAMPER DATA:
 TYPE WALKER
 RAM WEIGHT 3000 LBS
 STROKE 3 FT
 STROKES/MIN 40
 WATER COST 970
 FORMULA USED:
P. 2WH
S=0.1
 REQ. BEAR 45 TONS
 PLAN LENGTH 41 LF
 ORDERED LENGTH 40 LF
 SEE LETTER DATED 8/6-88
 PAY QUANTITIES:
 FURNISHING 14.1
 DRIVING 20.8
 REMARKS SPACE CRANKED
PAID W/PILE ON C/P FILE
STA 398+61.66

E INDICATES BATTER

ONLY

FOR

TESTING DIAGRAM



BY EF DATE 8-17-88
 CHKD. BY DATE
 SHEET NO. 1 OF 2
 ROUTE FA 71 (ILL. 54)
 SECTION 1/4 SEC 15 BE FILE
 PROJECT
 COUNTY FDN
 JOB NO. C-93-054-87
 LOCATION SOUTH ABUT
SA 397-43.18

PILE NO.	LENGTH FURNISHED	LENGTH CUT OFF	LENGTH IN STRUCTURE	BEARING
8	35.1	5.1	30.0	45.3
9	35.2	4.4	30.8	52.2
10	35.2	6.3	28.9	48.9
11	35.2	6.1	29.1	46.6
12	35.2	5.0	30.2	41.0
13	35.2			
14	TEST			
TOTAL	210	26.9	184.2	

TYPE PILE METAL SHELL
 WEIGHT N/A LBS
 HAMMER DATA:
 TYPE VULCAN-1
 RAN HEIGHT 5000 LBS
 STROKE 3 FEET
 STROKES/MIN 60
 BATTER COEF. .970
 FORMULA USED:
 $P = 2WH$
 $S = 0.1$
 REQ. BEAR 45 TONS
 PLAN LENGTH 35 FEET
 ORDERED LENGTH 36 FEET
 SEE LETTER DATED 8-10-88
 PILE QUANTITIES:
 FURNISHING 210
 DRIVING 184.2
 REMARKS

ONLY

Test Pile Driving Record

Project: ACSR-71(26) Type & Weight of Hammer: Vulcan 1 (Air) - 5,000 lbs.
 Route: FA 71 (Ill 54) Length of Fall: 3 ft.
 Section: 1148R, (1158R) 1158R-1 Type of Pile: Metal Shell
 County: Ford Required Bearing: 45 tons
 Station of Structure: 399+01 Elev. Top Pile: 195.68
 Elev. Tip of Pile: 140.88
 Elev. Cutoff: 124.88
 Estimated Plan Length: 44
 Station location at which pile was driven: 398+64.66 15.05' L.L. C.L. (N. Abandoned Length: 40)
 Elev. from which pile was driven: 192.2

Elev.	Feet Below Cut Off	Blows Per Foot	Blows Per Minute	Bearing In Tons	Remarks
180.88	14	6		7.1	
179.88	15	6		7.1	
178.88	16	*			* Stop for splice
177.88	17	9		10.3	
176.88	18	10		11.5	P=24/5+0.1
175.88	19	12	56	13.6	
174.88	20	13		14.7	
173.88	21	16		17.6	Date Driven:
172.88	22	17		18.6	8-8-88
171.88	23	23		24.1	
170.88	24	30	60	30.0	Prepared 5 ft.
169.88	25	44		40.2	Very little resistance
168.88	26	41		38.2	encountered 5' to 14'
167.88	27	47		42.2	
166.88	28	49	60	43.5	Witnessed by:
165.88	29	45		43.5	Mike Watterson, R.T. &
164.88	30	54		46.6	Bruce Fuoss
163.88	31	53		46.0	
162.88	32	56		47.7	
161.88	33	60		50.0	
160.88	34	61		50.6	
159.88	35	67	60	53.7	
158.88	36	62		57.1	
157.88	37	57		48.3	
156.88	38	59		49.4	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

Test Pile Driving Record

Project	ACRF-71(26)	Type & Weight of Hammer	Vulcan 1 (Air) - 5,000 lbs.
Route	FA 71 (111-54)	Length of Fall	3 ft.
Section	114BR, (115BR), 115BR-1	Type of Pile	Metal Shell
County	Ford	Required Bearing	45 Tons
Station of Structure	399+01	Elev. Top Pile	212.88
		Elev. Tip of Pile	138.08
		Elev. Cutoff	194.98
		Estimated Plan Length	41
		Ordered Length	26

Station location at which pile was driven 399+37.34 15-06' Lt. C.L. (S. Abut.)
Elev. from which pile was driven 194.0

Elev.	Feet Below Cut Off	Blows Per Foot	Blows Per Minute	Bearing In Tons	Remarks
189.98	5	3		3.7	
188.98	6	2		2.5	
187.98	7	3		3.7	P=2WH/S=0.1
186.98	8	4		4.8	
185.98	9	4		4.8	
184.98	10	4		4.8	Date Driven:
183.98	11	4		4.8	8-8-88
182.98	12	3		3.7	
181.98	13	4		4.8	Precored 5 ft.
180.98	14	4		4.8	
179.98	15	*		*	Stopped to splice lengths
178.98	16	11		12.6	
177.98	17	12		13.6	
176.98	18	14		15.7	Witnessed by:
175.98	19	14	56	15.7	Mike Watterson, R.T.
174.98	20	17		18.6	Bruce Fuoss
173.98	21	20		21.8	
172.98	22	26		26.7	
171.98	23	43		39.6	
170.98	24	40		37.5	
169.98	25	43		39.6	
168.98	26	52	60	45.3	
167.98	27	49		43.5	
166.98	28	49		43.5	
165.98	29	51		46.7	

SD-757 (Rev. 2-73)

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

Test Pile Driving Record

Project _____	Type & Weight of Hammer _____
Route _____	Length of Fall _____
Section _____	Type of Pile _____
County _____	Required Bearing _____
Station of Structure _____	Elev. Top of Pile _____
	Elev. Tip of Pile _____
	Elev. Cutoff _____
Station location at which pile was driven _____	Estimated Plan Length _____
Elev. from which pile was driven _____	Ordered Length _____

Elev.	Feet Below Cutoff	Blows Per Foot	Blows Per Minute	Bearing In Tons	Remarks
164.98	30	53		46.0	
163.98	31	55		47.1	
162.98	32	58		48.9	
161.98	33	54	60	46.6	
160.98	34	53		46.0	
159.98	35	51		44.7	
158.98	36	50		44.1	
157.98	37	48		42.9	
156.98	38	47		42.2	
155.98	39	45		40.9	
154.98	40	42		38.9	
153.98	41	41	60	38.2	
152.98	42	39		36.8	
151.98	43	38		36.1	
150.98	44	39		36.8	
149.98	45	38		36.1	
148.98	46	38		36.1	
147.98	47	35		33.9	
146.98	48	36		34.6	
145.98	49	35		33.9	
144.98	50	34		33.1	Stopped driving to apply extra length
143.98	51	35		33.9	
142.98	52	37		35.4	
141.98	53	37		35.4	
140.98	54	33		32.4	

ONLY



Illinois Department of Transportation

Division of Highways
Illinois Department of Transportation

SOIL BORING LOG

Date 8/25/09

ROUTE FAP 71 (IL 54) DESCRIPTION IL 54 over Big Four Ditch, 7.6 miles North of IL 9 LOGGED BY L. Myers

SECTION 115 BR LOCATION N 1/2, SEC. 15, TWP. 24N, RNG. 8E

COUNTY Ford DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME Automatic

STRUCT. NO. 027-0077 (Exist.)
Station 399+10

BORING NO. 1 (N.E. Quad.)
Station 398+59
Offset 31.00ft Lt.
Ground Surface Elev. 748.97 ft

D E P T H S H	B L O W S S Qu	U C S Qu	M O I S T T	Surface Water Elev.	Stream Bed Elev.	D E P T H S H	B L O W S S Qu	U C S Qu	M O I S T T
(ft)	(/6")	(tsf)	(%)	ft	ft	(ft)	(/6")	(tsf)	(%)

Medium Gray Fine Silty Sand and Silt with minor Clay (unconsolidated) (continued)	4			Dense Gray Fine Sand/Coarse Gravel with free water (continued)	736.81	10			
	5		22.7		736.21	17			8.7
	7					18			
				End of Boring		687.47			
Very Stiff Gray Silty Clay Loam Till with Silt & Sand pockets	5								
	6	3.5	16.4						
	8	P							
	6								
	8	3.9	12.8						
	11	S							
Hard Gray Silty Clay Loam Till	6								
	9	7.4	12.2						
	15	S							
	6								
	9	7.2	13.3						
	15	S							
	8								
	10	7.2	12.5						
	14	S							
	9								
	11	7.4	12.6						
	15	S							
	10								
	11	7.4	9.2						
	17	S							
Dense Gray Fine Sand/Coarse Gravel with free water									

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
Illinois Department of Transportation

SOIL BORING LOG

Date 8/31/09

ROUTE FAP 71 (IL 54) DESCRIPTION IL 54 over Big Four Ditch, 7.6 miles North of IL 9 LOGGED BY L. Myers

SECTION 115 BR LOCATION N 1/2, SEC. 15, TWP. 24N, RNG. 8E

COUNTY Ford DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME Automatic

STRUCT. NO. 027-0077 (Exist.)
Station 399+10

BORING NO. 2 (S.E. Quad.)
Station 399+71
Offset 27.00ft Lt
Ground Surface Elev. 751.07 ft

D E P T H H S	B L O W S S Qu	U C S Qu	M O I S T S T	Surface Water Elev. 736.81 ft	D E P T H H S	B L O W S S Qu	U C S Qu	M O I S T S T
(ft)	(/6")	(tsf)	(%)	Stream Bed Elev. 735.61 ft	(ft)	(/6")	(tsf)	(%)

Augered Black Silty Clay Loam Fill				Stiff to Very Stiff Gray Clay, Silt & Silty Clay with Fine Sand layers @ 23.5' with free water (continued)	wh			
					2	1.5	21.5	
					3	P		
748.57								
Stiff to Very Stiff Black Silty Clay Loam Fill					1			
	2				3	2.0	19.4	
	3	P	27.7		4	P		
-5				726.07	-25			
Hard Gray Silty Clay Loam Till					3			
	2	2.0	25.2		6	4.6	13.8	
	3	P			9	S		
744.57								
Stiff Gray & Brown Silty Clay Loam Till with layers of Silt					9			
	2	1.5	23.9		11	5.8	14.1	
	2	P			14	S		
-10					-30			
Hard Gray Clay Till with minor Silt layers					10			
	1				12	6.6	13.2	
	2	1.5	18.0		15	S		
	4	P						
739.07								
Hard Gray Clay Till with minor Silt layers					10			
	5				11	6.6	13.4	
	7	5.8	17.6		15	S		
	10	S						
-15				716.57	-35			
Hard Gray Clay Till with Silt & Fine Sand layers @ 46'					6			
	4				7	4.5	22.3	
	7	4.7	16.2		10	S		
	9	S						
734.07								
Stiff to Very Stiff Gray Clay, Silt & Silty Clay with Fine Sand layers @ 23.5' with free water					6			
	3				8	4.6	19.1	
	3	2.2	21.3		11	S		
	4	B						
-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)



Date 8/31/09

ROUTE FAP 71 (IL 54) DESCRIPTION IL 54 over Big Four Ditch, 7.6 miles North of IL 9 LOGGED BY L. Myers

SECTION 115 BR LOCATION N 1/2, SEC. 15, TWP. 24N, RNG. 8E

COUNTY Ford DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME Automatic

STRUCT. NO. 027-0077 (Exist.)
Station 399+10
BORING NO. 2 (S.E. Quad.)
Station 399+71
Offset 27.00ft Lt
Ground Surface Elev. 751.07 ft

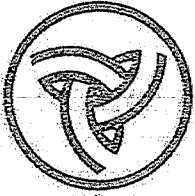
D E P T H H	B L O W S S	U C S Qu	M O I S T T
(ft)	(/6")	(tsf)	(%)

Surface Water Elev. 736.81 ft
Stream Bed Elev. 735.61 ft
Groundwater Elev.::
First Encounter 706.1 ft ▽
Upon Completion 733.1 ft ▽
After Hrs. ft

D E P T H H	B L O W S S	U C S Qu	M O I S T T
(ft)	(/6")	(tsf)	(%)

Hard Gray Clay Till with Silt & Fine Sand layers @ 46' (continued)	6			Dense Gray Coarse Sand to Coarse Gravel	12		
	9	4.6	22.7		21		14.1
	10	S			33		
				End of Boring	689.57		
Hard Gray Silty Clay Loam/Silty Loam Till	5						
	8	4.6	20.7				
	11	S					
	▼45				-65		
	6						
	9	4.5	23.1				
	9	S					
	704.07						
Hard Gray Silty Clay Loam/Silty Loam Till	8						
	9	5.1	17.0				
	11	S					
	-50				-70		
	9						
	10	5.7	13.0				
	12	S					
	-55				-75		
	10						
	12	7.1	14.5				
	14	S					
	691.07				-60		

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



Illinois Department of Transportation

Memorandum

To: J. T. Rayburn
From: R. H. Blasius By: J. Jereb
Subject: Foundation Boring Logs*
Date: February 25, 1985

* FA Route 71
Section 115BR
Ford County
P-93-048-79

We are transmitting the foundation boring logs for the proposed improvement.

This bridge is located on Illinois Route 54, 2.0 miles southwest of Melvin, Illinois.

WHB:sj

cc: Barrientos & Assoc., Inc.
B. L. Hynd
Soils

Attachment: (2) Boring Logs
(1) Location Sketch

BRIDGE FOUNDATION BORING LOG

PROJECT _____ BRIDGE IL Route 54 Date March 6, 1980
 ROUTE FA 71 Over Trib. W. Br. Vermilion R. Bored By G. Legan
 SEC 115BR STA. 399+10 Checked By W. Beck
 COUNTY Ford

Boring No. 1 (N. Abut.)
 Station 398+40
 Offset 14' Lt.

Elevation	N	Qu t/a.f.	w (%)	Surface Water El.	Elevation	N	Qu t/a.f.	w (%)
Ground Surface	200.2	0		191.3				
				LOOSE BR. GSE. SAND	177.2	4	-	22
				STIFF GR. SICL	176.2	2	1.3B	22
198.2				HARD GR. SIC-TILL	-25			
VERY STIFF Y. BR. TO B. SICL	13	2.5 P	28		173.7	28	5.4 B	14
196.2				VERY STIFF GR. SIC-TILL				
STIFF Y. BR. TO BL. SICL	5	1.2 B	24		171.2	29	3.5 B	15
193.7				MEDIUM GR. SIC-TILL	-30			
STIFF Y. BR. SANDY C	3	1.0 P	21		168.7	41	0.8 B	19
191.2				HARD GR. SIC-TILL				
VERY STIFF Y. BR. SIC-TILL	10	2.5 B	17		166.2	40	4.5 P	16
				VERY STIFF GR. SIC-TILL	-35			
	16	2.3 B	15			30	3.9 B	22
186.2								
STIFF OL. GR. SIC-TILL	-15	1.7 S	15		161.2	22	2.1 B	24
183.7				STIFF GR. SIC-TILL	-40			
VERY STIFF GR. SIC-TILL	14	2.7 B	21		158.7	17	1.7 B	26
				STIFF GR. SILT LOAM				
	-20	2.3 B	21			17	1.8 P	21
178.7					156.2			
					-45			

M - Standard Penetration Test - Blows per foot to drive 2" O.D. Split Spoon Sampler 12" with 140# hammer falling 30".

Qu - Unconfined Compressive Strength - t/sf
 w - Water Content - percentage of oven dry weight - %.

Type failure:
 B - Bulge Failure
 S - Shear Failure
 E - Estimated Value
 B - Blows

BRIDGE FOUNDATION BORING LOG

BORING #1 FA ROUTE 71 SECTION 115BR		Elevation	N	Qu t/a.f.	v (%)	Elevation	N	Qu t/a.f.	v (%)
VERY STIFF GR. SIC	153.7	13	2.5 B	26					
VERY STIFF OL. GR. SICL-TILL	151.2	23	2.5 B	15					
VERY STIFF GR. SIC-TILL	149.2	33	2.7 B	13					

INFORMATION ONLY

BRIDGE FOUNDATION BORING LOG

PROJECT _____
 ROUTE FA 71
 SEC. 115BR
 COUNTY Ford

BRIDGE IL Route 54
Over Trib. W. Br. Vermilion R.
 STA. 399+10

Date March 7, 1980
 Bored By J. Legan
 Checked By W. Beck

Boring No. 2(S. Abut.)
 Station 399+90
 Offset 15' Lt.

Elevation	N	Qu t/a.f.	w (%)	Surface Water El.	Elevation	N	Qu t/a.f.	w (%)
				191.3				
				Groundwater El. at Completion				
				After _____ Hours				
Ground Surface								
200.2	0							
				VERY STIFF GR. SICL		11	2.3 B	21
				176.2				
198.2				HARD GR. SIC-TILL				
				-25				
	13	1.5 P	30			25	4.1 B	14
				173.7				
				VERY STIFF GR. SIC-TILL				
				-5				
	8	1.7 B	30			25	3.5 B	14
				171.2				
193.7				HARD GR. SIC-TILL				
				-30				
	4	1.5 P	29			20	5.8 S	17
				168.7				
191.2				HARD OL. GR. SIC-TILL				
				-10				
	7	1.0 B	21			33	5.6 S	13
				166.2				
188.7				STIFF GR. SIC-TILL				
				-35				
	22	5.0 S	16			12	1.9 B	16
				163.7				
186.2				HARD GR. SIC-TILL				
				-15				
	14	1.9 S	15			38	4.5 P	13
				161.2				
183.7				VERY STIFF GR. SIC				
				-40				
	15	2.2 S	13			16	2.7 B	25
				181.2				
181.2				VERY STIFF GR. SICL				
				-20				
	18	3.1 B	21			22	2.9 B	25
				156.2				
				-45				

N - Standard Penetration Test -
 Blows per foot to drive 2"
 O.D. Split Spoon Sampler 12" with
 140# hammer falling 30".

Qu - Unconfined Compressive
 Strength - t/sf
 w - Water Content - percentage
 of oven dry weight - %

Type failure:
 B - Bulge Failure
 S - Shear Failure
 E - Estimated Value

BRIDGE FOUNDATION BORING LOG

BORING #2 F.A. ROUTE 71 SECTION 115BR		Elevation	H	Qu t/a.t.	w (%)	Elevation	H	Qu t/a.t.	w (%)
MEDIUM GR. SIL		-45							
			13	1.0 B	22				
	153.7								
VERY STIFF OL. GR. SIC-TILL									
			19	2.9 B	15				
		-50							
	149.2		29	3.7 B	14				

FOR INFORMATION ONLY

Conterminous 48 States
2007 AASHTO Bridge Design Guidelines
AASHTO Spectrum for 7% PE in 75 years
Latitude = 40.541695
Longitude = -088.281982
Site Class B

Data are based on a 0.05 deg grid spacing.

Period (sec)	Sa (g)	
0.0	0.052	PGA - Site Class B
0.2	0.122	Ss - Site Class B
1.0	0.050	S1 - Site Class B

Conterminous 48 States
2007 AASHTO Bridge Design Guidelines
Spectral Response Accelerations SDs and SD1

Latitude = 40.541695

Longitude = -088.281982

As = FpgaPGA, SDs = FaSs, and SD1 = FvS1

Site Class C - Fpga = 1.20, Fa = 1.20, Fv = 1.70

Data are based on a 0.05 deg grid spacing.

Period (sec)	Sa (g)	
0.0	0.062	As - Site Class C
0.2	0.146	SDs - Site Class C
1.0	0.084	SD1 - Site Class C

INFORMATION ONLY