Abbreviated

Structure Geotechnical Report

(In-House)

Illinois Route 121 over Jonathan Creek

Bridge Widening

Structure Number:	070-0003
Route:	FAP 320 (IL 121)
Section:	(104BR)BR-1
County:	Moultrie
Project Number:	D-97-013-09

Prepared For:	Derek G. Verhulst
Prepared By:	Lindsey N. Jones
Report Date:	May 1, 2014
Revised Report Date:	February 25, 2016

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Illinois Department of Transportation

Abbreviated Structure Geotechnical Report

Original Report Date: May 1, 2014	Proposed SN: NA	Route:	FAP 320 (IL 121)
Revised Date: February 25, 2016	Existing SN: 070-0003	Section:	(104BR)BR-1
Geotechnical Engineer: Lindsey N. Jones		County:	Moultrie
Structural Engineer: Derek G. Verhulst		Contract:	74358

Indicate the proposed structure type, substructure types, and foundation locations (attach plan and elevation drawing): The proposed improvements include widening and replacing the bridge deck. The bridge will be widened both to the north and the south of the existing structure. The profile will be unchanged. The existing abutments rest upon 2 rows of concrete piles and the existing piers are supported by 3 rows of untreated timber piles. There is a single row of treated timber piles beneath the existing approach slabs and concrete piles supporting the abutment wingwalls.

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 (2) borings were drilled in 1963 on the south side of the structure. These boring logs have been name 1-1963 (Pier #2 -East Pier) and 2-1963 (Pier #1 - West Pier). Additional boring data was collected in 2012 for each of the abutments. These borings are 2012-1 (West Abutment) and 2012-2 (East Abutment). The information collected in these four (4) borings appears to be sufficient.

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: The profile of the structure will not be changed, however due to the structure widening additional material will be added to the abutment embankments. The existing slope surrounding both abutments is 3H:1V. It is anticipated that after widening the same slope will be maintained. Less than 3.5 ft of new embankment fill is expected at either abutment embankment. This amount of material will produce negligible amounts of settlement. If more that 3.5 ft of fill is required for the site, then settlement will need to be re-evaluated.

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: Less than 3.5 ft of new embankment fill is expected at either abutment embankment. This minimal change will not effect the global stability. If more that 3.5 ft of fill is required for the site, then global stability will need to be re-evaluated.

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: See the next page for the Design Scour Elevations Table. For the abutments, the Q100, the Q500, and the Design scour elevation are to be set at the bottom of abutment elevation since the abutments are protected by a 2H:1V riprap slope. The bottom of abutment elevation for the West Abutment is 622.39 ft and is 622.82 ft for the East Abutment.

There is not a Hydraulic Report available for this structure, however a scour analysis was performed on July 28, 1994. From the 1994 analysis, the Pier 1 scour depths are 35 ft and 37 ft, respectively for the Q100 and Q500 design. The Pier 2 scour depths are 34 ft and 37 ft, respectively for the Q100 and Q500 design. The subsurface profile is made up of predominately granular material, therefore no reduction was made to the scour depths from the 1994 scour analysis. The proposed ground surface at the piers will basically be unchanged, with an elevation of 609.13 ft at Pier 1 and 608.13 ft at Pier 2. The Q100 scour elevations are 574.13 ft for Pier 1 and 574.13 ft for Pier 2. The Q500 scour elevations are 572.13 for Pier 1 and 571.13 ft for Pier 2. If no scour mitigation techniques are implemented, then the existing foundation for the piers is not sufficient. Scour mitigation will have to be implemented (see ABD Memo 14.2). Because this project only entails widening, designed riprap can be considered as an acceptable mitigation, as per Planning. With scour mitigation techniques implemented, the design scour elevations for the pier are set at the bottom of the pier footings. The recommended Design scour elevation is 603.84 ft for Pier 1 and 604.03 ft for Pier 2. As per ABD Memo 14.2, the Check scour elevation is not used for existing structures.

The Item 113 rating for the abutments is 8 and the rating for the piers is 7. Per ABD Memo 14.2, the lowest rating for the individual substructures should be used for the entire structure. The Item 113 rating for the structure is 7.

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: The latitude and longitude coordinates for the structure are approximately 39.600796 and -88.546146. The LRFD Seismic Soil Site Class is D and the Design Spectral accelerations for 0.2 and 1.0 seconds are 0.333 g and 0.169 g respectively. The Seismic Performance Zone (SPZ) is 2.

Using LFD code, the Seismic Performance Category (SPC) is A. The Horizontal Bedrock Acceleration Coefficient (A) is 0.05g, and the Site Coefficient (S) is 1.5.

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: See attached sheets for pile information. The estimated values are per ASD design and assume scour mitigation will be implemented. Pile shoes do not appear necessary for this soil profile. It is recommended that test piles be driven at 1 abutment and 1 pier (2 total), preferably on the north side of the structure.

Calculate the estimated water surface elevation and determine the need for cofferdam(s) and seal coat: IDOT District 7 Hydraulics Unit calculated an EWSE of 613.65 ft. To widen in-kind or as a pile bent extension four (4) Type 2 Cofferdams with Seal Coats will be necessary.

Assess the need for sheeting/soil retention versus using a temporary construction slope and provide recommendation for the most feasible option: Proposed improvements include work on the backwall of the abutments. After removal of the existing pavement, Temporary Sheet Piling can be used at the east abutment. Temporary Soil Retention System will be required at the west abutment due to an approximately 1 ft thick layer of concrete located 8 ft below ground surface (elevation 622.7 ft). If stage construction sequencing allows for sloped excavation a 1:1 slope appears stable for both abutments.

Event/Limit State	Design Scour Elevations (ft.)				Item 113
	W. Abut.	Pier 1	Pier 2	E. Abut.	
Q100	622.39	574.13	574.13	622.82	7
Q500	622.39	572.13	571.13	622.82	
Design	622.39	603.84	604.03	622.82	
Check	NA	NA	NA	NA	

Assumptions used for West Abutment foundation estimate:

Boring Log Referenced	Scour Elevation (ft)	Estimated Service Load (kips)	Pile Embedment Depth (ft)	Pile Cutoff Elevation (ft)	Ground Surface Elev. Against Pile During Driving (ft)
2012-1	NA	110	1.0	623.39	622.39

West Abutment

Foundation Type	Ultimate Required Bearing (kips)	Allowable Geotechnical Loss (kips)	Allowable Resistance Available (kips)	Estimated Pile Length (ft)
MS 12" w/0.179"	100	0	33	24
	150	0	50	34
	200	0	67	49
	256	0	85	82
MS 12" w/0.25"	100	0	33	24
	150	0	50	34
	250	0	83	82
	355	0	118	86
MS 14" w/0.25"	100	0	33	24
	225	0	75	36
	350	0	117	84
	416	0	139	88
MS 14" w/0.312"	100	0	33	24
	225	0	75	36
	350	0	117	84
	516	0	172	92
HP 10 X 42	100	0	33	83
	150	0	50	93
	250	0	83	116
	335	0	112	119
HP 12 X 53	100	0	33	73
	150	0	50	89
	250	0	83	114
	419	0	140	119
HP 12 X 63	100	0	33	73
	225	0	75	98
	350	0	117	116
	497	0	166	119
Timber Pile	75	0	25	16
	100	0	33	20
	125	0	42	23
	153	0	51	24
Precast 14" X 14"	100	0	33	20
	150	0	50	23
	200	0	67	28
	265	0	88	35

Assumptions used for East Abutment foundation estimate:

Boring Log Referenced	Scour Elevation (ft)	Estimated Service Load (kips)	Pile Embedment Depth (ft)	Pile Cutoff Elevation (ft)	Ground Surface Elev. Against Pile During Driving (ft)
2012-2	NA	110	1.0	623.82	622.82

East Abutment

Foundation Type	Ultimate Required Bearing (kips)	Allowable Geotechnical Loss (kips)	Allowable Resistance Available (kips)	Estimated Pile Length (ft)
MS 12" w/0.179"	100	0	33	15
	150	0	50	20
	200	0	67	32
	256	0	85	45
MS 12" w/0.25"	100	0	33	15
	150	0	50	20
	250	0	83	43
	355	0	118	72
MS 14" w/0.25"	100	0	33	15
	225	0	75	29
	350	0	117	50
	416	0	139	72
MS 14" w/0.312"	100	0	33	15
	225	0	75	29
	350	0	117	50
	516	0	172	78
HP 10 X 42	100	0	33	63
	150	0	50	92
	250	0	83	* 119
	335	0	112	* 120
HP 12 X 53	100	0	33	42
	150	0	50	76
	250	0	83	* 110
	419	0	140	* 120
HP 12 X 63	100	0	33	42
	225	0	75	102
	350	0	117	* 119
	497	0	166	* 120
Timber Pile	75	0	25	17
	100	0	33	22
	125	0	42	28
	153	0	51	34
Precast 14" X 14"	100	0	33	15
	150	0	50	17
	200	0	67	19
	265	0	88	24

* Depth extends below boring exploration. Rock elevation assumed from boring 2012-1 for estimate.

Assumptions used for Pier 1 foundation estimate:

Boring Log Referenced	Scour Elevation (ft)	Estimated Service Load (kips)	Pile Embedment Depth (ft)	Pile Cutoff Elevation (ft)	Ground Surface Elev. Against Pile During Driving (ft)
2-1963	604.31	150	1.0	604.84	603.84

Pier 1 - Expand Existing Footing - With Scour Mitigation

Foundation Type	Ultimate Required Bearing (kips)	Allowable Geotechnical Loss (kips)	Allowable Resistance Available (kips)	Estimated Pile Length (ft)
MS 12" w/0.179"	100	0	33	10
	150	0	50	17
	200	0	67	23
	256	0	85	28
MS 12" w/0.25"	100	0	33	10
	150	0	50	17
	250	0	83	28
	355	0	118	* 62
MS 14" w/0.25"	100	0	33	--
	225	0	75	20
	350	0	117	45
	416	0	139	* 65
MS 14" w/0.312"	100	0	33	--
	225	0	75	20
	350	0	117	45
	516	0	172	* 70
HP 10 X 42	100	0	33	* 65
	150	0	50	* 80
	250	0	83	* 95
	335	0	112	* 100
HP 12 X 53	100	0	33	* 62
	150	0	50	* 74
	250	0	83	* 95
	419	0	140	* 100
HP 12 X 63	100	0	33	* 62
	225	0	75	* 80
	350	0	117	* 99
	497	0	166	* 100
Timber Pile	75	0	25	12
	100	0	33	18
	125	0	42	22
	153	0	51	26
Precast 14" X 14"	100	0	33	--
	150	0	50	--
	200	0	67	10
	265	0	88	20

* Depth extends below boring exploration. Rock elevation assumed from boring 2012-1 for estimate.

-- Means pile would be embedded less than 10 ft. Piles should not be embedded less than 10 ft.

Assumptions used for Pier 2 foundation estimate:

Boring Log Referenced	Scour Elevation (ft)	Estimated Service Load (kips)	Pile Embedment Depth (ft)	Pile Cutoff Elevation (ft)	Ground Surface Elev. Against Pile During Driving (ft)
1-1963	604.50	150	1.0	605.03	604.03

Pier 2 - Expand Existing Footing - With Scour Mitigation

Foundation Type	Ultimate Required Bearing (kips)	Allowable Geotechnical Loss (kips)	Allowable Resistance Available (kips)	Estimated Pile Length (ft)
MS 12" w/0.179"	100	0	33	11
	150	0	50	14
	200	0	67	27
	256	0	85	33
MS 12" w/0.25"	100	0	33	11
	150	0	50	14
	250	0	83	32
	355	0	118	* 67
MS 14" w/0.25"	150	0	50	12
	225	0	75	19
	350	0	117	36
	416	0	139	* 70
MS 14" w/0.312"	150	0	50	12
	225	0	75	19
	350	0	117	36
	516	0	172	* 73
HP 10 X 42	100	0	33	* 67
	150	0	50	* 76
	250	0	83	* 97
	335	0	112	* 100
HP 12 X 53	100	0	33	* 60
	150	0	50	* 70
	250	0	83	* 97
	419	0	140	* 100
HP 12 X 63	100	0	33	* 63
	225	0	75	* 80
	350	0	117	* 98
	497	0	166	* 101
Timber Pile	75	0	25	14
	100	0	33	18
	125	0	42	20
	153	0	51	27
Precast 14" X 14"	100	0	33	--
	150	0	50	--
	200	0	67	12
	265	0	88	16

* Depth extends below boring exploration. Rock elevation assumed from boring 2012-1 for estimate.

-- Means pile would be embedded less than 10 ft. Piles should not be embedded less than 10 ft.

Assumptions used for Pier 1 foundation estimate:

Boring Log Referenced	Scour Elevation (ft)	Estimated Service Load (kips)	Pile Embedment Depth (ft)	Pile Cutoff Elevation (ft)	Ground Surface Elev. Against Pile During Driving (ft)
2-1963	604.31	150	1.0	623.84	603.84

Pier 1 - Pile Bent- With Scour Mitigation

Foundation Type	Ultimate Required Bearing (kips)	Allowable Geotechnical Loss (kips)	Allowable Resistance Available (kips)	Estimated Pile Length (ft)
MS 12" w/0.179"	100	0	33	29
	150	0	50	36
	200	0	67	42
	256	0	85	47
MS 12" w/0.25"	100	0	33	29
	150	0	50	36
	250	0	83	47
	355	0	118	* 81
MS 14" w/0.25"	100	0	33	--
	225	0	75	39
	350	0	117	64
	416	0	139	* 84
MS 14" w/0.312"	100	0	33	--
	225	0	75	39
	350	0	117	64
	516	0	172	* 89
HP 10 X 42	100	0	33	* 84
	150	0	50	* 99
	250	0	83	* 114
	335	0	112	* 119
HP 12 X 53	100	0	33	* 81
	150	0	50	* 93
	250	0	83	* 114
	419	0	140	* 119
HP 12 X 63	100	0	33	* 81
	225	0	75	* 99
	350	0	117	* 118
	497	0	166	* 119
Timber Pile	75	0	25	31
	100	0	33	37
	125	0	42	41
	153	0	51	45
Precast 14" X 14"	100	0	33	--
	150	0	50	--
	200	0	67	29
	265	0	88	39

* Depth extends below boring exploration. Rock elevation assumed from boring 2012-1 for estimate.

-- Means pile would be embedded less than 10 ft. Piles should not be embedded less than 10 ft.

Assumptions used for Pier 2 foundation estimate:

Boring Log Referenced	Scour Elevation (ft)	Estimated Service Load (kips)	Pile Embedment Depth (ft)	Pile Cutoff Elevation (ft)	Ground Surface Elev. Against Pile During Driving (ft)
1-1963	604.50	150	1.0	624.03	604.03

Pier 2 - Pile Bent - With Scour Mitigation

Foundation Type	Ultimate Required Bearing (kips)	Allowable Geotechnical Loss (kips)	Allowable Resistance Available (kips)	Estimated Pile Length (ft)
MS 12" w/0.179"	100	0	33	30
	150	0	50	33
	200	0	67	46
	256	0	85	52
MS 12" w/0.25"	100	0	33	30
	150	0	50	33
	250	0	83	51
	355	0	118	* 86
MS 14" w/0.25"	150	0	50	31
	225	0	75	38
	350	0	117	55
	416	0	139	* 89
MS 14" w/0.312"	150	0	50	31
	225	0	75	38
	350	0	117	55
	516	0	172	* 92
HP 10 X 42	100	0	33	* 86
	150	0	50	* 95
	250	0	83	* 116
	335	0	112	* 119
HP 12 X 53	100	0	33	* 79
	150	0	50	* 89
	250	0	83	* 116
	419	0	140	* 119
HP 12 X 63	100	0	33	* 82
	225	0	75	* 99
	350	0	117	* 117
	497	0	166	* 120
Timber Pile	75	0	25	33
	100	0	33	37
	125	0	42	39
	153	0	51	46
Precast 14" X 14"	100	0	33	--
	150	0	50	--
	200	0	67	31
	265	0	88	35

* Depth extends below boring exploration. Rock elevation assumed from boring 2012-1 for estimate.

-- Means pile would be embedded less than 10 ft. Piles should not be embedded less than 10 ft.

Illinois Department of Transportation

To:	Gary Welton	Attn: Mike Allen
From:	Terry Hoekstra	By: David Miller
Subject:	Foundation Boring Logs*	
Date:	April 9, 2012	

* Route: FAP 320 (IL 121)
Section: (104BR)BR-1
Structure No.: 070-0003
County: Moultrie
Contract: 74358
Job No.: D-97-013-09
Location: Jonathan Creek, 3 miles East of Sullivan

Attached is one (1) copy of the foundation boring logs, and fence diagram, for the above captioned section.

If you have any questions, or require any additional information, please contact David Miller, District Geotechnical Engineer, at (217) 342-8233.

By _____

Terry Hoekstra, P.E.
District Materials Engineer

DKM

Attachments

Illinois Department of Transportation
Division of Highways
ILLINOIS DOT

SOIL BORING LOG

Date 8/8/63

ROUTE FAP 320 (IL 121) DESCRIPTION Jonathan Creek LOGGED BY Baker

SECTION 104-BR(BR-1) LOCATION NE corner of SE 1/4, SEC. 5, TWP. 13 N, RNG. 6 E, 3 PM

COUNTY Moultrie DRILLING METHOD HAMMER TYPE

STRUCT. NO. 070-0003
Station 138+26.35

BORING NO. 1 - 1963
Station 138+46.9
Offset 34.0ft Rt
Ground Surface Elev. 616.90 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
▽ First Encounter ft
▽ Upon Completion 610.9 ft
▽ After 24 Hrs. 614.4 ft

DEPTH (ft)	BLOWS /6"	UCS Qu (tsf)	MOIST (%)	Description
				Medium, dark brown to black, SANDY CLAY LOAM & CLAY LOAM alluvium.
				▽ 610.90
-5	8	0.8 B	20	Soft, highly organic, CLAY LOAM alluvium.
	4	0.3 B	27	
-10				
	2	0.1 B	34	
	4	0.2 B	29	
603.10				Medium, gray, stratified fine and coarse, SAND w/ some fine Gravel.
-15	4			
	17			
596.90 -20				
				Medium, gray, stratified fine and coarse, SAND w/ some fine Gravel.
	14			
-25	19			
-30	20			
-35	30			
	12			
576.90 -40				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)
Abbreviations W.O.H - Sampler Advanced By Weight of Hammer, W.O.P - Advanced by Weight of Pipe, B.S. - Before Seating
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206) BBS, from 137 (Rev. 8-99)

File Name S:\NEW GEOTECHNICAL\GINTDATA\PROJECTS\MOULTRIE CO (070)\070-0003 SOIL 1963 2012.GPJ Data Template D6TEMPLT.GDT Date Printed 12/04/09
Latitude Longitude Datum Job Number

Illinois Department of Transportation
Division of Highways
ILLINOIS DOT

SOIL BORING LOG

Date 8/8/63

ROUTE FAP 320 (IL 121) DESCRIPTION Jonathan Creek LOGGED BY Baker

SECTION 104-BR(BR-1) LOCATION NE corner of SE 1/4, SEC. 5, TWP. 13 N, RNG. 6 E, 3 PM

COUNTY Moultrie DRILLING METHOD _____ HAMMER TYPE _____

STRUCT. NO. 070-0003
Station 138+26.35

BORING NO. 1 - 1963
Station 138+46.9
Offset 34.0ft Rt
Ground Surface Elev. 616.90 ft

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

Groundwater Elev.:
First Encounter _____ ft
Upon Completion 610.9 ft
After 24 Hrs. 614.4 ft

DEPTH (ft)	BLOWS /6"	UCS Qu (tsf)	MOIST (%)	
				Medium, gray, stratified fine and coarse, SAND w/ some fine Gravel.
	19			
-45	19			
-50	21			
-55	19			
561.40				Limit of boring.
-60				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)
Abbreviations W.O.H - Sampler Advanced By Weight of Hammer, W.O.P - Advanced by Weight of Pipe, B.S. - Before Seating
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206) BBS, from 137 (Rev. 8-99)

File Name S:\NEW GEOTECHNICAL\GINTDATA\PROJECTS\MOULTRIE CO.(070)\070-0003 SOIL 1963 2012.GPJ Data Template D61EMPLT.GDT Date Printed 12/04/09
Latitude Longitude Datum Job Number

Illinois Department of Transportation
Division of Highways
ILLINOIS DOT

SOIL BORING LOG

Date 8/12/63

ROUTE FAP 320 (IL 121) DESCRIPTION Jonathan Creek LOGGED BY Baker

SECTION 104-BR(BR-1) LOCATION NE corner of SE 1/4, SEC. 5, TWP. 13 N, RNG. 6 E, 3 PM

COUNTY Moultrie DRILLING METHOD HAMMER TYPE

STRUCT. NO. 070-0003
Station 138+26.35

BORING NO. 2 - 1963
Station 137+98.5
Offset 26.5ft Rt
Ground Surface Elev. 615.90 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter ft
Upon Completion 611.8 ft
After Hrs. Caved ft

	DEPTH (ft)	BLOWS /6"	UCS Qu (tsf)	MOIST (%)
Soft, dark brown to black, SILTY CLAY LOAM alluvium. ▽ 611.40				
Very soft, black, highly organic, SANDY CLAY LOAM alluvium.	-5	2	0.1 E	30
		3		
605.90	-10	8	1.2 B	24
Stiff to very stiff, brown, CLAY LOAM TILL.		12	3.1 B	12
601.90				
Medium, gray, fine, SAND w/ some medium, gray, Gravel.	-15	8		
		11		
595.90	-20	12		
Medium, gray, fine, SAND w/ some medium, gray, Gravel.	-25			
		18		
	-30	16		
	-35	20		
575.90	-40	26		

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)
Abbreviations W.O.H - Sampler Advanced By Weight of Hammer, W.O.P - Advanced by Weight of Pipe, B.S. - Before Seating
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206) BBS, from 137 (Rev. 8-99)

File Name S:\NEW GEOTECHNICAL\GINT\DATA\PROJECTS\MOULTRIE CO (070)\070-0003 SOIL 1963 2012.GPJ Data Template D6TEMPLT.GDT Date Printed 12/04/09
Latitude Longitude Datum Job Number

Illinois Department of Transportation
Division of Highways
ILLINOIS DOT

SOIL BORING LOG

Date 8/12/63

ROUTE FAP 320 (IL 121) DESCRIPTION Jonathan Creek LOGGED BY Baker

SECTION 104-BR(BR-1) LOCATION NE corner of SE 1/4, SEC. 5, TWP. 13 N, RNG. 6 E, 3 PM

COUNTY Moultrie DRILLING METHOD _____ HAMMER TYPE _____

STRUCT. NO. 070-0003
Station 138+26.35

BORING NO. 2 - 1963
Station 137+98.5
Offset 26.5ft Rt
Ground Surface Elev. 615.90 ft

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

Groundwater Elev.:
First Encounter _____ ft
Upon Completion 611.8 ft
After _____ Hrs. Caved ft

DEPTH (ft)	BLOWS /6"	UCS Qu (tsf)	MOIST (%)	Description
				Medium, gray, fine, SAND w/ some medium, gray, Gravel.
-45	29			
-50	18			
555.90 -60	23			
-65				Medium, gray, fine, SAND w/ some medium, gray, Gravel.
-70	6	0.6 B	20	
545.40				Limit of boring.
-75				
-80				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)
Abbreviations W.O.H - Sampler Advanced By Weight of Hammer, W.O.P - Advanced by Weight of Pipe, B.S. - Before Seating
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206) BBS, from 137 (Rev. 8-99)

File Name S:\NEW GEOTECHNICAL\GINTDATA\PROJECTS\MOULTRIE CO (070)\070-0003 SOIL 1963 2012.GPJ Data Template D6TEMPLT.GDT Date Printed 12/04/09
Latitude Longitude Datum Job Number

Illinois Department of Transportation
Division of Highways
ILLINOIS DOT

SOIL BORING LOG

Date 3/29/12

ROUTE FAP 320 (IL 121) DESCRIPTION Jonathan Creek LOGGED BY E. Sandschafer

SECTION 104-BR(BR-1) LOCATION NE corner of SE 1/4, SEC. 5, TWP. 13 N, RNG. 6 E, 3 PM

COUNTY Moultrie DRILLING METHOD Hollow stem auger & split spoon HAMMER TYPE Auto 140#

STRUCT. NO. 070-0003
Station 138+26.35

BORING NO. 2012 - 1 (SW)
Station 136+15
Offset 6.0ft Rt
Ground Surface Elev. 630.70 ft

Surface Water Elev. 608.59 ft
Stream Bed Elev. 608.59 ft

Groundwater Elev.:
▽ First Encounter 621.2 ft
▽ Upon Completion Caved at 22' ft
▽ After ____ Hrs. Backfilled ft

DEPTH (ft)	BLOWS /6"	UCS Qu (tsf)	MOIST (%)	Description
				1.5" asphalt on 12" concrete pavement.
629.60				
				Stiff, damp, gray, CLAY TILL, embankment.
	2			
	2	2.6	15	
	3	B		
-5	2			
	2	1.4	17	
	2	B		
623.70				
	2			Medium, damp, gray, SILTY CLAY, embankment.
622.70	3	0.8	20	
	0"/50	B		Estimated Concrete, old pavement. Augered through to next sample.
621.70				
				Stiff, damp, gray, SILTY CLAY, ▽ embankment.
-10	3			
	4	1.7	13	
	4	B		
618.70				
	2			Loose, very damp, dark gray, SANDY LOAM w/ many organics.
	3		14	
	3			
616.20				
-15	1			Loose, damp, gray, fine grained, SAND, fluffy consistency. *5% passing #200 sieve.*
	3		12	
	3			
613.70				
	1			Very soft to medium, very damp, gray, SANDY LOAM w/ many organics.
	1	0.2	27	
	2	B		
-20	0			

DEPTH (ft)	BLOWS /6"	UCS Qu (tsf)	MOIST (%)	Description
	1	0.6	19	Very soft to medium, very damp, gray, SANDY LOAM w/ many organics. *(continued)*
	2	B		
608.70				
608.20	2			Very soft, damp, gray, SILTY LOAM.
	3	0.1	21	Fine grained, SAND w/ gravel. *4% passing #200 sieve.*
	4	B		
606.20				
-25	1			Very soft, wet, gray, SANDY LOAM.
	0	0.1	20	
	2	S		
603.70				
	3			Very stiff, damp, gray, CLAY LOAM TILL.
	4	3.1	11	
	5	B		
600.70				
-30	2			
	7	0.3	14	Gray, fine grained, SAND, *13% passing #200 sieve.*
	8	B		
596.20				
-35	1			Medium, wet, gray, SAND w/ many 1/2" gravel. *1% passing #200 sieve.*
	2		13	
	9			
590.70				
-40	4			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)
Abbreviations W.O.H - Sampler Advanced By Weight of Hammer, W.O.P - Advanced by Weight of Pipe, B.S. - Before Seating
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206) BBS, from 137 (Rev. 8-99)

File Name S:\NEW GEOTECH\CALIGN\DATA\PROJECTS\MOULTRIE CO (070)\070-0003 SOIL 1963.2012.GPJ Data Template D6TEMPLT.GDT Date Printed 12/04/09
Latitude W 88 deg 32.801 min Longitude N 39 deg 36.044 min Datum Job Number

Illinois Department of Transportation
Division of Highways
ILLINOIS DOT

SOIL BORING LOG

Date 3/29/12

ROUTE FAP 320 (IL 121) DESCRIPTION Jonathan Creek LOGGED BY E. Sandschafer

SECTION 104-BR(BR-1) LOCATION NE corner of SE 1/4, SEC. 5, TWP. 13 N, RNG. 6 E, 3 PM

COUNTY Moultrie DRILLING METHOD Hollow stem auger & split spoon HAMMER TYPE Auto 140#

STRUCT. NO. 070-0003
Station 138+26.35

BORING NO. 2012 - 1 (SW)
Station 136+15
Offset 6.0ft Rt
Ground Surface Elev. 630.70 ft

Surface Water Elev. 608.59 ft
Stream Bed Elev. 608.59 ft

Groundwater Elev.:
▽ First Encounter 621.2 ft
▼ Upon Completion Caved at 22' ft
▼ After ____ Hrs. Backfilled ft

DEPTH (ft)	BLOWS /6"	UCS Qu (tsf)	MOIST (%)	Description
	5 5		13	Medium, wet, gray, SAND w/ many 1/2" gravel. *1% passing #200 sieve.*
-45	5			
	6 10		14	*2% passing #200 sieve.*
-50	3			
	1 3		17	*2% passing #200 sieve.*
570.70 -60	3			

DEPTH (ft)	BLOWS /6"	UCS Qu (tsf)	MOIST (%)	Description
	5 8		18	Medium, wet, gray, SAND w/ many 1/2" gravel. *1% passing #200 sieve.*
-65				
-70	3			
	4 5		12	*2% passing #200 sieve.*
-75				
-80	5			*1% passing #200 sieve.*

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)
Abbreviations W.O.H - Sampler Advanced By Weight of Hammer, W.O.P - Advanced by Weight of Pipe, B.S. - Before Seating
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206) BBS, from 137 (Rev. 8-99)

File Name S:\NEW GEOTECHNICAL\GINTDATA\PROJECTS\MOULTRIE CO (070)\070-0003 SOIL 1963 2012.GPJ Data Template D6TEMPLT.GDT Date Printed 12/04/09
Latitude W 88 deg 32.801 min Longitude N 39 deg 36.044 min Datum Job Number

Illinois Department of Transportation
Division of Highways
ILLINOIS DOT

SOIL BORING LOG

Date 3/29/12

ROUTE FAP 320 (IL 121) DESCRIPTION Jonathan Creek LOGGED BY E. Sandschafer

SECTION 104-BR(BR-1) LOCATION NE corner of SE 1/4, SEC. 5, TWP. 13 N, RNG. 6 E, 3 PM

COUNTY Moultrie DRILLING METHOD Hollow stem auger & split spoon HAMMER TYPE Auto 140#

STRUCT. NO. 070-0003
Station 138+26.35

BORING NO. 2012 - 1 (SW)
Station 136+15
Offset 6.0ft Rt
Ground Surface Elev. 630.70 ft

Surface Water Elev. 608.59 ft
Stream Bed Elev. 608.59 ft

Groundwater Elev.:
▽ First Encounter 621.2 ft
▼ Upon Completion Caved at 22' ft
▼ After ____ Hrs. Backfilled ft

DEPTH (ft)	BLOWS /6"	UCS Qu (tsf)	MOIST (%)	Description
550.10	6	2.0	33	
	5	PP		Gray, SILTY LOAM.
-85				
541.20				
-90	2			Very soft, damp, gray, SANDY LOAM.
	1	0.1	21	
	3	S		
-95				
-100	5			Very dense.
530.20	15		17	
	33			Wet, gray, coarse grained, SAND w/ 1/4" gravel. *7% passing #200 sieve.*
-105				
521.20				
-110	18			Hard, damp, gray, CLAY LOAM TILL.
	27	8.5	15	
	38	BS		
-115				
511.70				
-120	4			Stiff, damp, bluish gray, LOAM.

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)
Abbreviations W.O.H - Sampler Advanced By Weight of Hammer, W.O.P - Advanced by Weight of Pipe, B.S. - Before Seating
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206) BBS, from 137 (Rev. 8-99)

File Name S:\NEW GEOTECHNICAL\GINTDATA\PROJECTS\MOULTRIE CO (070)\070-0003 SOIL 1963 2012.GPJ Data Template D6TEMPLT.GDT Date Printed 12/04/09
Latitude W 88 deg 32.801 min Longitude N 39 deg 36.044 min Datum Job Number

Illinois Department of Transportation
Division of Highways
ILLINOIS DOT

SOIL BORING LOG

Date 3/29/12

ROUTE FAP 320 (IL 121) DESCRIPTION Jonathan Creek LOGGED BY E. Sandschafer

SECTION 104-BR(BR-1) LOCATION NE corner of SE 1/4, SEC. 5, TWP. 13 N, RNG. 6 E, 3 PM

COUNTY Moultrie DRILLING METHOD Hollow stem auger & split spoon HAMMER TYPE Auto 140#

STRUCT. NO. 070-0003
Station 138+26.35

BORING NO. 2012 - 1 (SW)
Station 136+15
Offset 6.0ft Rt
Ground Surface Elev. 630.70 ft

Surface Water Elev. 608.59 ft
Stream Bed Elev. 608.59 ft

Groundwater Elev.:
▽ First Encounter 621.2 ft
▽ Upon Completion Caved at 22' ft
▽ After ____ Hrs. Backfilled ft

DEPTH (ft)		BLOWS /6"	UCS Qu (tsf)	MOIST (%)
	Stiff, damp, bluish gray, LOAM. *(continued)* 510.20	5 11	1.9 B	20
	Very damp, SANDY LOAM. 506.20			
-125	Very dense, damp, gray, SANDSTONE, breaks easily. 505.90	2"/50 1"/50 0"/50		16
	Extent of exploration.			
	Benchmark: BM 225 - RR Spike in PP in SW quadrant of existing structure, Sta 136+67, 26.2' S of IL 121 CL = 630.51' elevation. Provided by Program Development.			
-130				
-135				
-140				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)
Abbreviations W.O.H - Sampler Advanced By Weight of Hammer, W.O.P - Advanced by Weight of Pipe, B.S. - Before Seating
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File Name S:\NEW GEOTECHNICAL\GINTDATA\PROJECTS\MOULTRIE CO (070)\070-0003 SOIL 1963 2012.GPJ Data Template D6TEMPLT.GDT Date Printed 12/04/09
Latitude W 88 deg 12.801 min Longitude N 39 deg 36.044 min Datum Job Number

Illinois Department of Transportation
Division of Highways
ILLINOIS DOT

SOIL BORING LOG

Date 3/30/12

ROUTE FAP 320 (IL 121) DESCRIPTION Jonathan Creek LOGGED BY E. Sandschafer

SECTION 104-BR(BR-1) LOCATION NE corner of SE 1/4, SEC. 5, TWP. 13 N, RNG. 6 E, 3 PM

COUNTY Moultrie DRILLING METHOD Hollow stem auger & split spoon HAMMER TYPE Auto 140#

STRUCT. NO. 070-0003
Station 138+26.35

BORING NO. 2012 - 2 (NE)
Station 139+74
Offset 10.0ft Lt
Ground Surface Elev. 631.24 ft

Surface Water Elev. 608.59 ft
Stream Bed Elev. 608.59 ft

Groundwater Elev.:
▽ First Encounter 614.2 ft
▼ Upon Completion 613.7 ft
▼ After ____ Hrs. Backfilled ft

DEPTH (ft)	BLOWS /6"	UCS Qu (tsf)	MOIST (%)	
				1.5" asphalt on 11" concrete pavement.
				630.24
				Medium to stiff, damp, gray, CLAY LOAM TILL, embankment.
	2			
	3	1.5	18	
	3	B		
-5	0			
	2	0.7	20	
	2	BS		
	0			
	0	0.8	23	
	2	BS		
-10	1			
	1	1.0	20	
	3	B		
	1			
	2	1.3	16	
	2	B		
-15	1			
	2	2.1	19	
	3	B		
	1			
	2	1.5	22	
	2	B		
				613.04
				Dark gray, SANDY LOAM w/ organics.
				611.24
-20	1			

DEPTH (ft)	BLOWS /6"	UCS Qu (tsf)	MOIST (%)	
	1	0.1	21	Very soft to medium, wet, dark gray, SANDY LOAM. *With 1/2" Sandstone fragments.*
	2	B		
	0			
	5	0.1	11	*With 3/4" topsize Gravel.*
	5	B		
				606.74
-25	5			Medium, wet, gray, fine grained.
	13		15	SAND. *14% passing #200 sieve.*
	12			
	6			
	8		16	*With 3/4" topsize Gravel. 5% passing #200 sieve.*
	9			
-30	10			
	8		13	*With 3/4" topsize Gravel. 3% passing #200 sieve.*
	9			
-35	5			
	6		15	*With 3/4" topsize Gravel. 2% passing #200 sieve.*
	9			
				With 3/4" topsize Gravel. 2% passing #200 sieve.
				591.24
-40	5			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)
Abbreviations W.O.H - Sampler Advanced By Weight of Hammer, W.O.P - Advanced by Weight of Pipe, B.S. - Before Seating
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206) BBS, from 137 (Rev. 8-99)

File Name S:\NEW GEOTECHNICAL\GINT DATA\PROJECTS\MOULTRIE CO (070)\070-0003 SOIL 1963 2012.GPJ Data Template D8\EMPLT.GDT Date Printed 12/04/09
Latitude W 88 deg 32.740 min Longitude N 39 deg 36.051 min Datum Job Number

Illinois Department of Transportation
Division of Highways
ILLINOIS DOT

SOIL BORING LOG

Date 3/30/12

ROUTE FAP 320 (IL 121) DESCRIPTION Jonathan Creek LOGGED BY E. Sandschafer

SECTION 104-BR(BR-1) LOCATION NE corner of SE 1/4, SEC. 5, TWP. 13 N, RNG. 6 E, 3 PM

COUNTY Moultrie DRILLING METHOD Hollow stem auger & split spoon HAMMER TYPE Auto 140#

STRUCT. NO. 070-0003
Station 138+26.35

BORING NO. 2012 - 2 (NE)
Station 139+74
Offset 10.0ft Lt
Ground Surface Elev. 631.24 ft

Surface Water Elev. 608.59 ft
Stream Bed Elev. 608.59 ft

Groundwater Elev.:
▽ First Encounter 614.2 ft
▼ Upon Completion 613.7 ft
▼ After ____ Hrs. Backfilled ft

DEPTH (ft)	BLOWS /6"	UCS Qu (tsf)	MOIST (%)	Description
	7 10		15	Medium, wet, gray, fine grained, SAND.
-45	5			
	7 8		20	*1% passing #200 sieve.*
-50	7			
	7 9		20	*With trace 3/8" topsize Gravel. 1% passing #200 sieve.*
-55				
571.24 -60	7			

DEPTH (ft)	BLOWS /6"	UCS Qu (tsf)	MOIST (%)	Description
	9 9		15	Medium, wet, gray, fine grained, SAND. *With 3/4" topsize Gravel. 2% passing #200 sieve.*
-65				
-70	5			
	6 7		14	*With 1 1/4" topsize Gravel. 2% passing #200 sieve.*
-75				
551.24 -80	5			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)
Abbreviations W.O.H - Sampler Advanced By Weight of Hammer, W.O.P - Advanced by Weight of Pipe, B.S. - Before Seating
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File Name S:\NEW GEOTECHNICAL\GINTDATA\PROJECTS\MOULTRIE CO (076)\070-0003 SOIL 1963 2012.GPJ Data Template D61EMPLT.GDT Date Printed 12/04/09
Latitude W 88 deg 32.740 min Longitude N 39 deg 36.051 min Datum Job Number

Illinois Department of Transportation
Division of Highways
ILLINOIS DOT

SOIL BORING LOG

Date 3/30/12

ROUTE FAP 320 (IL 121) DESCRIPTION Jonathan Creek LOGGED BY E. Sandschafer

SECTION 104-BR(BR-1) LOCATION NE corner of SE 1/4, SEC. 5, TWP. 13 N, RNG. 6 E, 3 PM

COUNTY Moultrie DRILLING METHOD Hollow stem auger & split spoon HAMMER TYPE Auto 140#

STRUCT. NO. 070-0003
Station 138+26.35

BORING NO. 2012 - 2 (NE)
Station 139+74
Offset 10.0ft Lt
Ground Surface Elev. 631.24 ft

Surface Water Elev. 608.59 ft
Stream Bed Elev. 608.59 ft

Groundwater Elev.:
▽ First Encounter 614.2 ft
▽ Upon Completion 613.7 ft
▼ After ____ Hrs. Backfilled ft

DEPTH (ft)	BLOWS /6"	UCS Qu (tsf)	MOIST (%)	Description
	6		12	Medium, wet, gray, medium grained, SAND, w/ 3/8" topsize Gravel. *1% passing #200 sieve.*
	10			
-85				
-90	5			
	13		10	
	15			
-95				
531.24 -100	7			

DEPTH (ft)	BLOWS /6"	UCS Qu (tsf)	MOIST (%)	Description
	9			Medium, wet, gray, medium grained, Estimated SAND, no return in sampler.
	13			
-105				
521.74				
-110	14			Hard, damp, gray, CLAY LOAM TILL
	21	6.3		
520.24	23	B		
				Extent of exploration.
				Benchmark: BM 225 - RR Spike in PP in SW quadrant of existing structure, Sta 136+67, 26.2' S of IL 121 CL = 630.51' elevation. Provided by Program Development.
-115				
-120				

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)
Abbreviations W.O.H - Sampler Advanced By Weight of Hammer, W.O.P - Advanced by Weight of Pipe, B.S. - Before Seating
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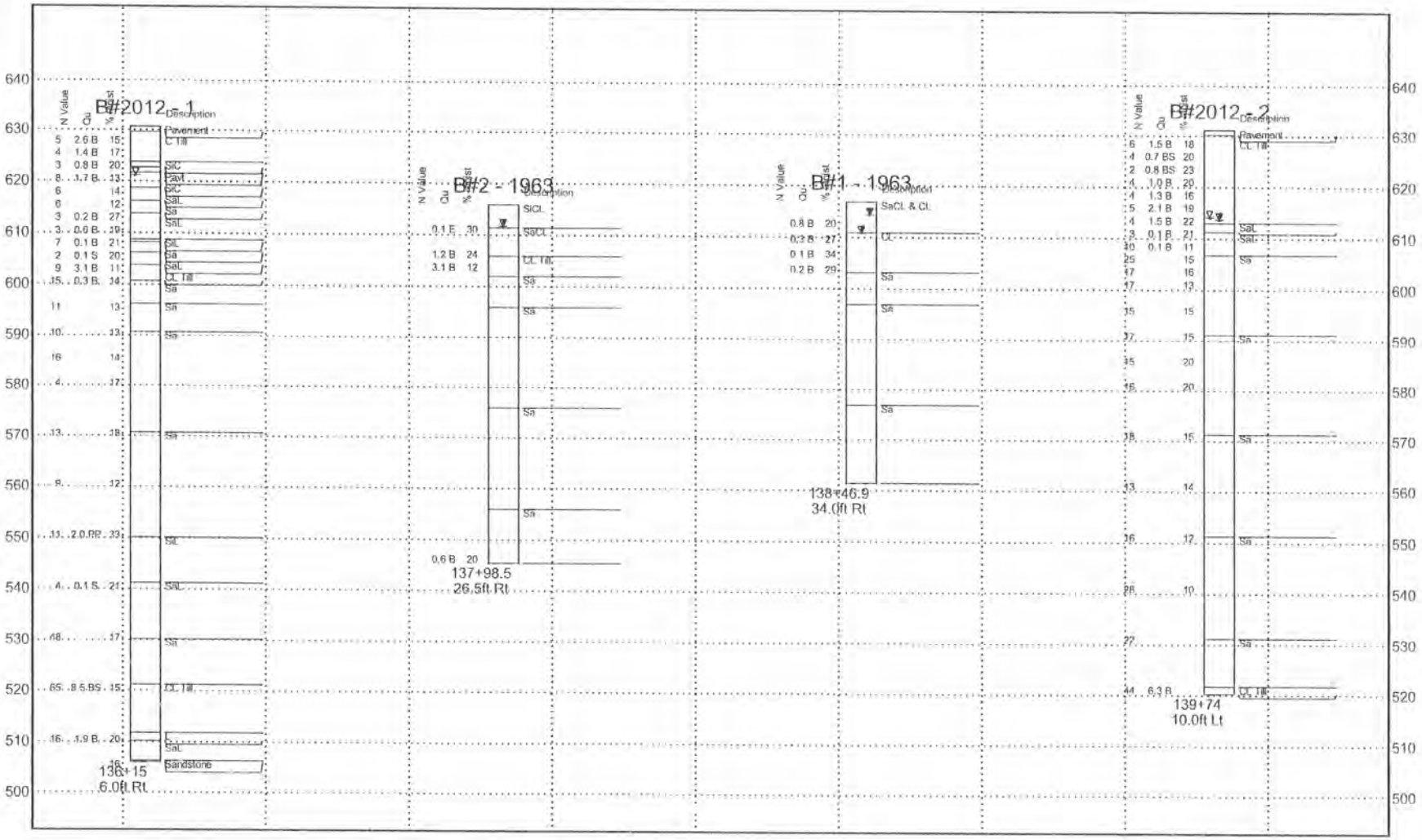
File Name S:\NEW GEOTECHNICAL\GINTDATA\PROJECTS\MOULTRIE CO (070)\070-0003 SOIL 1963.2012.GPJ Data Template D6TEMPLT.GDT Date Printed 12/04/09
Latitude W 88 deg 32.740 min Longitude N 39 deg 36.051 min Datum Job Number

Structure Number 070-0003 Jonathan Creek
Located in the NE corner of SE 1/4 of Section 5, Township 13 N, Range 6 E of the 3 P.M.



NOT TO HORIZONTAL SCALE

VARIATIONS IN SUBSURFACE CONDITIONS MAY EXIST BETWEEN BORINGS

Groundwater
First Encounter
Completion
after (refer to log) hours

Abbreviations
WOH - Sampler Advanced by Weight of Hammer, WOP - Weight of Pipe
B.S. - Before Sealing

Illinois Department of Transportation
Division of Highways
ILLINOIS DOT

SUBSURFACE DATA PROFILE

Route: FAP 320 (IL 121)

Section: 104-BR(BR-1)

County: Moultrie

TEST FENCE 2 070-0003 SOIL 1963 2012.GPJ D6TEMPLT.GDT 12/04/09

TEST FENCE 2 070-0003 SOIL 1963 2012.GPJ D6TEMPLT.GDT 12/04/09

FW: request for information

Siudyla, Alexander S
Sent: Tuesday, April 08, 2014 3:02 PM
To: Jones, Lindsey N.
Attachments: EWSE.xlsx (19 KB)

Lindsey: Here is some information on that inhouse bridge project. Do you need any other hydraulic information to complete the geotechnical report. If so I can try to get it from D7

From: Allen, Michael
Sent: Tuesday, April 08, 2014 9:16 AM
To: Verhulst, Derek G
Cc: Siudyla, Alexander S
Subject: RE: request for information

Derek,

As requested, I've attached the estimated water surface elevation.

Mike

From: Verhulst, Derek G
Sent: Thursday, February 20, 2014 2:38 PM
To: Allen, Michael
Cc: Siudyla, Alexander S
Subject: request for information

IL 121 over Jonathan Creek
SN 070-0003
Moultrie Co.

Mike Allen,

I am in the process of preparing a TSL for the above referenced project. The proposed letting date is 11/17/2017. The proposed scope of work includes a new concrete deck built on existing steel beams with structure widening on both sides which involves sub-structure widening to accommodate the wider superstructure. In order to provide a complete TSL, we will need the following information:

(1) Design High Water Elevation (to calc vertical clearance)
(2) Streambed elevation (to determine bottom of footing elevations)
(3) Estimated Water Surface Elevation at the time of construction (to determine if cofferdams are needed)
(4) Design Scour Elevations (to verify capacity of piles)
(5) Velocity of water during flood (to verify size of riprap)
(6) Suggested riprap layout

Based on the above list of requested information, we were going to ask for a hydraulic study. However, as I was typing up this email, Lindsey from our foundations unit gave me some preliminary soils information. I just learned that she has been in contact with you and she shared with me the 1994 scour calcs from your office that show over 30 feet of anticipated

scour. I also know the district installed class A4 riprap in 2000 as a scour counter-measure.

In addition to the 6 items above, I was wondering what you thought about building a new deck on piers that are supported on 20 foot long timber piles? According to the scour calcs, the theoretical scour is well below the pile tips. How confident are you that the class A4 riprap will eliminate all scour? I am discussing this issue with several people in our office and wanted to get your thoughts and input. We can discuss by phone if more convenient.

Thanks for your help and let me know if you have any questions.

DEREK G. VERHULST, PE, SE
PLANNING SECTION
BUREAU OF BRIDGES AND STRUCTURES
ILLINOIS DEPARTMENT OF TRANSPORTATION
(217) 785-2918
Trying to fill the gap.

SN 070-0003 ESTIMATED WATER SURFACE ELEVATION

Flowline Elevation of Channel		608.80
Please enter top of bank elevation		616.32
Enter number of month of survey		3
Enter water surface elevation taken during survey		612.9
April High	1	613.65
Sept. Low		609.90
Highest of flowline or Sept. Low		609.90
75% Bank - Sept Low	2	614.72
Estimated Water Surface Elev:		**613.65**

Cross Secion

RE: SGR 070-0003

Verhulst, Derek G

Tue 12/9/2014 3:19 PM

To:Jones, Lindsey N. <Lindsey.Jones@illinois.gov>;

Lindsey,

As promised, I am sending you the "adjusted" bottom of abutment and pier elevations for the design scour elevation table. The adjusted elevations are the elevations given in the existing plans minus 0.47 feet which is the average difference between plan elevation and survey elevation provided by the district. Someone else is working on the design for the scour mitigation system.

West abut = 622.39
Pier 1 = 603.84
Pier 2 = 604.03
East abut = 622.82

Just to make sure we are on the same page, I believe you were going to revise the following items in the ABCR:

- Adjust design scour elevation table based on above
- Provide LFD seismic data (including seismic category)
- Provide info about temp soil retention system (previous emails say it is feasible)

Once again, thanks for your help. As you probably remember, this job is not hot so there is not a huge rush – as long as the ball is moving. If you have any questions or need anything else from me, please let me know. (Hopefully, we can finish this job before either one of us retires.)

Derek G. Verhulst, PE, SE
(217) 785-2918

STRUCTURE INSPECTION RECORD

DISTRICT #5 CODE NO. 010 0003

COUNTY	ROUTE	SECTION	PROJECT	STATION	M.T.S.	S.S
	SBI 132				512	121
Moultrie	121	104 BR		138+26.29	~~529~~	~~21~~

TYPE OF STRUCTURE	LOCATION & STREAM	YEAR BUILT (BY)
W.F. Beam Deck Girder	Ill. 121 over Jonathan Creek East of Sullivan	1968

SPANS	SKEW	CLEARANCE
3 @ 66'3"; 84'5"; 66'3"	35°	HORZ. 32'6" VERT.

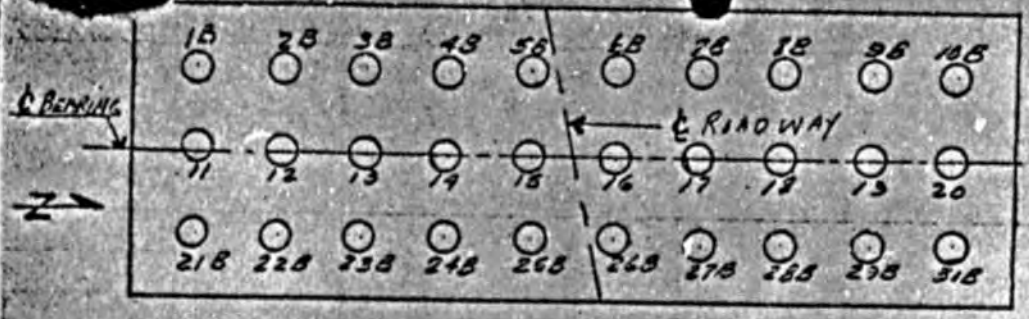
REMARKS: Reel #5-52

TOTAL WT. OF STRUCTURAL STEEL: 110.725

223'-0" long

070-0003 PAGE 1 of 2

PILING DIAGRAM
PIER #1 STA. 137+08

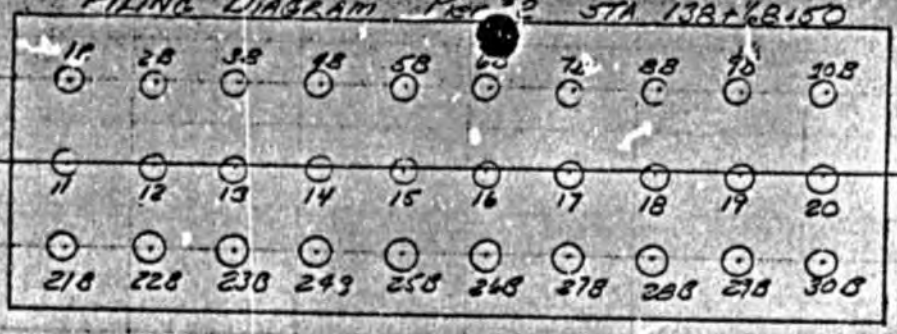


S.B.I. - 132
SEC. 104 BR
MOULTRIE COUNTY
C-95-112-66
UNTREATED TIM. PILING
VULCAN 1-SB
5000# HAMMER
3 FT. DROP.

PILE #	LN. EURN	CUT-OFF	LN. DRIVEN	BRG-TONS
1B	30.0	0.0	30.0	23
2B	30.0	0.0	30.0	44
3B	30.0	0.0	30.0	33
4B	30.0	0.0	30.0	39
5B	30.0	0.0	30.0	35
6B	30.0	0.0	30.0	35
7B	30.0	0.0	30.0	30
8B	30.0	0.0	30.0	28
9B	30.0	0.0	30.0	47
10B	30.0	0.0	30.0	34
11	30.0	10.4	19.6	32
12	30.0	0.0	30.0	35
13	30.0	0.0	30.0	31
14	30.0	0.0	30.0	31
15	30.0	0.0	30.0	34
16	30.0	0.0	30.0	46
17	30.0	0.0	30.0	40
18	30.0	0.0	30.0	31
19	TEST	—	—	—
20	30.0	0.0	30.0	36
21B	30.0	0.0	30.0	36
22B	30.0	0.0	30.0	33
23B	30.0	0.0	30.0	29
24B	30.0	0.0	30.0	26
26B	30.0	0.0	30.0	33
27B	30.0	4.0	26.0	31
28B	30.0	0.0	30.0	43
29B	30.0	0.0	30.0	36
30B	30.0	0.0	30.0	37
25B	30.0	0.0	30.0	35
TOTALS	870.0	14.4	855.6	21 REQ'D

DATE: DRIVEN.
9/12-13/67

PILING DIAGRAM Pier #2 STA 138+68.50



SBI 132
Sec 104 BR
Moultrie County
C-95-112-66
Untreated timber piles
Vulcan 1-SB
5000# Hammer
3' Drop

DATE DRIVEN
10/26-27/67

PILE #	Ln Furnish (Ft.)	Cut-Off	Ln Driven	Brg-Tons
1B	30.0	3.9	26.1	33
2B	↓	0.0	30.0	30
3B		4.6	25.4	29
4B		0.0	30.0	35
5B		4.4	25.6	33
6B		2.6	27.4	38
7B		0.0	30.0	30
8B		14.2'	15.8	27
9B		15.0	15.0'	36
10B		8.5	21.5	35
11		6.8	23.2	30
12		5.1	24.9	33
13		4.7	25.3	26
14		0.0	30.0	30
15		6.3	23.7	28
16		0.0	30.0	29
17		0.0	30.0	26
18		11.1	18.9	36
19		15.2	14.8	26
20		18.6	11.4	35
21B		5.8	24.2	42
22B		6.9	23.1	37
23B		4.7	25.3	30
24B		0.0	30.0	38
25B		0.0	30.0	37
26B		0.0	30.0	25
27B		0.0	30.0	29
28B		8.6	21.4	26
29B		9.8	20.2	24
30B	30.0	16.3	13.7	25
Total	900.0	173.1	726.9	21 Tn's REQUIRED

```
T1            S.N. 070-0003     SECTION 104 BR     STA. 138+26.29
T2            ILL. RTE. 121     OVER  JONATHAN  CREEK
T3                              FILE:  S7003A.DAT   BY:  MLK
*
*        50YR       100YR      500YR
Q        4640       5240       6660
SK       0.0004     0.0004     0.0004
*
*   --------------------------------------------------------------------------
XS   DS380   620        10         *           0.001
*            DOWNSTREAM  380 FT.  (X,Y)  -  ROTATED  10 DEG.
GR           -82.5,630.4    -77,629.9      -38.5,618.3     -29.6,617.7
GR           -18.6,608.3    0.0,609.2      15.7,609.9      23.2,616.8
GR            100,615.9     200,615.9      300,615.5       400,616.2
GR            500,616.4     553,615.6      575,616.3       600,631.3
*
N            0.080      0.055      0.080
SA                -29.6       23.2
*   --------------------------------------------------------------------------
XS   DS280   720        30
*            DOWNSTREAM  280 FT.  -  ROTATED  30 DEG.
GR           -107,630.6     -100,629.7     -52,616.7       -26,616.0
GR           -9,609.9       0.0,607.4      19,609.0        38,616.6
GR            100,616.6     200,615.1      300,616.0       305,616.3
GR            315,616.1     400,616.2      500,615.3       600,614.9
GR            627,612.9     648,615.1      666,627.8       675,630.0
*
N            0.080      0.055      0.080
SA                -26        38
*   --------------------------------------------------------------------------
XS   EXIT    820        0.0
*                       DOWNSTREAM  180 FT.
GR           -136,630.5     -130,630.0     -88,615.9       -26.1,617.1
GR           -13.4,610.4    0.0,608.8      16.6,610        28.6,615.3
GR            34.7,617.3    100,617.0      200,616.0       300,615.1
GR            357,618.2     400,628.4      405,630.0
*
N            0.080      0.055      0.080
SA                -26.1      34.7
*   --------------------------------------------------------------------------
XS   FULLV   1000
*            FULL  VALLEY  AT  BRIDGE:  PROPAGATED  FROM  EXIT
*   --------------------------------------------------------------------------
*            SRD        LSEL       SKEW
BR   BRIDG   1000       627.5      35
*                       EXISTING  BRIDGE  -  LOOKING  UPSTREAM
GR           0.0,627.5      0.0,626.4      3,626.4         3,625.1
GR           14,624.5       49,617.1       65.5,616.8      67.5,616.2
GR           75,616.9       82,616.1       89.5,611.6      106,610.5
GR           148,612.9      150,612.9      151,616.1       152,616.5
GR           136,616.5      175,616.8      218.5,626.4     219,626.8
GR           219,627.9      0.0,622.5
*            RIPRAP     CHANNEL    RIPRAP
N            0.050      0.055      0.050
SA                49         175
*            PIER  DATA:  ELEV.,  SUMM. WIDTHS
PW           616.5,5.2       627.7,4
*            BRTYPE     BRWDTH     EMBSS      EMBELV
CD           3          44         3          631.7
*   --------------------------------------------------------------------------
*            SRD        EMBWID     IPAVE      USERCF     SKEW
XR   ROAD    1018       52         1          *          35
*                       ROAD  PROFILE  -  ILL.  RTE.  121
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N             0.040
*             XREFLT
BP            -110
*
AS    APPRO   1224
*                        UPSTREAM  180 FT.
GR            -1000,632.2     -930,618.8     -900,617.3     -800,616.0
GR            -700,616.0      -600,616.2     -500,616.5     -400,616.5
GR            -300,616.6      -200,616.4     -100,616.6     -26.4,616.9
GR            -22.1,611.4      0.0,611.4      19.8,612.9     31.5,616.6
GR             100,616.2       200,615.6      297,615.8      330,618.0
GR             358,627.8       382,636.2
*
N             0.070     0.055     0.070
SA                 -80.0      80.0
*             XREFLT
BP            -106
*
XS    US280   1324
*                        UPSTREAM  280 FT.
GR            -985,634.5      -922,621.0     -900,619.5     -800,617.3
GR            -700,616.8      -600,616.7     -500,617.0     -400,616.9
GR            -300,617.2      -150,616.5     -25,616.5      -12.9,612.2
GR             0.0,611.4       18.9,611.5     25.8,617.3     100,616.7
GR             200,615.5       300,615.6      400,616.0      413,616.5
GR             465,632.7
*
N             0.070     0.055     0.070
SA                 -25        25.8
*
HP 1 BRIDG         621.8      0     621.8
HP 2 BRIDG         621.8      0     621.8      5240
*
HP 1 BRIDG         622.74     0     622.74
HP 2 BRIDG         622.74     0     622.74     6660
*
HP 1 APPRO         623.06     0     623.06
HP 1 APPRO         624.23     0     624.23
*
EX
ER
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 ++++ BEGINNING PROFILE CALCULATIONS ---    3
1
 WSPRO          FEDERAL HIGHWAY ADMINISTRATION - U. S. GEOLOGICAL SURVEY
 P0600188           MODEL  FOR  WATER-SURFACE  PROFILE  COMPUTATIONS

                    S.N. 070-0003     SECTION 104 BR     STA. 138+26.29
                   ILL.  RTE.  121  OVER  JONATHAN  CREEK
                                    FILE:  S7003A.DAT  BY:  MLK
              *** RUN DATE & TIME: 07-28-94  08:34

  XSID:CODE    SRDL     LEW       AREA     VHD      HF       EGL      CRWS         Q      WSEL
        SRD    FLEN     REW          K   ALPH      HO       ERR       FR#       VEL

 DS380:XS    ******    -48.     3492.     .04  *****   621.32   617.36    4640.   621.29
       620.  ******    583.   231844.    1.50  *****  *******      .12     1.33

 DS280:XS      100.    -69.     3752.     .03     .04   621.36  *******    4640.   621.32
       720.    100.    657.   256928.    1.45     .00      .00      .11     1.24

  ===135 CONVEYANCE RATIO OUTSIDE OF RECOMMENDED LIMITS.
                              "EXIT "      KRATIO =    .68

 EXIT :XS      100.   -104.     2559.     .08     .05   621.43  *******    4640.   621.35
       820.    100.    370.   173597.    1.59     .02      .00      .17     1.81

 FULLV:FV      180.   -105.     2622.     .08     .12   621.56  *******    4640.   621.48
      1000.    180.    371.   179850.    1.58     .00      .00      .17     1.77
          <<<<<THE ABOVE RESULTS REFLECT "NORMAL" (UNCONSTRICTED) FLOW>>>>>

  ===135 CONVEYANCE RATIO OUTSIDE OF RECOMMENDED LIMITS.
                              "APPRO"      KRATIO =   2.57

 APPRO:AS      224.   -945.     6855.     .01     .06   621.62  *******    4640.   621.61
      1224.    224.    340.   461828.    1.14     .00      .00      .06      .68
          <<<<<THE ABOVE RESULTS REFLECT "NORMAL" (UNCONSTRICTED) FLOW>>>>>

                 <<<<<RESULTS REFLECTING THE CONSTRICTED FLOW FOLLOW>>>>>

  XSID:CODE    SRDL     LEW       AREA     VHD      HF       EGL      CRWS         Q      WSEL
        SRD    FLEN     REW          K   ALPH      HO       ERR       FR#       VEL

 BRIDG:BR      180.     29.      832.     .78     .31   622.16   618.05    4640.   621.38
      1000.    180.    196.    79102.    1.62     .42      .00      .51     5.58

       TYPE  PRCD  FLOW       C      P/A     LSEL    BLEN    XLAB    XRAB
          3.    0.    1.     .787     .029   627.50  ******  ******  ******

    XSID:CODE     SRD    FLEN     HF      VHD      EGL       ERR          Q     WSEL
   ROAD  :RG     1018.          <<<<<EMBANKMENT IS NOT OVERTOPPED>>>>>

  XSID:CODE    SRDL     LEW       AREA     VHD      HF       EGL      CRWS         Q      WSEL
        SRD    FLEN     REW          K   ALPH      HO       ERR       FR#       VEL

 APPRO:AS      180.   -950.     8060.     .01     .14   622.55   617.33    4640.   622.54
      1224.    282.    343.   599176.    1.11     .25      .00      .04      .58

        M(G)     M(K)       KQ     XLKQ     XRKQ     OTEL
        .869     .881    71540.    -307.    -140.   622.53

                          <<<<<END OF BRIDGE COMPUTATIONS>>>>>

  XSID:CODE    SRDL     LEW       AREA     VHD      HF       EGL      CRWS         Q      WSEL
        SRD    FLEN     REW          K   ALPH      HO       ERR       FR#       VEL
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 WSPRO          FEDERAL HIGHWAY ADMINISTRATION - U. S. GEOLOGICAL SURVEY
WP060188              MODEL  FOR  WATER-SURFACE  PROFILE  COMPUTATIONS

                      S.N. 070-0003     SECTION 104 BR     STA. 138+26.29
                      ILL.  RTE.  121   OVER  JONATHAN  CREEK
                                        FILE:  S7003A.DAT  BY:  MLK
                 *** RUN DATE & TIME: 07-28-94  08:34

  XSID:CODE    SRDL      LEW       AREA     VHD      HF       EGL      CRWS          Q      WSEL
        SRD    FLEN      REW          K    ALPH      HO       ERR       FR#        VEL

DS380:XS     ******     -50.     3783.     .04  *****   621.79   617.50     5240.   621.75
      620.   ******     584.   261854.    1.45  *****  *******      .12      1.39

DS280:XS        100.     -71.     4046.     .04     .04   621.83  *******     5240.   621.79
      720.      100.     657.   288602.    1.41     .00      .00      .11      1.30

 ===135 CONVEYANCE RATIO OUTSIDE OF RECOMMENDED LIMITS.
                              "EXIT "      KRATIO =    .68

EXIT :XS         100.    -106.     2781.     .09     .05   621.90  *******     5240.   621.81
       820.      100.     372.   196173.    1.55     .02      .00      .17      1.88

FULLV:FV         180.    -106.     2844.     .08     .12   622.03  *******     5240.   621.95
      1000.      180.     373.   202763.    1.53     .00      .00      .17      1.84
          <<<<<THE ABOVE RESULTS REFLECT "NORMAL" (UNCONSTRICTED) FLOW>>>>>

 ===135 CONVEYANCE RATIO OUTSIDE OF RECOMMENDED LIMITS.
                              "APPRO"      KRATIO =   2.61

APPRO:AS         224.    -947.     7458.     .01     .06   622.08  *******     5240.   622.08
      1224.      224.     342.   528845.    1.12     .00      .00      .05      .70
          <<<<<THE ABOVE RESULTS REFLECT "NORMAL" (UNCONSTRICTED) FLOW>>>>>

              <<<<<RESULTS REFLECTING THE CONSTRICTED FLOW FOLLOW>>>>>

  XSID:CODE    SRDL      LEW       AREA     VHD      HF       EGL      CRWS          Q      WSEL
        SRD    FLEN      REW          K    ALPH      HO       ERR       FR#        VEL

BRIDG:BR         180.      27.      890.     .88     .30   622.68   618.42     5240.   621.80
      1000.      180.     198.    87442.    1.64     .48      .00      .53     5.89

     TYPE  PPCD  FLOW        C      P/A      LSEL     BLEN     XLAB     XRAB
        3.    0.    1.     .781     .029   627.50  ******   ******   ******

  XSID:CODE     SRD    FLEN      HF      VHD      EGL       ERR          Q      WSEL
 ROAD :RG      1018.          <<<<<EMBANKMENT IS NOT OVERTOPPED>>>>>

  XSID:CODE    SRDL      LEW       AREA     VHD      HF       EGL      CRWS          Q      WSEL
        SRD    FLEN      REW          K    ALPH      HO       ERR       FR#        VEL

APPRO:AS         180.    -952.     8735.     .01     .14   623.07   617.41     5240.   623.06
      1224.      283.     344.   682155.    1.10     .25      .00      .04      .60

       M(G)     M(K)       KQ      XLKQ     XRKQ     OTEL
       .866     .877    83891.     -317.    -146.   623.05

                  <<<<<END OF BRIDGE COMPUTATIONS>>>>>

  XSID:CODE    SRDL      LEW       AREA     VHD      HF       EGL      CRWS          Q      WSEL
        SRD    FLEN      REW          K    ALPH      HO       ERR       FR#        VEL
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100 YEAR STORM

1

WSPRO FEDERAL HIGHWAY ADMINISTRATION - U. S. GEOLOGICAL SURVEY
PO60180 MODEL FOR WATER-SURFACE PROFILE COMPUTATIONS

S.N. 070-0003 SECTION 104 BR STA. 138+26.29
ILL. RTE. 121 OVER JONATHAN CREEK
FILE: S7003A.DAT BY: MLK
*** RUN DATE & TIME: 07-28-94 08:34

XSID:CODE / SRD	SRDL / FLEN	LEW / REW	AREA / K	VHD / ALPH	HF / HO	EGL / ERR	CRWS / FR#	Q / VEL	WSEL
DS380:XS	******	-53.	4422.	.05	*****	622.82	617.81	6660.	622.77
620.	******	586.	332895.	1.37	*****	*******	.12	1.51	
DS280:XS	100.	-75.	4691.	.04	.04	622.85	*******	6660.	622.81
720.	100.	659.	363216.	1.34	.00	.00	.11	1.42	

===135 CONVEYANCE RATIO OUTSIDE OF RECOMMENDED LIMITS.
"EXIT " KRATIO = .69

EXIT :XS	100.	-109.	3271.	.09	.05	622.93	*******	6660.	622.83
820.	100.	377.	249708.	1.47	.03	.00	.17	2.04	
FULLV:FV	180.	-109.	3335.	.09	.12	623.05	*******	6660.	622.96
1000.	180.	377.	257012.	1.46	.00	.00	.16	2.00	

<<<<<THE ABOVE RESULTS REFLECT "NORMAL" (UNCONSTRICTED) FLOW>>>>>

===135 CONVEYANCE RATIO OUTSIDE OF RECOMMENDED LIMITS.
"APPRO" KRATIO = 2.68

APPRO:AS	224.	-952.	8783.	.01	.06	623.11	*******	6660.	623.10
1224.	224.	345.	688234.	1.10	.00	.00	.05	.76	

<<<<<THE ABOVE RESULTS REFLECT "NORMAL" (UNCONSTRICTED) FLOW>>>>>

<<<<<RESULTS REFLECTING THE CONSTRICTED FLOW FOLLOW>>>>>

XSID:CODE / SRD	SRDL / FLEN	LEW / REW	AREA / K	VHD / ALPH	HF / HO	EGL / ERR	CRWS / FR#	Q / VEL	WSEL
BRIDG:BR	180.	22.	1025.	1.11	.30	623.85	619.23	6660.	622.74
1000.	180.	202.	107645.	1.69	.63	.00	.56	6.50	

TYPE	PPCD	FLOW	C	P/A	LSEL	BLEN	XLAB	XRAB
3.	0.	1.	.768	.030	627.50	******	******	******

XSID:CODE	SRD	FLEN	HF	VHD	EGL	ERR	Q	WSEL
ROAD :RG	1018.		<<<<<EMBANKMENT IS NOT OVERTOPPED>>>>>					

XSID:CODE / SRD	SRDL / FLEN	LEW / REW	AREA / K	VHD / ALPH	HF / HO	EGL / ERR	CRWS / FR#	Q / VEL	WSEL
APPRO:AS	180.	-958.	10255.	.01	.13	624.24	617.59	6660.	624.23
1224.	284.	348.	883485.	1.08	.25	.01	.04	.65	

M(G)	M(K)	KQ	XLKQ	XRKQ	OTEL
.860	.869	115254.	-332.	-153.	624.22

<<<<<END OF BRIDGE COMPUTATIONS>>>>>

XSID:CODE / SRD	SRDL / FLEN	LEW / REW	AREA / K	VHD / ALPH	HF / HO	EGL / ERR	CRWS / FR#	Q / VEL	WSEL
US280:XS	100.	-937.	10277.	.01	.01	624.24	*******	6660.	624.24

500 YEAR STORM

1 NORMAL END OF WSPRO EXECUTION.

S.N. 070-0003 SECTION 104 BR STA. 138+26.29
ILL. RTE. 121 OVER JONATHAN CREEK
FILE: S7003A.DAT BY: MLK

*** RUN DATE & TIME: 07-28-94 15:08

CROSS-SECTION PROPERTIES: ISEQ = 7; SECID = APPRO; SRD = 1224.

WSEL	SA#	AREA	K	TOPW	WETP	ALPH	LEW	REW	QCR
	1	5659.	418877.	872.	873.				81795.
	2	1265.	134243.	160.	163.				20195.
	3	1806.	138022.	264.	265.				26777.
623.06		8730.	691142.	1297.	1301.	1.06	-952.	344.	124575.

1

HP 1 APPRO 624.23 0 624.23

1

WSPRO FEDERAL HIGHWAY ADMINISTRATION - U. S. GEOLOGICAL SURVEY
P060188 MODEL FOR WATER-SURFACE PROFILE COMPUTATIONS

S.N. 070-0003 SECTION 104 BR STA. 138+26.29
ILL. RTE. 121 OVER JONATHAN CREEK
FILE: S7003A.DAT BY: MLK

*** RUN DATE & TIME: 07-28-94 15:08

CROSS-SECTION PROPERTIES: ISEQ = 7; SECID = APPRO; SRD = 1224.

WSEL	SA#	AREA	K	TOPW	WETP	ALPH	LEW	REW	QCR
	1	6683.	550079.	878.	879.				104608.
	2	1453.	168946.	160.	163.				24838.
	3	2117.	178342.	268.	269.				33780.
624.23		10253.	897367.	1306.	1311.	1.06	-958.	348.	158426.

1

S.N. 070-0003 SECTION 104 BR STA. 138+26.29
ILL. RTE. 121 OVER JONATHAN CREEK
FILE: S7003A.DAT BY: MLK
*** RUN DATE & TIME: 07-28-94 08:10

CROSS-SECTION PROPERTIES: ISEQ = 5; SECID = BRIDG; SRD = 1000.

WSEL	SAM	AREA	K	TOPW	WETP	ALPH	LEW	REW	QCR
	1	43.	2206.	18.	19.				372.
	2	801.	82748.	103.	108.				12664.
	3	46.	2488.	19.	19.				416.
621.80		890.	87442.	140.	146.	1.06	27.	198.	12362.

1
HP 2 BRIDG 621.8 0 621.8 5240
1
WSPRO FEDERAL HIGHWAY ADMINISTRATION - U. S. GEOLOGICAL SURVEY
P060188 MODEL FOR WATER-SURFACE PROFILE COMPUTATIONS

S.N. 070-0003 SECTION 104 BR STA. 138+26.29 100 YEAR STORM
ILL. RTE. 121 OVER JONATHAN CREEK
FILE: S7003A.DAT BY: MLK
*** RUN DATE & TIME: 07-28-94 08:10

VELOCITY DISTRIBUTION: ISEQ = 5; SECID = BRIDG; SRD = 1000.

WSEL	LEW	REW	AREA	K	Q	VEL
621.80	26.8	197.7	890.3	87442.	5240.	5.89

X STA.	26.8		57.5	68 PIER #2	73.0		86.1		91.1	95.2
A(I)		76.1		45.1		61.5		39.4	34.7	
V(I)		3.44		4.03		4.26		6.64	7.54	
X STA.	95.2		99.1		102.9		106.6		110.4	114.2
A(I)		34.6		33.9		34.1		34.2	34.6	
V(I)		7.58		7.73		7.68		7.65	7.57	
X STA.	114.2		118.2		122.3		126.6		130.9	135.5
A(I)		35.0		35.3		35.6		35.8	36.5	
V(I)		7.49		7.42		7.36		7.31	7.18	
X STA.	135.5		140.2		145.0		154.4 PIER #1		168.3	197.7
A(I)		36.2		36.2		57.7		59.6	74.0	
V(I)		7.24		7.23		4.54	4.47	4.40	3.54	

1
*
HF 1 BRIDG 622.74 0 622.74

S.N. 070-0003 SECTION 104 BR STA. 138+26.29
ILL. RTE. 121 OVER JONATHAN CREEK
FILE: S7003A.DAT BY: MLK
*** RUN DATE & TIME: 07-28-94 08:34
CROSS-SECTION PROPERTIES: ISEQ = 5; SECID = BRIDG; SRD = 1000.

WSEL	SAM	AREA	K	TOPW	WETP	ALPH	LEW	REW	QCR
	1	62.	3587.	22.	23.				587.
	2	898.	100116.	103.	108.				15033.
	3	65.	3939.	22.	23.				640.
622.74		1025.	107642.	147.	153.	1.07	22.	202.	14842.

1
HP 2 BRIDG 622.74 0 622.74 6660
1
WSPRO FEDERAL HIGHWAY ADMINISTRATION - U. S. GEOLOGICAL SURVEY
P060198 MODEL FOR WATER-SURFACE PROFILE COMPUTATIONS

S.N. 070-0003 SECTION 104 BR STA. 138+26.29
ILL. RTE. 121 OVER JONATHAN CREEK
FILE: S7003A.DAT BY: MLK
*** RUN DATE & TIME: 07-28-94 08:34

500 YEAR STORM

VELOCITY DISTRIBUTION: ISEQ = 5; SECID = BRIDG; SRD = 1000.

WSEL	LEW	REW	AREA	K	Q	VEL
622.74	22.3	201.9	1025.2	107642.	6660.	6.50

X STA.	22.3		53.9		68.2 (PIER #2)		81.5		89.3		93.7	
A(I)		84.2		69.6		67.1		56.2		40.1		
V(I)		3.95		4.78	4.87	4.96		5.93		8.30		
X STA.	93.7		97.9		102.0		106.0		109.9		114.0	
A(I)		39.9		39.7		39.2		39.6		40.1		
V(I)		8.34		8.38		8.50		8.41		8.31		
X STA.	114.0		118.3		122.7		127.2		131.8		136.6	
A(I)		40.5		40.9		41.3		40.7		42.2		
V(I)		8.22		8.13		8.07		8.17		7.89		
X STA.	136.6		141.5		146.8 (153) (PIER #1)		158.4		171.4		201.9	
A(I)		41.9		43.2		70.6		64.9		63.2		
V(I)		7.95		7.71		4.72		5.13		4.00		

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HP 1 APPRO 623.06 0 623.06

Illinois Department of Transportation

Computations

Computed By CAE

Date 7-29-94

Checked By _____

Date _____

IL Route 121

Section 104 BR

MOULTRIE County

Sheet ____ of ____

	COMPUTATIONS	ITEM	CODE NUMBER
		COMPUTATIONS FOR SCOUR INPUT S.N. 070-0003	

PIER SCOUR: PIER # 1

1) ATTACK ANGLE OF FLOW = 0°

2) LENGTH OF PIER = 46 FT.

3) WIDTH OF PIER = 3 FT

4) VELOCITY OF FLOW @ STRUCTURE = 4.47 FOR 100 YR , 4.72 FOR 500 YR

5) DEPTH OF FLOW @ STRUCTURE = 621.8 - 615 = 6.8 FT (100 YR) 622.74 - 615 = 7.74 FT (500 YR)

6) PIER TYPE CODE = 2 ROUND NOSE

7) FOOTING WIDTH = 8.5 FT

8) FOOTING HEIGHT = 8 FT

9) d-84 BED MATERIAL = 1 mm

PIER SCOUR: PIER #2

1) ATTACK ANGLE OF FLOW = 0°

2) LENGTH OF PIER = 46 FT

3) WIDTH OF PIER = 3 FT

4) VELOCITY OF FLOW @ STRUCTURE = 4.03 FOR 100 YR 4.87 FOR 500 YR.

5) DEPTH OF FLOW @ STRUCTURE = 621.8 - 614.75 = 7.05 (100 YR) 622.74 - 614.75 = 7.99 FT (500 YR)

6) PIER TYPE CODE = 2 (ROUND NOSE)

7) FOOTING WIDTH = 8.5 FT

8) FOOTING HEIGHT = 8 FT

9) d-84 BED MATERIALS = 1 mm

Illinois Department of Transportation

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Section 104 BR

MOULTRIE County

Sheet ____ of ?

	COMPUTATIONS	ITEM	CODE NUMBER
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CONTRACTION

A) 100 YR SCOUR:

1) FLOW DEPTH @ APPROACH = 7.9 FT

2) WIDTH @ APPROACH = 160 FT

3) WIDTH @ CONTRACTION = 156 FT

4) CONTRACTED FLOW = 5240 CFS

5) MAIN CHANNEL FLOW @ APPROACH = $5240\left(\frac{134243}{691142}\right)$ = 1018 CFS

6) V_{RATIO} = 0.1

7) MANNING "n" RATIO = 1

B) 500 YEAR STORM:

1) FLOW DEPTH @ APPROACH = $\frac{1453}{160}$ = 9.1 FT

2) WIDTH @ APPROACH = 160 FT

3) WIDTH @ CONSTRICTION = 172 FT

4) CONTRACTED FLOW = 6660 CFS

5) MAIN CHANNEL FLOW @ APPROACH = $6660\left(\frac{168946}{897367}\right)$ = 1253.8 CFS

6) V_{RATIO} = 0.1

7) MANNING "n" RATIO = 1

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CONTRACTION SCOUR
CASE 1 Overbank flow on a flood plain being forced back to the
channel by the approaches to the bridge.
BRIDGE NUMBER0700003 Q=

1	flow depth @ approach	y1	ft	=	7.9
2	width @ approach	w1	ft	=	160
3	width @ constriction	w2	ft	=	156
4	contracted flow	Qt	cfs	=	5240
5	main channel flow @ approach	Qc	cfs	=	1018
6	Vratio ShearV/FallV			=	.1
7	Manning nRatio contracted/approach			=	1

CONTRACTION SCOUR EQUATION 1 = 25 Ft

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PIER SCOUR Equation (4)
PIER NUMBER 1
BRIDGE NUMBER 0700003 Q=

1	attack angle of flow	theta	deg	=	0
2	length of pier	L	ft	=	46
3	width of pier	a	ft	=	3
4	velocity of flow @ approach	V	fps	=	4.47
5	depth of flow @ approach	y1	ft	=	6.8
6	pier type code 1 - 5			=	2
7	footing width	af	ft	=	8.5
8	footing height	yf	ft	=	8
9	d-84 bed material	ks	mm	=	1

PIER SCOUR EQUATION 4 (COLUMN) = 5 Ft
PIER SCOUR EQUATION 4 (FOOTING) = 10 Ft

****

PIER SCOUR Equation (4)
PIER NUMBER 2
BRIDGE NUMBER 0700003 Q=

1	attack angle of flow	theta	deg	=	0
2	length of pier	L	ft	=	46
3	width of pier	a	ft	=	3
4	velocity of flow @ approach	V	fps	=	4.03
5	depth of flow @ approach	y1	ft	=	7.05
6	pier type code 1 - 5			=	2
7	footing width	af	ft	=	8.5
8	footing height	yf	ft	=	8
9	d-84 bed material	ks	mm	=	1

PIER SCOUR EQUATION 4 (COLUMN) = 5 Ft
PIER SCOUR EQUATION 4 (FOOTING) = 9 Ft

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CONTRACTION SCOUR
CASE 1 Overbank flow on a flood plain being forced back to the main channel by the approaches to the bridge.
BRIDGE NUMBER0700003 Q=

1	flow depth @ approach	y1	ft	=	9.1
2	width @ approach	w1	ft	=	160
3	width @ constriction	w2	ft	=	172
4	contracted flow	Qt	cfs	=	6660
5	main channel flow @ approach	Qc	cfs	=	1253.8
6	Vratio ShearV/FallV			=	.1
7	Manning nRatio contracted/approach			=	1

CONTRACTION SCOUR EQUATION 1 = 27 Ft

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PIER SCOUR Equation (4)
PIER NUMBER 1
BRIDGE NUMBER 0700003 Q=

1	attack angle of flow	theta	deg	=	0
2	length of pier	L	ft	=	46
3	width of pier	a	ft	=	3
4	velocity of flow @ approach	V	fps	=	4.72
5	depth of flow @ approach	y1	ft	=	7.74
6	pier type code 1 - 5			=	2
7	footing width	af	ft	=	8.5
8	footing height	yf	ft	=	8
9	d-84 bed material	ks	mm	=	1

PIER SCOUR EQUATION 4 (COLUMN) = 5 Ft
PIER SCOUR EQUATION 4 (FOOTING) = 10 Ft

****

PIER SCOUR Equation (4)
PIER NUMBER 2
BRIDGE NUMBER 0700003 Q=

1	attack angle of flow	theta	deg	=	0
2	length of pier	L	ft	=	46
3	width of pier	a	ft	=	3
4	velocity of flow @ approach	V	fps	=	4.87
5	depth of flow @ approach	y1	ft	=	7.99
6	pier type code 1 - 5			=	2
7	footing width	af	ft	=	8.5
8	footing height	yf	ft	=	8
9	d-84 bed material	ks	mm	=	1

PIER SCOUR EQUATION 4 (COLUMN) = 5 Ft
PIER SCOUR EQUATION 4 (FOOTING) = 10 Ft

CAC

SCOUR FIELD REVIEW

STRUCTURE NO. 070-0003 DATE: 8/8/94

LOCATION: IL. 121 OVER JONATHON CR. EAST OF SULLIVAN

INSPECTORS: ADRIAN GREENWELL, CRAIG EMBERTON

GIVEN:

STRUCTURE TYPE: 3 SPAN MULTIBEAM ON PILING

PREDICTED SCOUR: UNDERMINES PILING

DRAINAGE AREA: 57.50 mi

STREAMBED MATERIAL: SILTY CLAY

OTHER:

FINDINGS: NO SCOUR FOUND, STREAM SIDE OF EAST PIER WAS RIP RAPPED IN 1991 SEEMS TO BE HOLDING WELL

RATING(ITEM 113): 3

RATE ITEM 93B5: 1

NOTES: STREAM LEVEL IS VERY LOW, U.S. OF BRIDGE IS DRYING UP, FAIRLY DEEP POOL DIRECTLY UNDER BRIDGE