



Original Report Date:	04/22/24	Proposed SN:	025-0113	Route:	57 (NB)
Revised Date:		Existing SN:	025-0003	Section:	25-8BR
Geotechnical Engineer:	Doris D. Gonzalez (FGU)			County:	Effingham
Structural Engineer:				Contract:	74A04

**Indicate the proposed structure type, substructure types, and foundation locations (attach plan and elevation drawing):** The proposed structure is a simple span bridge on PPC IL63 beams with integral abutments supported by metal shell piles. The estimated substructure factored loads are 2161 kips.

**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):** The existing structure is a 3-span wide flange bridge with piers supported by spread footings and abutments supported by concrete piles. The geotechnical investigation consisted of two boring logs designated Boring 1 and 2, respectively. The borings depths range from 56 to 76 ft and did not encounter rock. The soil profile consists of stiff to hard clay loams mainly, with a granular layer encountered in both borings.

**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 Plan and Profile shows less than 2 ft of new fill. No significant settlement is expected.

**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:** No significant cuts or fills are shown on the TSL or the Plan and Profile. The site geometry appears to remain very close to the existing one. The most critical boring (Boring 2) was utilized in the slope stability analysis and both the static and seismic have satisfactory factors of safety. Both analyses were modeled utilizing end-of-construction soil parameters and the factors of safety for static and seismic conditions were 1.7 and 1.2, respectively. No further testing or ground improvement appear necessary.

**Indicate at each substructure, the 100-year and 200-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:** For spill thru abutments, the design and check scour elevations is to be taken at the bottom of abutment caps elevations.

**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:**

Seismic Site Class: C, SPZ = 1

As = 0.163g

SDS = 0.343g

SD1 = 0.144g

Since the proposed structure is located in Seismic Performance Zone 1, a liquefaction analysis is not required.

**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 factored unit side and tip resistance values shall be indicated when drilled shafts are proposed:** Metal shell piles are feasible; however, since the piles will be driven through hard tills, we recommend limiting the pile selection to piles equal or larger than MS 14" w/.312 walls. Pile shoes should be utilized at both abutments. The South Abutment piles will need to be driven through precored holes that extend 10 ft below the bottom of the Abutment cap. FGU recommends one test pile at each abutment.

**Calculate the estimated water surface elevation and determine the need for cofferdams (type 1 or 2), and seal coat:** The EWSE was not provided on the TSL; however, it is not expected to reach the abutment caps.

**Assess the need for sheeting or soil retention or temporary construction slope and provide recommendation for other construction concerns:** Traffic will be maintained utilizing a crossover; therefore, temporary sheeting or soil retention systems will not be needed. If stage construction were to be implemented, the pay item Temporary Soil Retention System would be required.



# SOIL BORING LOG

Date 9/27/22

ROUTE FAI 57A (I-57) DESCRIPTION Northbound I-57 over East Branch Green Creek LOGGED BY E. Sandschafer

SECTION 25-8BR LOCATION West Half, SEC. 26, TWP. 9N, RNG. 6E, 3<sup>rd</sup> PM,

Latitude N 39.194187, Longitude W 88.502221

COUNTY Effingham DRILLING METHOD Hollow stem auger & split spoon HAMMER Auto ETR = 91.8% @ 57.4 bpm

STRUCT. NO. 025-0003 (Existing)  
025-0113 (Proposed)  
Station 5530+55

BORING NO. 1 South Abutment  
Station 5529+53  
Offset 16.0 ft RT  
Ground Surface Elev. 600.79 ft

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

Surface Water Elev.	Dry	ft
Stream Bed Elev.	568.05	ft
Groundwater Elev.:		
First Encounter	583.8	ft
Upon Completion	585.8	ft
After 48 Hrs.	593.8	ft

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

Pavement				Hard, moist, grey, CLAY LOAM Till	20	6.6	10
					30	B	
598.79							
Gravel and Rock					1		
					6	5.2	16
					11	B	
Brown, CLAY LOAM							
596.29							
Medium, wet, brown, CLAY LOAM	-5	1			-25	6	
		1	0.8	17		13	6.8
		1	B			18	S
593.79							
Very stiff, moist, grey, grey, SILTY CLAY LOAM		1				7	
		3	2.1	18		15	6.0
		3	B			24	S
591.29							
Stiff, moist, brown, CLAY LOAM Till	-10	1			-30	5	
		2	1.2	14		17	5.6
		3	B			27	S
		2					
Hard, grey		14	5.0	9			
		19	B				
		4			-35	5	
	-15	18	7.2	9		16	7.8
		26	S			30	B
583.79							
Very dense, moist, grey, medium grain, SAND		3					
19.0% passing #200 Sieve		46	NT	6			
		50/4-3/4"	NT				
580.79	-20	11			560.79	-40	5

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)  
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206), WH-Weight of Hammer, NT-Not Tested.

<b>ROUTE</b>	<u>FAI 57A (I-57)</u>	<b>DESCRIPTION</b>	<u>Northbound I-57 over East Branch Green Creek</u>	<b>LOGGED BY</b>	<u>E. Sandschafer</u>
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**SECTION** 25-8BR **LOCATION** West Half, SEC. 26, TWP. 9N, RNG. 6E, 3<sup>rd</sup> PM,  
**Latitude** N 39.194187, Longitude W 88.502221




**COUNTY** Effingham **DRILLING METHOD** Hollow stem auger & split spoon **HAMMER** Auto ETR = 91.8% @ 57.4 bpm

STRUCT. NO.	025-0003 (Existing)
Station	025-0113 (Proposed)
	5530+55

**BORING NO.** 1 South Abutment  
**Station** 5529+53  
**Offset** 16.0 ft RT  
**Ground Surface Elev.** 600.79

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

Surface Water Elev.	Dry	ft
Stream Bed Elev.	568.05	ft

<b>Groundwater Elev.:</b>		
<b>First Encounter</b>	<u>583.8</u>	ft 
<b>Upon Completion</b>	<u>585.8</u>	ft 
<b>After 48 Hrs.</b>	<u>593.8</u>	ft 

Hard, moist, grey, CLAY LOAM  
Till

18	9.3	10
25	S	

-45	7		
	20	9.3	10
	29	S	

-50	4		
	11	6.4	11
	17	B	

-55	4		
	12	5.2	11
	23	B	

Benchmark:  
BM 651-Sta. 5529+55, 22 feet LT  
Elevation = 602.41 feet.  
End of Boring

-60		
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SOIL BORING 025-0113 (OLD 0003 ) SOIL 2022.GPJ IL\_DOT.GDT 11/23/22

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)  
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206), WH-Weight of Hammer,  
NT-Not Tested.

BBS, form 137 (Rev. 8-99)



# SOIL BORING LOG

Date 9/28/22

ROUTE FAI 57A (I-57) DESCRIPTION Northbound I-57 over East Branch Green Creek LOGGED BY E. Sandschafer

SECTION 25-8BR LOCATION West Half, SEC. 26, TWP. 9N, RNG. 6E, 3<sup>rd</sup> PM

Latitude N 39.194782, Longitude W 88.501885

COUNTY Effingham DRILLING METHOD Hollow stem auger & split spoon HAMMER Auto ETR = 91.8% @ 57.4 bpm

STRUCT. NO. 025-0003 (Existing)  
025-0113 (Proposed)  
Station 5530+55

BORING NO. 2 North Abutment  
Station 5531+73  
Offset 18.0 ft RT  
Ground Surface Elev. 599.43 ft

D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)	Surface Water Elev. <u>Dry</u> ft	D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
				Stream Bed Elev. <u>568.05</u> ft				
				Groundwater Elev.: First Encounter <u>577.4</u> ft				
				Upon Completion <u>579.4</u> ft				
				After <u>24</u> Hrs. <u>577.9</u> ft				
5" Asphalt over 8" Gravel				Stiff, moist, brown, CLAY		3	1.8	19
598.33						3	B	
Brown, CLAY LOAM								
	1							
Stiff, moist	2	1.8	13			1		
	2	B				1	0.7	16
						2	B	
594.93								
Stiff, moist, grey, CLAY	-5	1				1		
	2	1.9	18			1	0.3	26
	3	B				1	B	
Brown	2					1		
	3	1.9	18			1	0.4	20
	3	B				8	B	
	1							
	1	2.0	17			2		
	3	B				12	NT	19
						14	NT	
	1							
	1	1.2	17					
	1	B						
584.93								
Medium, moist, grey, SILTY CLAY	-15	1				4		
	1	0.8	16			7	4.5	16
	3	B				12	B	
582.43								
Stiff, moist, grey & brown marbled, CLAY								
	1							
	1	1.7	22					
	2	B						
579.43	-20	1				2		

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)  
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206), WH-Weight of Hammer,  
NT-Not Tested.

<b>ROUTE</b>	<u>FAI 57A (I-57)</u>	<b>DESCRIPTION</b>	<u>Northbound I-57 over East Branch Green Creek</u>	<b>LOGGED BY</b>	<u>E. Sandschafer</u>
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SECTION 25-8BR LOCATION West Half, SEC. 26, TWP. 9N, RNG. 6E, 3<sup>rd</sup> PM,  
Latitude N 39.194782, Longitude W 88.501885

**COUNTY** Effingham **DRILLING METHOD** Hollow stem auger & split spoon **HAMMER** Auto ETR = 91.8% @ 57.4 bpm

<b>STRUCT. NO.</b>	025-0003 (Existing)
	025-0113 (Proposed)
<b>Station</b>	5530+55

**BORING NO.** 2 North Abutment  
**Station** 5531+73  
**Offset** 18.0 ft RT  
**Ground Surface Elev.** 599.43

[illegible]

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)  
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206), WH-Weight of Hammer,  
NT-Not Tested.

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SOIL BORING 025-0113 (OLD 0003 ) SOIL 2022.GPJ IL\_DOT.GDT 11/23/22



# Illinois Department of Transportation

Division of Highways  
Illinois Department of Transportation

## SOIL BORING LOG

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Date 9/28/22

ROUTE FAI 57A (I-57) DESCRIPTION Northbound I-57 over East Branch Green Creek LOGGED BY E. Sandschafer

SECTION 25-8BR LOCATION West Half, SEC. 26, TWP. 9N, RNG. 6E, 3<sup>rd</sup> PM,

Latitude N 39.194782, Longitude W 88.501885

COUNTY Effingham DRILLING METHOD Hollow stem auger & split spoon HAMMER Auto ETR = 91.8% @ 57.4 bpm

STRUCT. NO. 025-0003 (Existing)  
025-0113 (Proposed)  
Station 5530+55

BORING NO. 2 North Abutment  
Station 5531+73  
Offset 18.0 ft RT  
Ground Surface Elev. 599.43 ft

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

Surface Water Elev. Dry ft  
Stream Bed Elev. 568.05 ft  
Groundwater Elev.:  
First Encounter 577.4 ft▼  
Upon Completion 579.4 ft▽  
After 24 Hrs. 577.9 ft▽

Grey, CLAY Till

NT	NT	NT
NT	NT	NT

514.93

Hard, moist, brown & grey, SILTY  
CLAY LOAM Till

-85	4	
17	5.7	18
25	S	

513.43

Benchmark:  
BM 651-Sta. 5529+55, 22 feet LT  
Elevation = 602.41 feet.  
End of Boring

-90

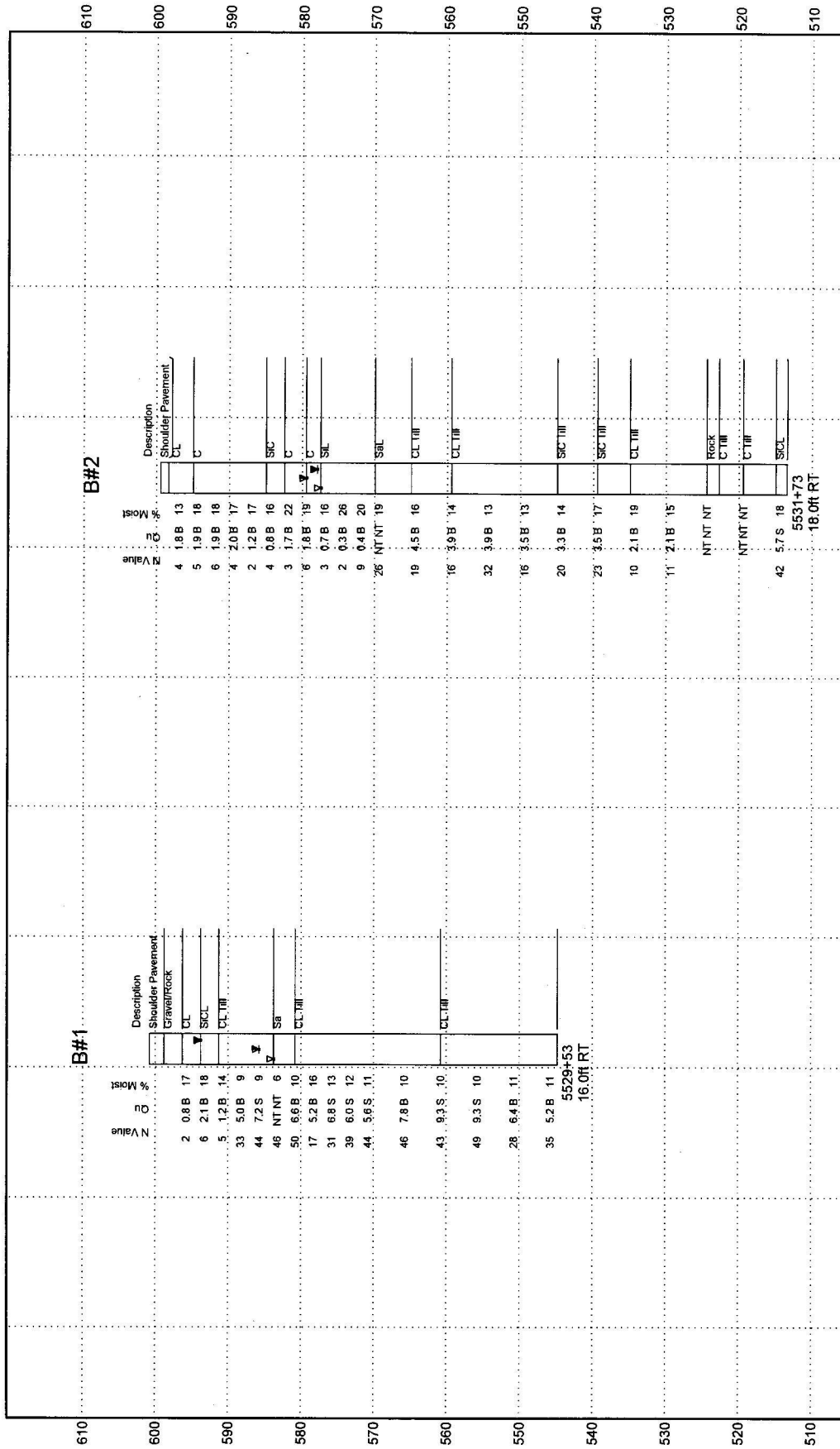
-95

-100

SOIL BORING 025-0113 (OLD 0003) SOIL 2022.GPJ IL\_DOT.GDT 11/23/22

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)  
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206), WH-Weight of Hammer,  
NT-Not Tested.

Structure Number 025-0003 (Existing) 025-0113 (Proposed) Northbound I-57 over East Branch Green Creek  
 Located in the West Half of Section 26, Township 9N, Range 6E of the 3 P.M.



NOT TO HORIZONTAL SCALE

VARIATIONS IN SUBSURFACE  
 CONDITIONS MAY EXIST  
 BETWEEN BORINGS

# SUBSURFACE DATA PROFILE

Route: FAI 57A (I-57)

Section: 25-8BR

County: Effingham

**Illinois Department  
 of Transportation**

Division of Highways  
 Illinois Department of Transportation

Groundwater  
 First Encounter  
 Completion  
 after (refer to log) hours

Abbreviations  
 W4 - Soil Moisture  
 of Hammer, WCP - Weight of Pipe  
 B.S. - Before Sealing  
 NT - Not Tested



<b>ROUTE</b>	FAI 57A (I-57)	<b>DESCRIPTION</b>	Southbound I-57 over East Branch Green Creek	<b>LOGGED BY</b>	E. Sandschafer
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**SECTION** 25-8BR **LOCATION** West 1/2, SEC. 26, TWP. 9N, RNG. 6E, 3<sup>rd</sup> PM.

**Latitude** N 39.194251, **Longitude** W 88.503213

COUNTY Effingham DRILLING METHOD Hollow stem auger & split spoon HAMMER Auto ETR = 91.8% @ 57.4 bpm

	025-0004 (Existing)
<b>STRUCT. NO.</b>	<u>025-0114 (Proposed)</u>
<b>Station</b>	5530+20

**BORING NO.** 1 South Abutment  
**Station** 5529+15  
**Offset** 20.0 ft LT  
**Ground Surface Elev.** 601.24

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

Surface Water Elev.	Dry	ft
Stream Bed Elev.	567.63	ft
Groundwater Elev.:		
First Encounter	Dry	ft
Upon Completion	Dry	ft
After 24 Hrs.	Dry	ft

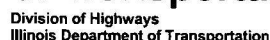
D E P T H	B L O W S	U C S  Qu	M O I S T
(ft)	((/6"))	(tsf)	(%)

Aggregate over Clay Loam (Shoulder)				Hard, moist, grey, CLAY LOAM Till		11 13	6.2 B	9
599.24								
Brown, CLAY LOAM				Very stiff		1 2 3		19
Very stiff, moist, grey, till								
596.74								
Very stiff, moist, grey, CLAY LOAM Till	-5	3			-25	1		
		8 12	3.7 B	9		4 5	2.7 B	15
		3				1		
		9 12	3.7 B	8	Hard	6 9	4.7 B	13
Hard	-10	4			-30	2		
		8 12	7.0 B	9		7 11	5.8 B	13
		3						
		9 12	6.6 B	9				
	-15	6			-35	3		
		11 12	6.4 B	9		5 8	4.3 B	10
		5						
		11 16	6.0 B	9				
581.24	-20	5			561.24	-40	3	

**The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated). The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206), WH-Weight of Hammer, NT-Not Tested.**

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SOIL BORING 025-0114 (OLD 0004 ) SOIL 2022.GPJ IL DOT.GDT 11/23/22



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Date 9/29/22



**Date** 9/29/22

BBS, form 137 (Rev. 8-99)



# SOIL BORING LOG

Date 9/29/22

ROUTE FAI 57A (I-57) DESCRIPTION Southbound I-57 over East Branch Green Creek LOGGED BY E. Sandschafer

SECTION 25-8BR LOCATION West 1/2, SEC. 26, TWP. 9N, RNG. 6E, 3<sup>rd</sup> PM,

Latitude N 39.194969, Longitude W 88.502977

COUNTY Effingham DRILLING METHOD Hollow stem auger & split spoon HAMMER Auto ETR = 91.8% @ 57.4 bpm

STRUCT. NO. 025-0004 (Existing)  
025-0114 (Proposed)  
Station 5530+20

BORING NO. 2 North Abutment  
Station 5531+74  
Offset 17.0 ft LT  
Ground Surface Elev. 600.95 ft

D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)	Surface Water Elev. <u>Dry</u> ft	D E P T H (ft)	B L O W S (/6")	U C S Qu (tsf)	M O I S T (%)
				Stream Bed Elev. <u>567.63</u> ft				
				Groundwater Elev.:				
				First Encounter <u>574.0</u> ft				
				Upon Completion <u>572.0</u> ft				
				After <u>24</u> Hrs. <u>580.0</u> ft				
8-inch Asphalt over Aggregate (Shoulder) 599.45				Stiff, moist, grey, SILTY LOAM		2 4	1.2 B	21
Brown, CLAY Rocks stuck in augers 596.45				578.95		1 3 6		17
Hard, moist, brown, CLAY LOAM 593.95	-5 3 4	WH 4.0 P	10	Soft, moist, grey, fine grain, SANDY LOAM		1 2 2	0.4 S	14
Stiff, moist, brown and grey marbled, CLAY 588.95	2 2 3	1.7 B	16	Loose, moist, grey, fine grain, SAND 12.1 % passing #200 Sieve		2 3 3	NT NT	16
Stiff, moist, grey, CLAY LOAM With organics 586.45	1 2 4	1.2 B	23	Very loose 13.1% passing #200 Sieve		1 1	NT NT	17
Stiff, moist, grey, CLAY 583.95	1 2 3	1.6 B	20	Stiff, moist, grey, CLAY Till		9 7 6	1.7 B	19
Very stiff, moist, grey, CLAY LOAM 580.95	1 2 3	2.1 B	20			3		

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)  
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206), WH-Weight of Hammer, NT-Not Tested.



<b>ROUTE</b>	<u>FAI 57A (I-57)</u>	<b>DESCRIPTION</b>	<u>Southbound I-57 over East Branch Green Creek</u>	<b>LOGGED BY</b>	<u>E. Sandschafer</u>
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**SECTION** 25-8BR **LOCATION** West 1/2, SEC. 26, TWP. 9N, RNG. 6E, 3<sup>rd</sup> PM,

**Latitude N 39.194969, Longitude W 88.502977**

**COUNTY** Effingham **DRILLING METHOD** Hollow stem auger & split spoon **HAMMER** Auto ETR = 91.8% @ 57.4 bpm

STRUCT. NO.	025-0004 (Existing)
Station	025-0114 (Proposed)
	5530+20

**BORING NO.** 2 North Abutment  
**Station** 5531+74  
**Offset** 17.0 ft LT  
**Ground Surface Elev.** 600.95

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

Surface Water Elev.	Dry	ft
Stream Bed Elev.	567.63	ft
Groundwater Elev.:		
First Encounter	574.0	ft
Upon Completion	572.0	ft
After 24 Hrs.	580.0	ft

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

[illegible]

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer, E-Estimated)  
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206), WH-Weight of Hammer,  
NT-Not Tested.

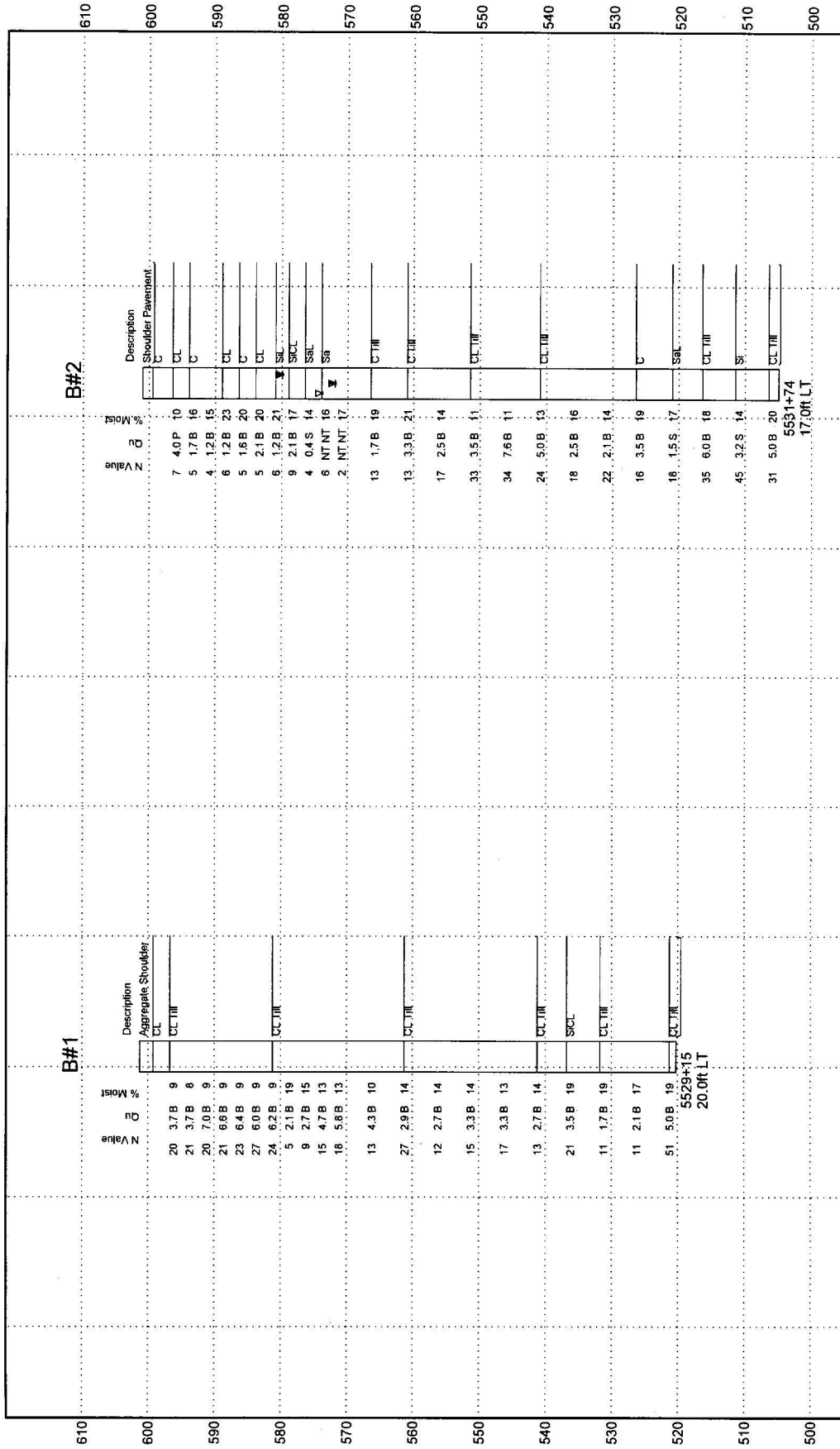
SOIL BORING 025-0114 (OLD 0004 ) SOIL 2022.GPJ IL\_DOT.GDT 11/23/22

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**Date** 9/29/22

BBS, form 137 (Rev. 8-99)

Structure Number 025-0004 (Existing) 025-0114 (Proposed) Southbound I-57 over East Branch Green Creek  
Located in the West 1/2 of Section 26, Township 9N, Range 6E of the 3 P.M.



NOT TO HORIZONTAL SCALE

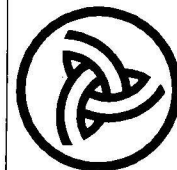
VARIATIONS IN SUBSURFACE  
CONDITIONS MAY EXIST  
BETWEEN BORINGS

SUBSURFACE DATA PROFILE

Route: FAI 57A (I-57)

Section: 25-8BR

County: Effingham



Illinois Department  
of Transportation

Division of Highways  
Illinois Department of Transportation

Groundwater  
First Encounter  
Completion  
after (refer to log) hours

Abbreviations  
WH - Sample Advanced by Weight  
of Hammer WOP - Weight of Pipe  
B.S. - Before Sealing  
NT - Not Tested