Illinois Department of Transportation
Office of Highways Project Implementation / Region 3 / District 4
401 Main Street / Peoria, Illinois 61602-1111

STRUCTURE GEOTECHNICAL REPORT

Replacement of Dual Bridges Carrying US 34 over TR 162 in Warren County, Illinois

Route:	FAP 313 (US 34)
Section:	94-16HB
County:	Warren
New Structure Nos.:	094-0053 (WB)
	094-0054 (EB)
Report Date:	June 17, 2019
Revision Date:	Dec. 30, 2019

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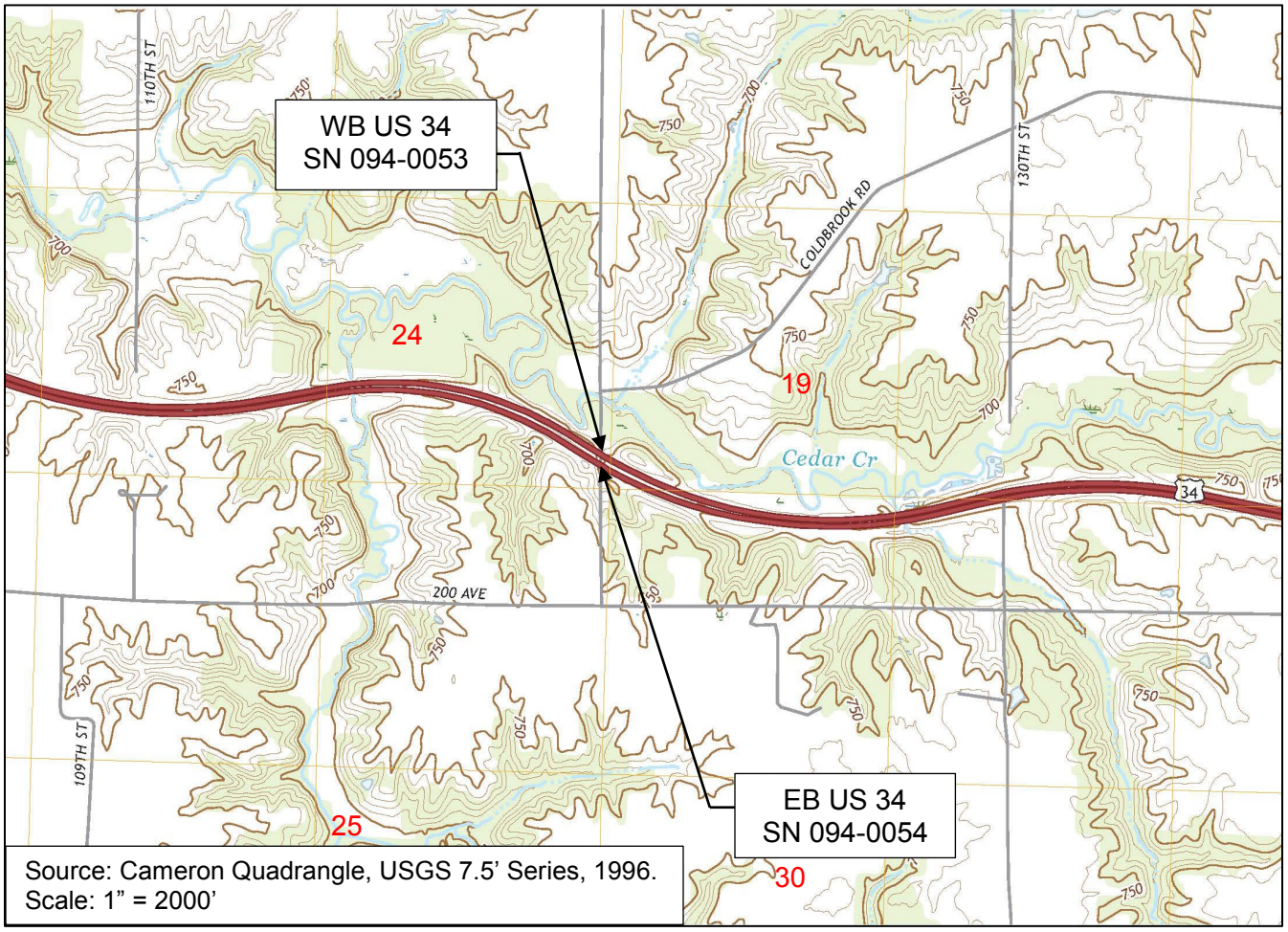
Project Description and Scope

The geotechnical study summarized in this report was performed for the proposed replacement of dual bridges that carry US 34 over Township Road (TR) 162 in Warren County, Illinois. The site is located 4.5 miles east of Monmouth in Section 19, Township 11 North, Range 1 West of the Fourth Principal Meridian, in the Galesburg Plain of the Till Plains Section. Each structure is identified on the map below, along with existing and proposed IDOT Structure Numbers.



Existing Structures. The original bridges were constructed in 1979, each being a 3-span, 36" PPC I-beam structure with open stub abutments on steel H-piles (HP 8x36) and multi-column, reinforced concrete piers on spread footings. Concrete slopewalls extend down from each abutment to TR 162 at a 2H:1V slope. The concrete slopewalls also extend laterally between the bridges. Expansion joints were replaced in 2005, along with minor concrete repairs to the abutments and application of an HMA wearing surface. Eight soil borings were drilled in 1975 for design of the existing bridges. Those boring logs and the 1976 General Plan & Elevation drawing are included with this report for information only.

Proposed Structures. Full bridge replacements were recommended in the Bridge Condition Reports (BCR) dated January 30, 2018 and prepared by Bacon, Farmer, Workman Engineering and Testing. The proposed scope of work was approved by IDOT Bridges and Structures in a memo dated May 18, 2018.

The preliminary Type, Size, and Location (TS&L) plan prepared by Fehr Graham is included in the Appendix. Based on the BCRs and the preliminary TS&L, each new bridge will be a 3-span structure with an 8” deck supported by 27” deep PPC beams (IL 27-1830). The westbound structure, SN 094-0053, will have back-to-back abutment length of 134’-2” and out-to-out deck width of 44’-6”. The eastbound structure, SN 094-0054, will have back-to-back abutment length of 145’-2” and out-to-out deck width of 43’-10”. Both structures will be built on a 30d 16’ 12” skew from the centerline of TR 162. The substructure units for each bridge will consist of integral abutments supported by H-piles and piers supported by spread footings. New concrete slopewalls will also be constructed. Table 1 lists the LRFD factored loads at each foundation unit as calculated by Fehr Graham, the structural engineer for the project.

Table 1. Factored Foundation Loads

Location	Foundation	Factored Load (kips)
Westbound US 34 SN 094-0053	West Abutment	1,131
	Pier 1	1,835
	Pier 2	1,783
	East Abutment	1,074
Eastbound US 34 SN 094-0054	West Abutment	1,197
	Pier 1	1,919
	Pier 2	1,789
	East Abutment	1,099

Structure replacement is expected to include removal of the existing abutments, concrete slopewalls, piers, and spread footings. Existing abutment piles will be removed at least 12” below the excavation line for the proposed construction. Bridge replacement will be accomplished with stage construction.

Field Exploration

Subsurface Exploration and Testing. The site is mostly surrounded by wooded areas, except to the southwest where a home and farmstead are located. Two ponds are located approximately 800 feet southeast of the intersection. It appears berms were built several years ago to create the ponds. The terrain generally slopes from south to north toward Cedar Creek, which runs along the north side of US 34. Based on the site topography, drainage from the south channelizes onto TR 162, flows north along the township road, under US 34 to Cedar Creek. No major erosion or flood damage to the township road was observed during the subsurface investigation. No significant erosion or flood damage to the US 34 bridges was observed. Some erosion and undermining of the concrete slopewalls has been noted.

Eight standard penetration test (SPT) borings were drilled by Geo Services, Inc. (GSI) on November 13-16, 2018. GSI served as a subconsultant to Terracon, who served as the prime consultant and provided lab testing. Borings SB-1 through SB-4 were drilled for the westbound bridge SN 094-0053. SB-5 through SB-8 were drilled for the eastbound SN 094-0054. The boring locations are shown below.

The soil borings were drilled with a truck-mounted rig using 4" diameter continuous flight augers for the first 10' of depth followed by rotary drilling for the remainder of boring. Casing was installed in each boring from 0' to 10'. SPT blow counts were measured with an automatic hammer on 2.5' intervals. Corresponding split spoon samples were collected with each SPT. GSI's field representative logged the soil samples and performed unconfined compressive strength (Q_u) tests on cohesive soil samples using a RIMAC spring tester. Representative samples were also collected and stored in glass jars to be returned to Terracon's soils lab for moisture content testing.

Upon encountering rock in all borings except SB-2 and SB-7, SPT tests and split-spoon sampling were continued approximately 10' into the rock. In SB-2 and SB-7, rock coring was performed for the next 10' of depth using rotary wash with an NX-2 double swivel, 10' long barrel. SB-2 was cored from a depth of 11' to 21'. SB-7 was cored from 6' to 16'. All borings were terminated in rock. Core samples were placed in boxes and returned to Terracon's lab for logging and testing for moisture content, RQD, and uniaxial compressive strength.

Subsurface Conditions. In addition to the following descriptions, subsurface conditions are presented on the Subsurface Date Profiles included in the Appendix.

SN 094-0053 (WB) – Abutment borings SB-1 and SB-4 were drilled through the US 34 embankments. Based on the borings, the westbound embankments consist of 17' of stiff silty clay fill and clay loam fill. Q_u for the embankments ranged from 0.8 to 2.0 tons per square foot (tsf) with an average of 1.5 tsf. N-values ranged from 6 to 17 blows per foot (bpf) with an average of 10 bpf. Moisture contents ranged from 14% to 21% with an average of 17%. Pier borings SB-2 and SB-3 were drilled through TR 162. The borings indicate the road is built of 2' to 3' of sand fill at this location. Moisture contents of the sand fill ranged from 8% to 11% with an average of 10%.

Natural soil was encountered at elevations ranging from 690.5 under the embankments to 686 under TR 162. The first 8' to 10' of natural soil generally consists of stiff to very stiff silty clay, clay loam, and silty loam. Q_u ranged from 1.0 to 2.9 tsf with an average of 2.1 tsf. N-values ranged from 2 to 25 bpf with an average of 13 bpf. Moisture contents ranged from 16% to 36% with an average of 23%. This layer overlies an approximate 3' layer of stiff to very stiff weathered shale that extends under most of the site. However, SB-1 indicates the weathered shale narrows down to 1' thick in the vicinity of the west abutment, and that it is overlies 2' of stiff sandy clay over 3' of medium dense sand. The sandy clay and sand were not observed in the other borings. Q_u values of 1.3 tsf were

measured in the weathered shale and sandy clay. N-values generally exceeded 100 bpf in the weathered shale. N-values in the sandy clay and sand were measured at 9 bpf and 12 bpf, respectively. Moisture contents in this depth interval ranged from 10% to 33% with an average of 21%.

The weathered shale and sand overlie rock consisting of hard shale and hard siltstone. Top of rock elevations ranged from approximately 674 to 678 moving west to east across the site. N-values exceeded 100 bpf from the top of rock to the termination of each boring.

SN 094-0054 (EB) – Abutment borings SB-5 and SB-8 were drilled through the US 34 embankments. Based on the borings, the eastbound embankments consist of 20' of stiff to very stiff silty clay fill and clay loam fill. Q_u for the embankments ranged from 1.2 to 2.4 tsf with an average of 1.9 tsf. N-values ranged from 7 to 16 bpf with an average of 11 bpf. Moisture contents of ranged from 7% to 31% with an average of 19%. Pier borings SB-2 and SB-3 were drilled through TR 162. The borings indicate the road is built of 2' of silty loam fill and sand fill at this location. Moisture contents of the fill ranged from 8% to 14% with an average of 11%.

Natural soil was encountered at elevations ranging from 693 under the embankments to 691.5 under TR 162. The first 4' to 6' of natural soil consists of stiff to very stiff clay loam and very stiff silty clay. Q_u ranged from 0.9 to 2.4 tsf with an average of 1.8 tsf. N-values ranged from 7 to 33 bpf with an average of 16 bpf. Moisture contents ranged from 13% to 29% with an average of 21%. This layer overlies rock consisting of hard siltstone and hard weathered shale over hard shale. Top of rock elevations ranged from approximately 686 to 685 moving west to east across the site. N-values generally exceeded 100 bpf from the top of rock to the termination of each boring.

Table 2 lists the top of rock elevations encountered in each boring. Also listed are boring elevations for ground surface, end of boring, and groundwater. Soil boring logs and rock core logs are included in the Appendix, along with photos of the rock cores.

Table 2. Boring Elevation Information

Location	Boring	Foundation	Ground Surface (ft)	Top of Rock (ft)	End of Boring (ft)	Groundwater (ft)
Westbound US 34 SN 094-0053	SB-1	West Abutment	707.76	674.26	662.76	Not observed
	SB-2	Pier 1	688.45	676.95	666.95 [1]	Not observed
	SB-3	Pier 2	687.86	675.86	665.86	684.36 [2]
	SB-4	East Abutment	706.44	677.94	666.44	Not observed
Eastbound US 34 SN 094-0054	SB-5	West Abutment	712.32	685.82	674.82	Not observed
	SB-6	Pier 1	694.15	685.65	677.15	688.90 [2]
	SB-7	Pier 2	691.39	684.89	674.89 [3]	Not observed
	SB-8	East Abutment	713.44	684.94	673.94	Not observed

[1] Rock core from 676.95 to 666.95
[2] Following boring completion
[3] Rock core from 684.89 to 674.89

Geotechnical Evaluations and Recommendations

Settlement. Based on the preliminary TS&L plan, the proposed grades for the new structures are only slightly above existing grades. New concrete slopewalls will match the existing 2H:1V slopes, but will be built a few feet behind the existing slopewalls. Because the changes to the structure and slopewall grades are minimal and no additional soil fill is planned for the embankments, settlement is expected to be insignificant. No additional analysis or field treatment is warranted or recommended at this time.

Slope Stability. New concrete slopewalls will be built no steeper than 2H:1V with a vertical height of approximately 15’. This is nearly identical to current conditions, except that the new slopewalls will be located behind the existing slopewalls. Slope stability under static and seismic loading was checked using Slide 2018, a 2D slope stability analysis program using limit equilibrium method.

Seismic loading was modeled by applying a horizontal bedrock acceleration coefficient, A_s = 0.047g. This value was calculated using the USGS Seismic Design Maps Web Services and the 2009 AASHTO Guide Specifications. A circular failure was analyzed for short term (undrained) and long term (drained) conditions. The analyses were performed assuming a maximum vertical slope height of 15' and using the weakest soil conditions as represented by boring SB-4. Factors of safety (FOS) against slope failure exceeded 1.5 for static loading and 1.0 for seismic loading. No additional analysis or field treatment is necessary. The Appendix contains output from the Slide program showing the analyzed sections, input parameters, and resulting factor of safety.

Scour. The existing and proposed structures carry US 34 over a township road. Since no waterways are crossed, scour is not applicable.

Seismic Considerations. The site is located in the northern third of Illinois, a region of low seismic hazard. Soil Site Class C controls for this site, as calculated using the IDOT Seismic Site Class Determination spreadsheet. Because Site Class C controls, Figure 2.3.10-2 from the IDOT Bridge Manual was used to determine the Seismic Performance Zone (SPZ). SPZ 1 is recommended for the site. Horizontal response spectral acceleration coefficients (S_{D1} and S_{DS}) were calculated using the USGS Seismic Design Maps Web Services and the 2009 AASHTO Guide Specifications. Table 3 summarizes the recommended seismic design parameters.

Table 3. Seismic Design Parameters

Parameter	Value
Seismic Performance Zone	SPZ 1
Design Spectral Acceleration at 1.0 sec. (S_{D1})	0.07g
Design Spectral Acceleration at 0.2 sec. (S_{DS})	0.11g
Soil Site Class	C

These parameters are recommended so that the new bridges are designed for a seismic event with 7% probability of exceedance in 75 years, which is approximately a 1000-year return period. Because the site located in SPZ 1, liquefaction analysis was not performed.

Foundation Recommendations

Abutments. The proposed integral abutments should be supported on steel H-piles driven to maximum nominal required bearing in siltstone or shale. Metal shell piles were also considered as part of estimating pile lengths and capacities using the IDOT Static Method. Based on those results, metal shells cannot be driven to rock without overstressing and potentially damaging the piles.

Tables 4 and 5 list design parameters for several different H-pile sizes at each abutment location. Pile lengths were estimated based on the borings, assumed ground elevations, and cutoff elevations shown on the table. The ground elevation during driving was taken as the bottom of abutment elevation shown on the preliminary TS&L plan in the Appendix. No geotechnical losses were applied since scour and liquefaction are not applicable to this site, and downdrag is not a concern because settlement is expected to be insignificant.

Table 4. Pile Design Parameters for SN 094-0053 (WB)

Location	Pile Cutoff Elevation (ft)	Pile Type & Size	Nominal Required Bearing (kips)	Factored Resistance Available (kips)	Estimated Length (ft)
West Abutment SB-1	702	HP 10 x 57	454	250	35
		HP 12 x 53	419	230	32
		HP 12 x 63	497	273	34
		HP 12 x 74	589	324	35
		HP 12 x 84	664	365	36
		HP 14 x 73	578	318	33
		HP 14 x 89	705	388	35
		HP 14 x 102	810	445	37
East Abutment SB-4	701	HP 10 x 57	454	249	31
		HP 12 x 53	419	230	28
		HP 12 x 63	497	273	29
		HP 12 x 74	589	324	31
		HP 12 x 84	664	365	32
		HP 14 x 73	578	318	29
		HP 14 x 89	705	388	31
		HP 14 x 102	810	445	33

Table 5. Pile Design Parameters for SN 094-0054 (EB)

Location	Pile Cutoff Elevation (ft)	Pile Type & Size	Nominal Required Bearing (kips)	Factored Resistance Available (kips)	Estimated Length (ft)
West Abutment SB-5	709	HP 10 x 57	454	250	30
		HP 12 x 53	419	230	28
		HP 12 x 63	497	273	29
		HP 12 x 74	589	324	31
		HP 12 x 84	664	365	32
		HP 14 x 73	578	318	28
		HP 14 x 89	705	388	30
		HP 14 x 102	810	445	32
East Abutment SB-8	708	HP 10 x 57	454	249	30
		HP 12 x 53	419	230	27
		HP 12 x 63	497	273	29
		HP 12 x 74	589	323	30
		HP 12 x 84	664	365	32
		HP 14 x 73	578	318	29
		HP 14 x 89	705	388	31
		HP 14 x 102	810	445	32

At least two test piles are recommended for the project. One test pile should be driven at the west abutment of the westbound structure, and one test pile should be driven at the east abutment of the eastbound structure. Pile shoes are not required.

Piers. The proposed piers should be supported on spread footings set in siltstone or weathered shale. Table 6 provides design parameters for spread footings, including factored bearing and sliding resistances and estimated footing elevations. At least 12” of embedment into the rock is recommended.

Table 6. Spread Footing Design Parameters

Location	Foundation	Estimated Footing Elevation (ft)	Factored Bearing Resistance (ksf)[1]	Factored Sliding Resistance (kip)[2]
Westbound US 34 SN 094-0053	Pier 1	675	9.0	2,000
	Pier 2	674	9.0	2,000
Eastbound US 34 SN 094-0053	Pier 1	684	7.2	1,600
	Pier 2	682	7.2	1,600

[1] Bearing resistance factor = 0.45 from AASHTO LRFD Bridge Design Specification (2012)
[2] Sliding resistance factor = 0.80 from AASHTO LRFD Bridge Design Specification (2012)

Piles and drilled shafts were also considered for support of the piers. However, the existing spread footings make those foundation types less feasible. If the existing spread footings are removed as currently planned, much of the excavation needed to install new spread footings will be completed. To install piers or drilled shafts at that point is not cost-effective. If the existing footings remain, new piles or drilled shafts would have to be designed and installed around the footings. This would require an even longer span over TR 162 and would likely increase the time, difficulty, and cost of construction. Spread footings are the preferred foundation type for the piers.

Construction Considerations

Temporary soil retention will be needed since stage construction is planned for each bridge. Based on the preliminary TS&L plan, the new abutments will be installed a few feet behind the existing abutments. Temporary sheet piling appears to be feasible to retain an estimated 8’ height along the stage line. Temporary sheet piling should be designed according to IDOT Bridge Manual Design Guide 3.13.1.

Excavations for removal and replacement of spread footings for the piers will also require temporary soil retention or laid-back slopes. Temporary sheet piling does not appear to be feasible for the footing excavations. If temporary sloped excavations are not feasible due to instability, ROW limitations, etc., a temporary soil retention system will be necessary. The construction contractor is responsible for retaining an Illinois Licensed Structural Engineer to design temporary soil retention systems and/or braced excavations.

Appendix

Type, Size, and Location Plan

Subsurface Data Profiles

Soil Boring and Rock Core Logs

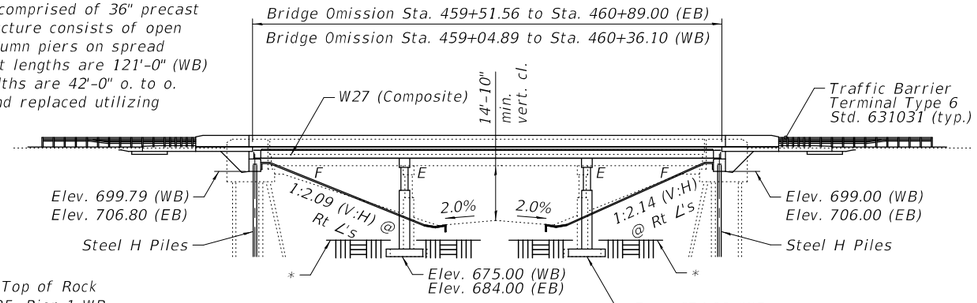
Rock Core Photos

Slope Stability Analysis Results from SLIDE 2018

Bench Mark: Cut "□" SW corner pier base, East side TR 162
under US 34 WB lane (SN 094-0025)
Elev. 692.20

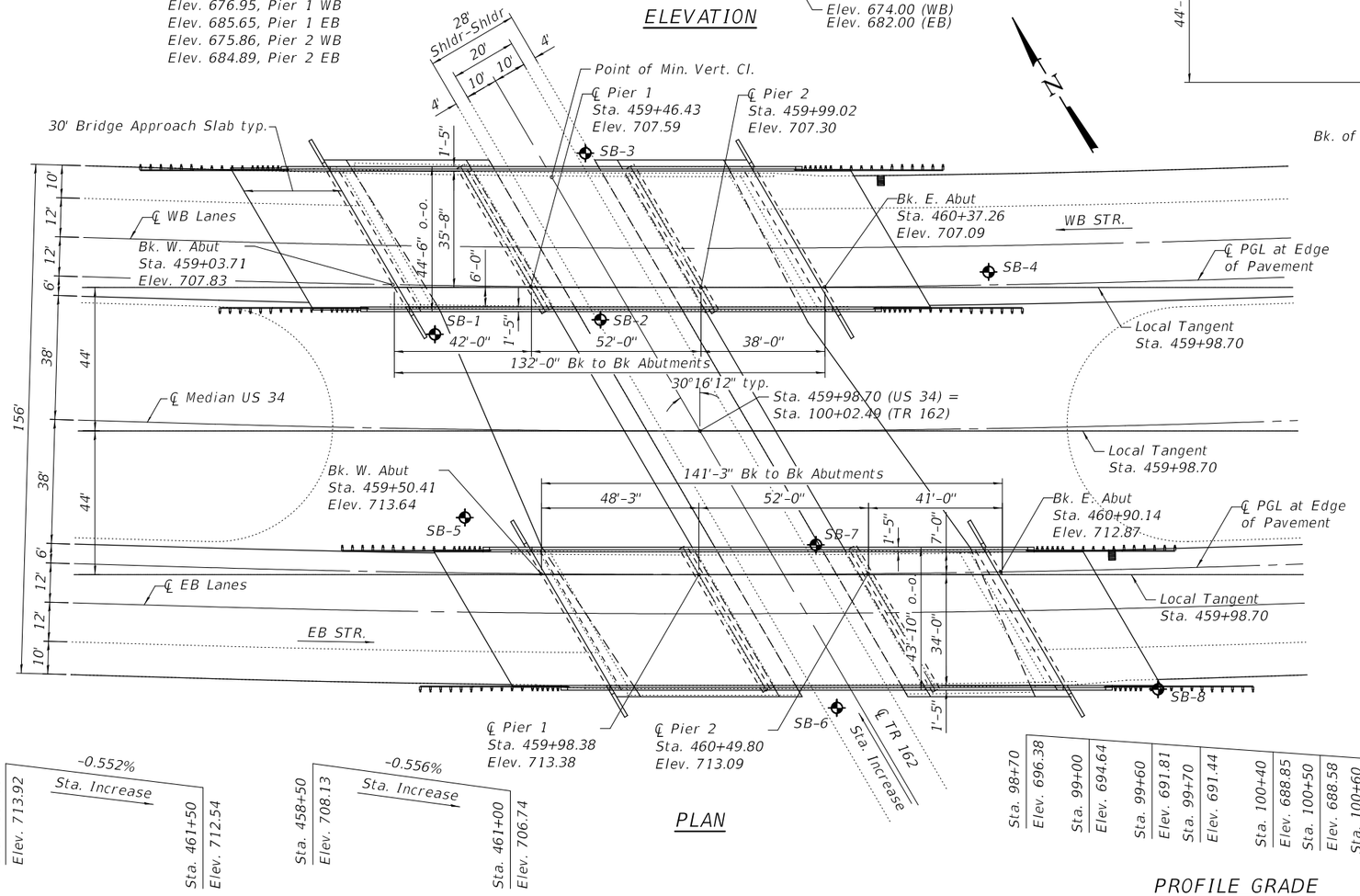
Existing Structures: SN 094-0025 (WB), SN 094-0026 (EB), originally built in 1979 as FAP Rte. 404, Sec. 94-16 HB. Each superstructure consists of a continuous conc. deck slab supported on 3 simple spans comprised of 36" precast prestressed I beams. Each substructure consists of open abutments on H-piles and multi-column piers on spread footings. The bk. to bk. of abutment lengths are 121'-0" (WB) and 132'-0" (EB). The structure widths are 42'-0" o. to o. Both structures will be removed and replaced utilizing crossovers.

No Salvage.

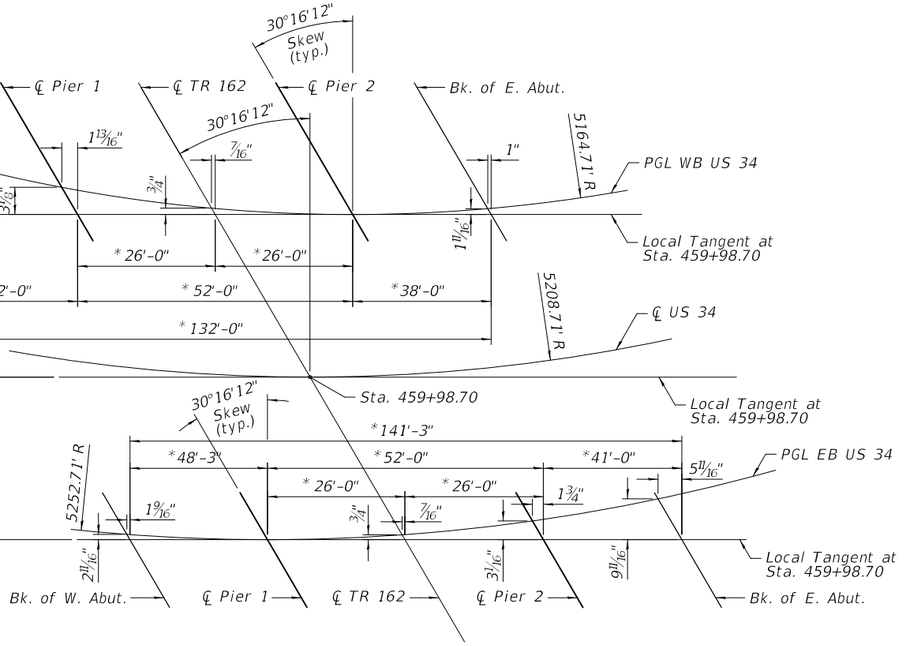


ELEVATION

* Estimated Top of Rock
Elev. 676.95, Pier 1 WB
Elev. 685.65, Pier 1 EB
Elev. 675.86, Pier 2 WB
Elev. 684.89, Pier 2 EB



PLAN



OFFSET SKETCH

* Dim. along Local Tangent

CURVE DATA

℄ FAP 313
PI STA. = 480+55.08
Δ = 45° 53' 16" (LT)
D = 1° 06' 00"
R = 5,208.71'
T = 2,204.95'
L = 4,171.62'
E = 447.48'
S.E. = 0.0454'
S.A. = 456+90.13 to 459+30.13
499+41.75 to 501+81.75
P.C. STA. = 458+50.13
P.T. STA. = 500+21.75

HIGHWAY CLASSIFICATION

FAP 313 (US 34)
Functional Class: Expressway
ADT: 9650 (2017); 11775 (2037)
ADTT: 1925 (2017)
DHV: 965 (2017)
Design Speed: 70 m.p.h.
Posted Speed: 65 m.p.h.
One-Way Traffic
Directional Distribution: 50:50

TR 162
Functional Class: Local Road
ADT: 25 (2017)
DHV: 2.5 (2017)
Design Speed: 45 m.p.h.
Posted Speed: 45 m.p.h.
Two-Way Traffic
Directional Distribution: 50:50

SEISMIC DATA

Seismic Performance Zone (SPZ) = 1
Design Spectral Acceleration at 1.0 sec. (SD1) = 0.07 g
Design Spectral Acceleration at 0.2 sec. (SDS) = 0.11 g
Soil Site Class = C

DESIGN SPECIFICATIONS

2017 AASHTO LRFD Bridge Design Specifications, 8th Edition

DESIGN STRESSES

FIELD UNITS
f'c = 3,500 psi
fy = 60,000 psi (Reinforcement)
fy = 50,000 psi (M270 Grade 50) (Galvanized)

LOADING HL-93

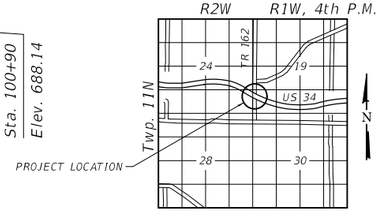
Allow 50#/sq. ft. for future wearing surface.

PROFILE GRADE
US 34 (EB Str.)
(Along Inside Edge of Pavement)

PROFILE GRADE
US 34 (WB Str.)
(Along Inside Edge of Pavement)

Note:
Temporary Soil Retention System to be provided for pier footing Excavations.

PROFILE GRADE
Along ℄ TR 162



LOCATION SKETCH

GENERAL PLAN & ELEVATION
US 34 OVER TR 162
FAP ROUTE 313
SECTION (94-16 HB)BR
WARREN COUNTY
STATION 459+98.70
STRUCTURE NO. 094-0053 (WB)
STRUCTURE NO. 094-0054 (EB)

MODEL: Default
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FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL
ILLINOIS DESIGN FIRM NO. 184-003525

FEHR GRAHAM PROJECT NUMBER: 15-1016G

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	CHECKED -	REVISED -	
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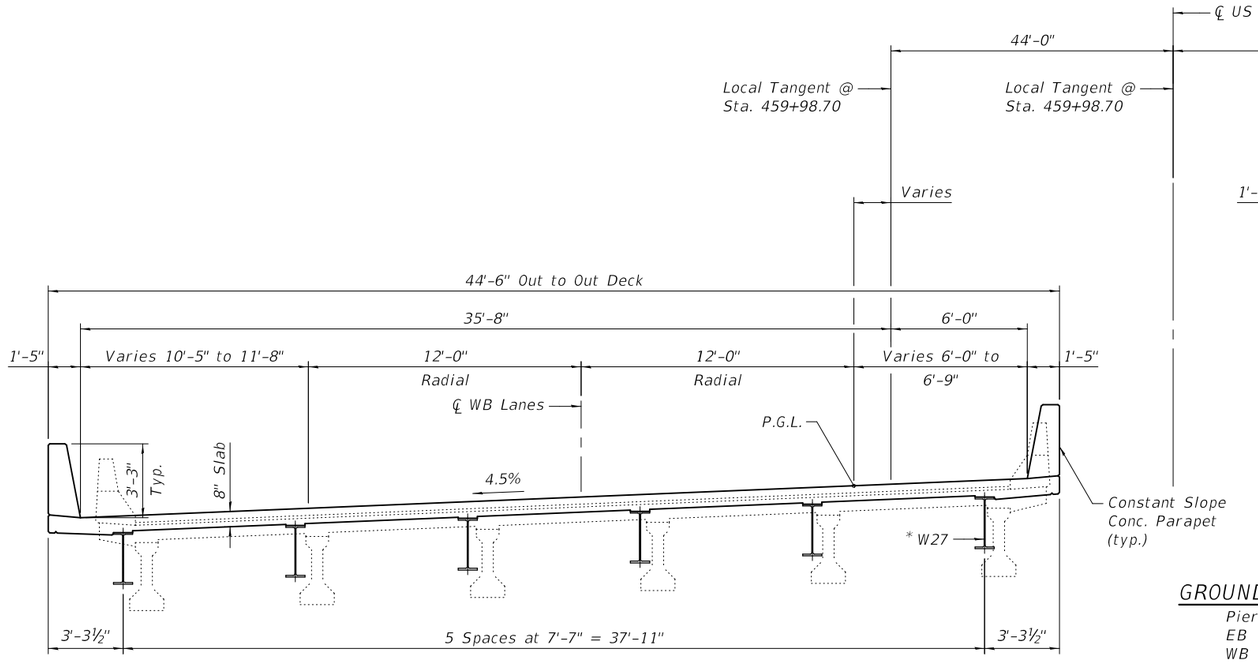
PLOT DATE = 12/11/2019	CHECKED - MCB	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

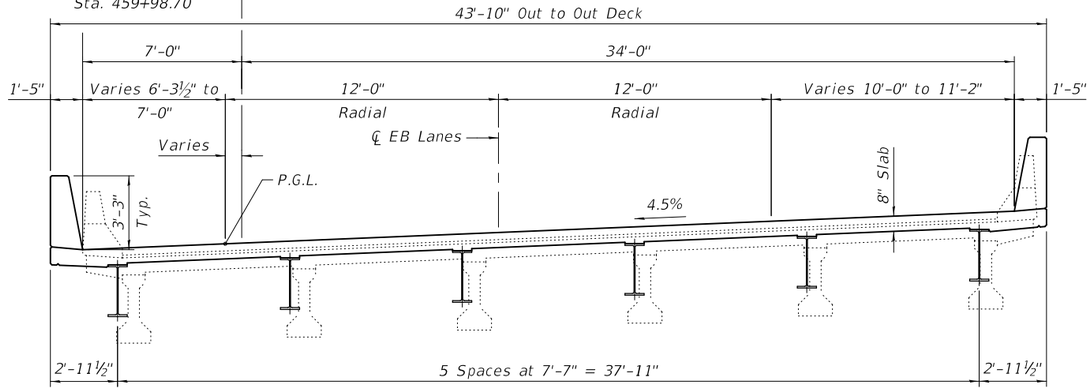
SHEET 1 OF 2 SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
313	(94-16 HB) BR	WARREN	2	1
		CONTRACT NO. 68D95		
		ILLINOIS	FED. AID PROJECT	



CROSS SECTION
(Looking East)
(West Bound Structure)

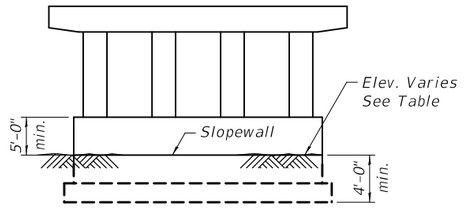
* Composite entire length (typ.)



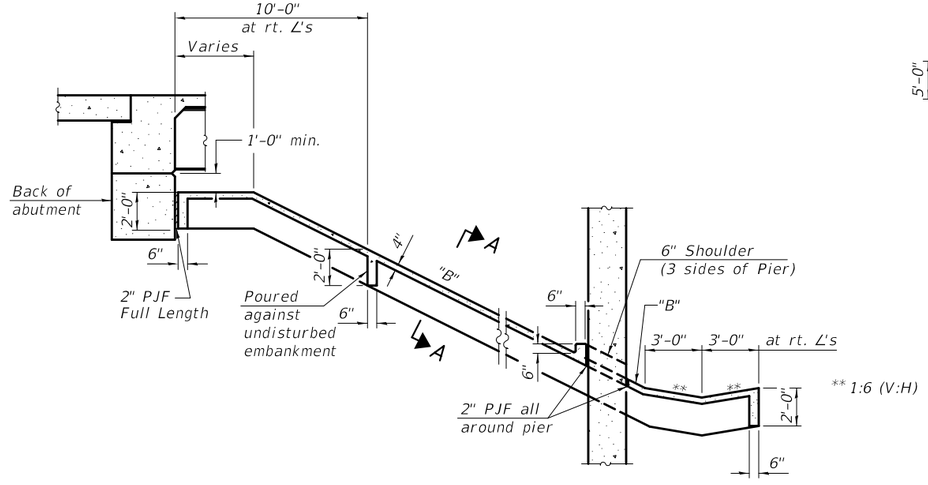
CROSS SECTION
(Looking East)
(East Bound Structure)

GROUND ELEV. AT PIERS

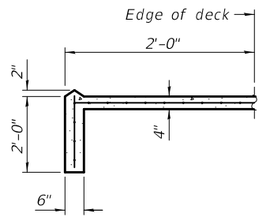
	N. End	S. End
Pier 1		
EB	691.7	693.9
WB	688.2	688.7
Pier 2		
EB	692.9	695.4
WB	688.8	689.8



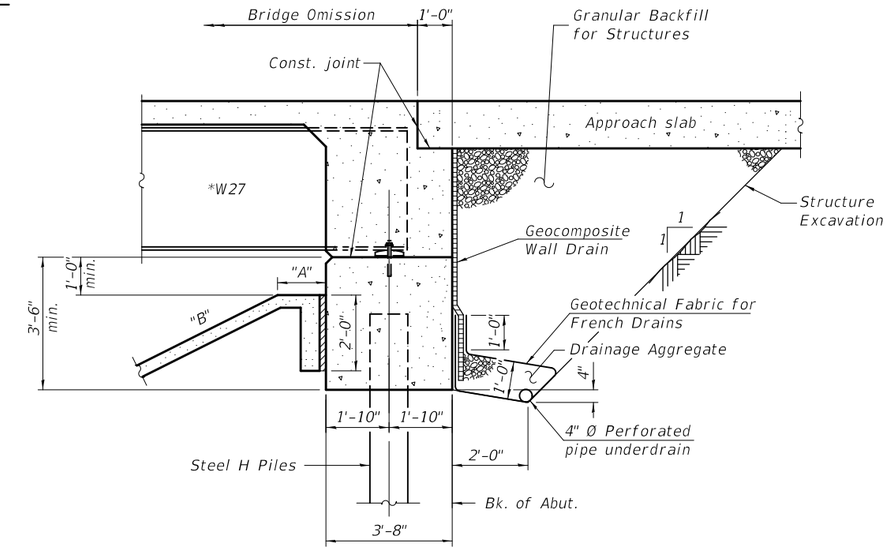
PIER SKETCH



SECTION THRU CONCRETE SLOPEWALL



SECTION A-A
(Typ. All four corners)
N. Edge WB
S. Edge EB



SECTION THRU INTEGRAL ABUTMENT
(Horiz. dim. @ Rt. ℄'s)

"A" – Berm width Varies
1'-0" min. to 3'-9⅞" W. Abut. EB
1'-0" min. to 7'-0⅛" E. Abut. EB
3'-9½" min. to 6'-6⅞" E. Abut. WB
3'-7⅝" min. to 5'-2¼" W. Abut. WB

"B" – Slope at right angles
1:2.09 (V:H) W. Abut.
1:2.14 (V:H) E. Abut.

DETAILS
US 34 OVER TR 162
FAP ROUTE 313
SECTION (94-16 HB)BR
WARREN COUNTY
STATION 459+98.70
STRUCTURE NO. 094-0053 (WB)
STRUCTURE NO. 094-0054 (EB)

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FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL
ILLINOIS DESIGN FIRM NO. 184-003525

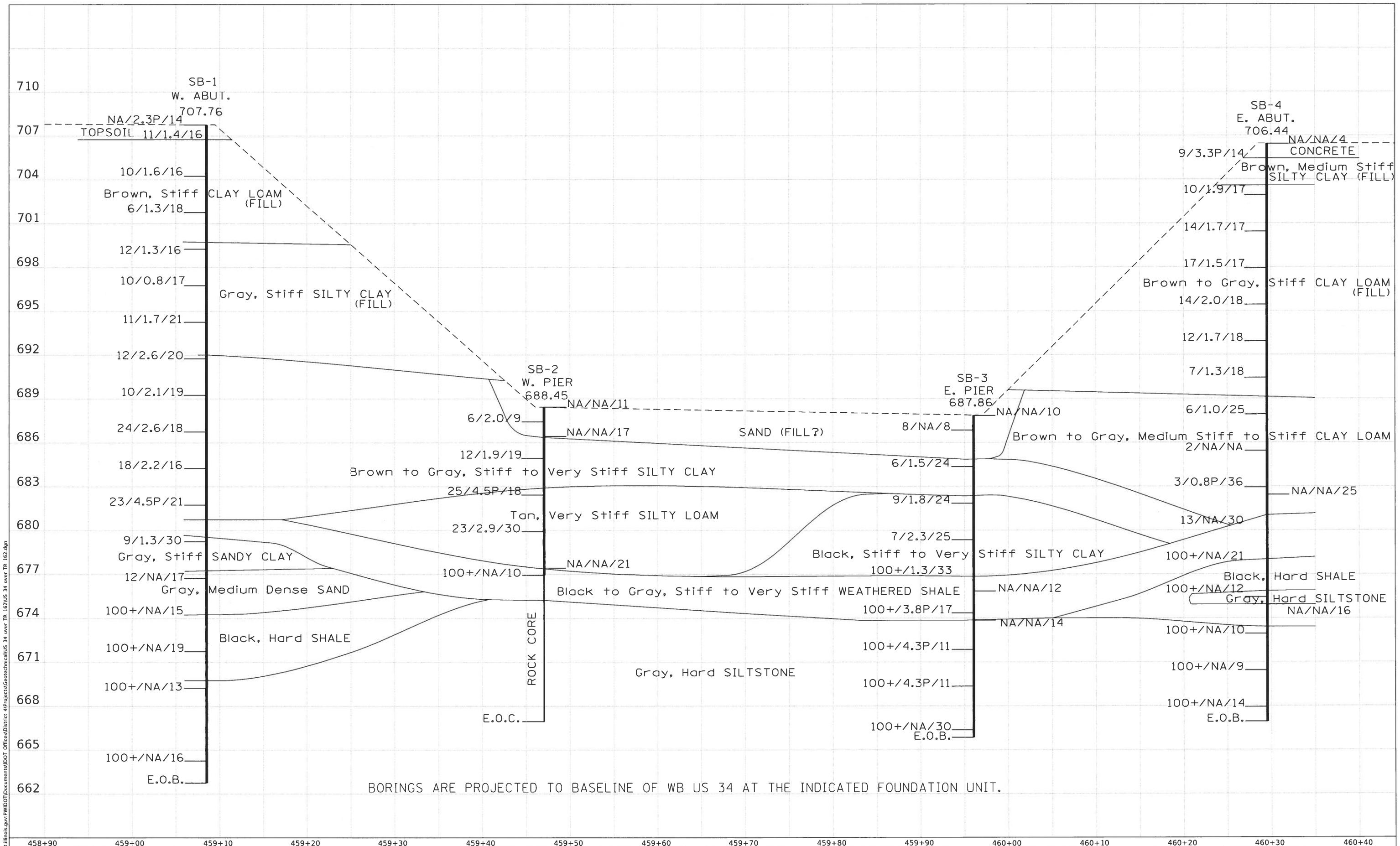
USER NAME = cconnor	DESIGNED - MCB	REVISED -	
	CHECKED -	REVISED -	
PLOT SCALE = 6:8.0000 ':" / in.	DRAWN - CFC	REVISED -	
PLOT DATE = 12/11/2019	CHECKED - MCB	REVISED -	

FEHR GRAHAM PROJECT NUMBER: 15-1016G

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET 2 OF 2 SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
313	(94-16 HB) BR	WARREN	2	2
		CONTRACT NO. 68D95		
		ILLINOIS	FED. AID PROJECT	



PLAN: SURVEYED, PLOTTED, ALIGNMENT CHECKED, GRADES CHECKED, NOTE BOOK, NO., BY, DATE

PROFILE: SURVEYED, PLOTTED, GRADES CHECKED, NOTE BOOK, NO., STRUCTURE NO(S), BY, DATE

MODEL: Default
FILE NAME: pw:\\planroom.dot.illinois.gov:PWIDOT\Documents\IDOT Offices\District 4\Projects\Geotechnical\US 34 over TR 162\US 34 over TR 162.dgn

USER NAME = withrowjm	DESIGNED -	REVISED -	
	DRAWN -	REVISED -	
PLOT SCALE = 40.0000 ' / in.	CHECKED -	REVISED -	
PLOT DATE = 6/14/2019	DATE -	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DATA PROFILE
SN 094-0025 WB US 34 OVER TR 162

SCALE: _____ SHEET ___ OF ___ SHEETS STA. 458+90 TO STA. 460+40

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
404	94-16	WARREN	___	___
		CONTRACT NO. 68095		
		ILLINOIS FED. AID PROJECT		

715
712
709
706
703
700
697
694
691
688
685
682
679
676
673

SB-5
W. ABUT.
712.32
NA/NA/24
TOPSOIL
7/1.2/18
10/2/20
Brown, Stiff SILTY CLAY (FILL)
9/2/20
13/1.9/21
Brown, Stiff CLAY LOAM (FILL)
8/2.3P/31
11/2.4/20
Gray, Very Stiff SILTY CLAY (FILL)
13/2.4/18
Gray to Brown, Very Stiff CLAY LOAM (FILL)
15/2.2/21
18/1.3P/22
Gray to Brown, Stiff CLAY LOAM
13/2.2/22
100+/4.5P/NA
NA/NA/17
100+/2.5P/15
Gray, Hard SILTSTONE
100+/NA/14
NA/NA/16
100+/NA/13
Black, Hard SHALE
100+/NA/NA
NA/NA/12
E.O.B.

SB-6
W. PIER
694.15
NA/NA/8
12/1.6/7
NA/NA/22
22/NA/13
Brown to Gray, Very Stiff to Hard SILTY CLAY
100+/NA/7
Gray, Hard SHALEY CLAY
100+/NA/9
100+/NA/16
Gray, Hard WEATHERED SHALE
25/NA/15
100+/NA/15
100+/NA/14
Black, Hard WEATHERED SHALE with COAL
E.O.B.

Tan, Stiff SILTY LOAM (FILL?)
Brown, Loose SAND (FILL?)

SB-7
E. PIER
691.39
NA/2.0P/8
NA/NA/14
9/2.5P/23
33/4.5P/18
100+/1.4/6
ROCK CORE
E.O.C.

SB-8
E. ABUT.
713.44
NA/NA/13
8/1.8/18
TOPSOIL
Brown, Stiff CLAY LOAM (FILL)
14/1.4/19
Gray, Stiff SILTY CLAY (FILL)
11/2.2/16
9/2.1/19
Brown to Gray, Very Stiff SILTY CLAY (FILL)
16/2.3/17
14/1.9/19
11/1.4/18
Brown to Gray, Stiff CLAY LOAM (FILL)
9/1.3/23
7/0.9/29
Brown to Gray, Stiff to Very Stiff CLAY LOAM
11/1.8/23
17/2.4/19
100+/NA/14
Gray, Hard SILTSTONE
100+/NA/14
100+/NA/14
NA/NA/17
100+/NA/18
Black, Hard SHALE
100+/NA/13
E.O.B.

BORINGS ARE PROJECTED TO BASELINE OF EB US 34 AT THE INDICATED FOUNDATION UNIT.

459+40 459+50 459+60 459+70 459+80 459+90 460+00 460+10 460+20 460+30 460+40 460+50 460+60 460+70 460+80 460+90

PLAN
SURVEYED
PLOTTED
DRAWN / CHECKED
AT OF WAY CHECKED
CADD FILE NAME
NOTE BOOK
NO
DATE
BY

PROFILE
SURVEYED
PLOTTED
DRAWN / CHECKED
STRUCTURE NO(S)/NOS. CITED
NOTE BOOK
NO
DATE
BY

MODEL: Default
FILE NAME: pw:\\plannroom.dot.illinois.gov:PWIDOT\Documents\IDOT Offices\District 4\Projects\Geotechnical\US 34 over TR 162\US 34 over TR 162.dgn

USER NAME = withrowjm	DESIGNED -	REVISED -
	DRAWN -	REVISED -
PLOT SCALE = 40.0000 ' / in.	CHECKED -	REVISED -
PLOT DATE = 6/14/2019	DATE -	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SUBSURFACE DATA PROFILE
SN 094-0026 EB US 34 OVER TR 162

SCALE: _____ SHEET ___ OF ___ SHEETS STA. 459+40 TO STA. 460+90

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
404	94-16	WARREN	___	___
		CONTRACT NO. 68D95		
	ILLINOIS	FED. AID PROJECT		

Illinois Department of Transportation
Division of Highways
IDOT District

SOIL BORING LOG

Date 11/15/18

ROUTE FAP Route 404 (US 34) **DESCRIPTION** Structure boring for West Abutment - WB bridge **LOGGED BY** GSI (DT)

SECTION 94-16 HB **LOCATION** US 34 over TR 162, **SEC.** 24, **TWP.** 11N, **RNG.** 2W, 4th **PM**, **Latitude** 40°55'23.7504", **Longitude** -90°33'14.9256"

COUNTY Warren **DRILLING METHOD** CFA TO 10', THEN ROTARY **HAMMER TYPE** AUTO

STRUCT. NO. 094-0053 (WB)
Station 459+98.7

BORING NO. SB-1
Station 459+17
Offset 29.0 ft LT
Ground Surface Elev. 707.76 ft

Surface Water Elev. ft
Stream Bed Elev. ft

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				TOPSOIL
		2.3	14	706.76
	3	P		Brown, Moist, Stiff CLAY LOAM (FILL)
	6	1.4	16	
	5			
	3			
	5	1.6	16	
-5	5			
	2			
	3	1.3	18	
	3			699.76
	2			Gray, Moist, Stiff SILTY CLAY (FILL)
	6	1.3	16	
-10	6			
	3			
	5	0.8	17	
	5			
	3			
	5	1.7	21	
-15	6			
				691.76
	4			Gray, Moist, Very Stiff SILTY CLAY
	6	2.6	20	
	6			
	3			
	5	2.1	19	
-20	5			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Gray, Moist, Very Stiff SILTY CLAY *(continued)*
	4			
	11	2.6	18	
	13			
	5			
	8	2.2	16	
-25	10			
	5			
	7	4.5	21	680.76
	16	P	30	Black, Very Stiff SHALE
				679.76
	4			Gray, Moist, Stiff SANDY CLAY
	4	1.3	17	
-30	5			
				677.26
	5			Gray, Medium Dense SAND, trace gravel
	6			
	6			
				674.26
	17			Dark Gray to Black, Hard SHALE
	50/4"		15	
-35				
	18			
	24		19	
	50/4"			
				669.76
	45			Gray, Hard SILTSTONE
	50/4"		13	
-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)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
IDOT District

SOIL BORING LOG

Date 11/15/18

ROUTE FAP Route 404 (US 34) **DESCRIPTION** Structure boring for West Abutment - WB bridge **LOGGED BY** GSI (DT)

SECTION 94-16 HB **LOCATION** US 34 over TR 162, **SEC.** 24, **TWP.** 11N, **RNG.** 2W, 4th **PM**,
Latitude 40°55'23.7504", **Longitude** -90°33'14.9256"

COUNTY Warren **DRILLING METHOD** CFA TO 10', THEN ROTARY **HAMMER TYPE** AUTO

STRUCT. NO. 094-0053 (WB)
Station 459+98.7

BORING NO. SB-1
Station 459+17
Offset 29.0 ft LT
Ground Surface Elev. 707.76 ft

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

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

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Gray, Hard SILTSTONE *(continued)*				
Interval 41-42.5 skipped due to loss of daylight				
		22		
		45		16
662.76	-45	50/4"		
End of Boring				
	-50			
	-55			
	-60			

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
IDOT District

SOIL BORING LOG

Date 11/13/18

ROUTE FAP Route 404 (US 34) **DESCRIPTION** Structure boring for Pier 1 - WB bridge **LOGGED BY** GSI (DT)

SECTION 94-16 HB **LOCATION** US 34 over TR 162, **SEC.** 24, **TWP.** 11N, **RNG.** 2W, 4th **PM**,
Latitude 40°55'23.4912", **Longitude** -90°33'14.2992"

COUNTY Warren **DRILLING METHOD** CFA TO 10', THEN ROTARY **HAMMER TYPE** AUTO

STRUCT. NO. 094-0053 (WB)
Station 459+98.7

BORING NO. SB-2
Station 459+68
Offset 34.0 ft LT
Ground Surface Elev. 688.45 ft

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

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

		DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Brown, Loose GRAVELLY SAND			3		11
	686.45		3 3	2.0	9 17
Olive, Moist, Stiff CLAY with gravel					
	684.95		3		
Brown, Moist, Stiff SILTY CLAY with gravel			5 7	1.9	19
		-5			
	682.95				
Tan, Moist, Very Stiff SILTY LOAM			7		
			12 13	4.5 P	18
			6		
			10 13	2.9	30
		-10			
	677.45				
Tan SILT with black shale	676.95		46		
			50/5.5"		
Borehole continued with rock coring.					
		-15			
		-20			

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
IDOT District

ROCK CORE LOG

Date 11/13/18

ROUTE FAP Route 404 (US 34) **DESCRIPTION** Structure boring for Pier 1 - WB bridge **LOGGED BY** GSI (DT)

SECTION 94-16 HB **LOCATION** US 34 over TR 162, **SEC.** 24, **TWP.** 11N, **RNG.** 2W, 4th **PM**,
Latitude 40°55'23.4912", **Longitude** -90°33'14.2992"

COUNTY Warren **CORING METHOD** Rotary Wash

STRUCT. NO. 094-0053 (WB)
Station 459+98.7

BORING NO. SB-2
Station 459+68
Offset 34.0 ft LT
Ground Surface Elev. 688.45 **ft**

CORING BARREL TYPE & SIZE NX-2
Core Diameter 2 **in**
Top of Rock Elev. 676.95 **ft**
Begin Core Elev. 676.95 **ft**

	DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
676.95		1	100	43		
Gray Claystone and Sandstone						37.0
	-15					
						130.0
671.70						
Light Gray to Gray Claystone Shale						19.0
670.20						24.0
Light Gray Claystone and Siltstone						97.0
669.35						
Light Gray Claystone and Sandstone						48.0
	-20					
						155.0
666.95						
End of Boring						
	-25					
	-30					

Color pictures of the cores Yes
Cores will be stored for examination until _____
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

Illinois Department of Transportation
Division of Highways
IDOT District

SOIL BORING LOG

Date 11/14/18

ROUTE FAP Route 404 (US 34) **DESCRIPTION** Structure boring for Pier 2 - WB bridge **LOGGED BY** GSI (DT)

SECTION 94-16 HB **LOCATION** US 34 over TR 162, **SEC.** 24, **TWP.** 11N, **RNG.** 1W, 4th **PM**, **Latitude** 40°55'24.0456", **Longitude** -90°33'13.9752"

COUNTY Warren **DRILLING METHOD** CFA TO 10', THEN ROTARY **HAMMER TYPE** AUTO

STRUCT. NO. 094-0053 (WB)
Station 459+98.7

BORING NO. SB-3
Station 459+63
Offset 85.0 ft LT
Ground Surface Elev. 687.86 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 679.4 ft ▼
Upon Completion 684.4 ft ▽
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
			10	Brown/Gray, Moist, Medium Dense GRAVELLY SAND
686.36	12			
	5		8	Tan, Moist, Loose SAND with gravel
	3			
684.86				
				Olive/gray/black, Moist, Stiff SILTY CLAY ▽
	3			
	3	1.5	24	
-5	3			
682.36				
	3			Black, Moist, Stiff to Very Stiff SILTY CLAY with organics (buried topsoil?)
	4	1.8	24	
	5			
▼				
	2			
	3	2.3	25	
-10	4			
676.86				
	1			Gray, Moist, Stiff CLAY LOAM with black weathered shale
	7	1.3	33	
	50/5.5"		12	
673.86				
	20			Gray, Hard SILTSTONE with clay
	50/5.5"	3.8 P	17	
-15			14	
	50/5"	4.3 P	11	
	50/5"	4.3 P	11	
-20				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Gray, Hard SILTSTONE with clay *(continued)*
665.86	50/4"			
	50/4"		30	End of Boring
-25				
-30				
-35				
-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)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
IDOT District

SOIL BORING LOG

Date 11/15/18

ROUTE FAP Route 404 (US 34) **DESCRIPTION** Structure boring for East Abutment - WB bridge **LOGGED BY** GSI (DT)

SECTION 94-16 HB **LOCATION** US 34 over TR 162, **SEC.** 24, **TWP.** 11N, **RNG.** 1W, 4th **PM**, **Latitude** 40°55'22.9656", **Longitude** -90°33'13.0104"

COUNTY Warren **DRILLING METHOD** CFA TO 10', THEN ROTARY **HAMMER TYPE** AUTO

STRUCT. NO. 094-0053 (WB)
Station 459+98.7

BORING NO. SB-4
Station 460+88
Offset 48.0 ft LT
Ground Surface Elev. 706.44 ft

Surface Water Elev. ft
Stream Bed Elev. ft

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
			4	CONCRETE
				705.44
	3			Brown, Moist, Very Stiff SILTY CLAY with sand/gravel (FILL)
	4 5	3.3 P	14	
				703.44
	3			Gray, Moist, Stiff CLAY LOAM with sand/gravel (FILL)
	4	1.9	17	
-5	6			
	3			
	5	1.7	17	
	9			
	4			trace wood
	6	1.5	17	
-10	11			
	3			
	6	2.0	18	
	8			
				693.44
	3			Brown to Gray, Moist, Stiff CLAY LOAM with sand/gravel (FILL)
	5	1.7	18	
-15	7			
	2			Sand seam
	3	1.3	18	
	4			689.44
				Brown to Gray, Moist, Medium Stiff to Stiff CLAY LOAM with sand/gravel
	2			
	3	1.0	25	
-20	3			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
	1			Brown to Gray, Moist, Medium Stiff to Stiff CLAY LOAM with sand/gravel *(continued)*
	1 1			
	3			
	1	0.8	36	Sand/shale seam
-25	2	P	25	
				680.44
	6			Gray, Moist, Stiff WEATHERED SHALE with limestone/chert gravel and trace sand
	9 4		30	
				677.94
	50/5"		21	Black, Hard SHALE with rounded pebbles
-30				
				675.94
	33			Gray, Hard SILTSTONE
				674.94
	50/5"		12 16	Black, Hard SHALE
				673.44
	50/4"		10	Gray, Hard SILTSTONE
-35				
	29			
	50/5"		9	
	50/3"		14	
-40				End of Boring 666.44

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
IDOT District

SOIL BORING LOG

Date 11/15/18

ROUTE FAP Route 404 (US 34) **DESCRIPTION** Structure boring for West Abutment - EB bridge **LOGGED BY** GSI (DT)

SECTION 94-16 HB **LOCATION** US 34 over TR 162, **SEC.** 24, **TWP.** 11N, **RNG.** 2W, 4th **PM**, **Latitude** 40°55'23.2068", **Longitude** -90°33'15.1956"

COUNTY Warren **DRILLING METHOD** CFA TO 10', THEN ROTARY **HAMMER TYPE** AUTO

STRUCT. NO. 094-0054 (EB)
Station 459+98.7

BORING NO. SB-5
Station 459+27
Offset 27.0 ft RT
Ground Surface Elev. 712.32 ft

Surface Water Elev. ft
Stream Bed Elev. ft

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
			24	TOPSOIL
				711.32
	3			Brown, Moist, Stiff SILTY CLAY with gravel (FILL)
	3 4	1.2	18	
	3			
-5	5 5	2.0	20	
	2			
	3 6	2.0	20	
				703.82
	3			Brown, Moist, Stiff CLAY LOAM with gravel (FILL)
-10	5 8	1.9	21	
				701.32
	3			Gray, Moist, Very Stiff SILTY CLAY trace roots (FILL)
	4 4	2.3 P	31	
				698.82
	2			Gray to brown, Moist, Very Stiff CLAY LOAM with sand/gravel (FILL)
-15	5 6	2.4	20	
	5			
	6 7	2.4	18	
	4			
				692.82
-20	7 8	2.2	21	

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
	7			Gray to brown, Moist, Stiff CLAY LOAM with sand/gravel *(continued)*
	8 10	1.3 P	22	
				688.82
	3			Gray, Moist, Very Stiff SILTY CLAY with sand/gravel
-25	6 7	2.2	22	
	8			685.82
	18 50/5"	4.5 P	17	Gray, Hard WEATHERED SILTSTONE
	51/6"	2.5 P	15	
-30				
	15			
	29 50/5"		14 16	680.32 Black, Hard SHALE
	17			
-35	42 50/3"		13	
	50/3"			675.82
			12	Gray, Hard SILTSTONE 674.82
				End of Boring
-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)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
IDOT District

SOIL BORING LOG

Date 11/13/18

ROUTE FAP Route 404 (US 34) **DESCRIPTION** Structure boring for Pier 1 - EB bridge **LOGGED BY** GSI (DT)

SECTION 94-16 HB **LOCATION** US 34 over TR 162, **SEC.** 24, **TWP.** 11N, **RNG.** 2W, 4th **PM**,
Latitude 40°55'22.0908", **Longitude** -90°33'14.3496"

COUNTY Warren **DRILLING METHOD** CFA TO 10', THEN ROTARY **HAMMER TYPE** AUTO

STRUCT. NO. 094-0054 (EB)
Station 459+98.7

BORING NO. SB-6
Station 460+40
Offset 85.0 ft RT
Ground Surface Elev. 694.15 ft

Surface Water Elev. ft
Stream Bed Elev. ft

Groundwater Elev.:
First Encounter 683.7 ft ▼
Upon Completion 688.9 ft ▽
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Tan, Stiff SILTY LOAM with gravel		4		8
692.15		6	1.6	7
Gray, Moist, Very Stiff SILTY CLAY with sand/gravel		6		22
		4		
		9		13
	-5	13		
▽ 688.15				
Gray, Hard WEATHERED SHALEY CLAY		14		
		50/5.5"		7
685.65				
Gray, Hard WEATHERED SHALE, vertical bedding		6		
		21		9
	-10	50/5.5"		
▼				
		40		
		50/5"		16
680.15		25		15
Black, Hard WEATHERED SHALE with COAL		50/5.5"		15
	-15			
		35		
677.15		50/4"		14
End of Boring				
	-20			

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
IDOT District

SOIL BORING LOG

Date 11/14/18

ROUTE FAP Route 404 (US 34) **DESCRIPTION** Structure boring for Pier 2 - EB bridge **LOGGED BY** GSI (DT)

SECTION 94-16 HB **LOCATION** US 34 over TR 162, **SEC.** 24, **TWP.** 11N, **RNG.** 1W, 4th **PM**,
Latitude 40°55'22.6992", **Longitude** -90°33'13.9824"

COUNTY Warren **DRILLING METHOD** CFA TO 10', THEN ROTARY **HAMMER TYPE** AUTO

STRUCT. NO. 094-0054 (EB)
Station 459+98.7

BORING NO. SB-7
Station 460+34
Offset 35.0 ft RT
Ground Surface Elev. 691.39 ft

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

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

		DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Brown, Loose SAND with gravel	690.89				
Brown/gray, Moist, Very Stiff SILTY CLAY				2.0	8
			2	P	14
			4	2.5	23
			5	P	
	687.89				
Brown/gray, Moist, Hard SILTY CLAY with iron oxide			14		
			18	4.5	18
		-5	15	P	
	685.39				
Gray, Hard WEATHERED SHALE	684.89		25		
			50/5.5"		
Borehole continued with rock coring.					
		-10			
		-15			
		-20			

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)

BBS, form 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
IDOT District

ROCK CORE LOG

Date 11/14/18

ROUTE FAP Route 404 (US 34) **DESCRIPTION** Structure boring for Pier 2 - EB bridge **LOGGED BY** GSI (DT)

SECTION 94-16 HB **LOCATION** US 34 over TR 162, **SEC.** 24, **TWP.** 11N, **RNG.** 1W, 4th **PM**,
Latitude 40°55'22.6992", **Longitude** -90°33'13.9824"

COUNTY Warren **CORING METHOD** Rotary Wash

STRUCT. NO. 094-0054 (EB)
Station 459+98.7

BORING NO. SB-7
Station 460+34
Offset 35.0 ft RT
Ground Surface Elev. 691.39 **ft**

CORING BARREL TYPE & SIZE NX-2
Core Diameter 2 **in**
Top of Rock Elev. 684.89 **ft**
Begin Core Elev. 684.89 **ft**

	DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
684.89		1	70	18		
Very Dark Gray to Black Mudstone						3.6
682.89						
	-10					
Gray to Dark Gray Claystone Shale						8.4
						25.0
678.64						
No recovery						
	-15					
674.89						
End of Boring						
	-20					
	-25					

Color pictures of the cores Yes
Cores will be stored for examination until _____
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

BBS, form 138 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
IDOT District

SOIL BORING LOG

Date 11/16/18

ROUTE FAP Route 404 (US 34) **DESCRIPTION** Structure boring for East Abutment - EB bridge **LOGGED BY** GSI (DT)

SECTION 94-16 HB **LOCATION** US 34 over TR 162, **SEC.** 24, **TWP.** 11N, **RNG.** 1W, 4th **PM**, **Latitude** 40°55'21.72", **Longitude** -90°33'13.1796"

COUNTY Warren **DRILLING METHOD** CFA TO 10', THEN ROTARY **HAMMER TYPE** AUTO

STRUCT. NO. 094-0054 (EB)
Station 459+98.7

BORING NO. SB-8
Station 461+37
Offset 81.0 ft RT
Ground Surface Elev. 713.44 ft

Surface Water Elev. ft
Stream Bed Elev. ft

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

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
			13	Brown SILTY CLAY TOPSOIL with gravel (FILL)
712.44				
	2			
	4	1.8	18	Brown, Moist, Stiff CLAY LOAM with sand/gravel (FILL)
	4			
710.44				
	3			Olive/gray, Moist, Stiff SILTY CLAY with sand/gravel, trace wood (FILL)
	5	1.4	19	
-5	9			
707.94				
	4			Brown to gray, Moist, Very Stiff SILTY CLAY with sand/gravel (FILL)
	5	2.2	16	
	6			
	3			
	4	2.1	19	
-10	5			
	4			
	7	2.3	17	
	9			
700.44				
	3			Brown to Gray, Moist, Stiff CLAY LOAM with sand/gravel, trace wood (FILL)
	6	1.9	19	
-15	8			
	2			
	5	1.4	18	
	6			
	3			
	4	1.3	23	
693.44	5			
-20				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
	2			Brown to Gray, Moist, Stiff CLAY LOAM with sand/gravel, trace wood
	3	0.9	29	
	4			
	3			
	5	1.8	23	
-25	6			
687.44				
	7			Gray, Moist, Very Stiff SILT/CLAY STONE
	8	2.4	19	
	9			
684.94				
	8			Gray, Hard SILTSTONE
	35		14	
-30	50/5"			
	17			
	42		14	
	50/5"			
	20			
678.94	43		14	
-35	50/1"		17	Black, Hard SHALE
	50/4"		18	
	32			
673.94	50/5.5"		13	
-40				End of Boring

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

Terracon

Rock Quality Designation (RQD) of Rock Core ASTM D 6032

Laboratory Services Group *192 Exchange Boulevard Glendale Heights, Illinois 60139* *Phone: (630) 717-4263*

Project No.: MR185327 **Date: 1/3/19**
Project Name: WO 40 US 34 Bridge

Summary of Test Results

Boring No. / Run No.	Depth (ft)	Total Length >100mm	Total Length of Core (mm)	Recovery (mm)	RQD (%)	Rock Quality Classification	Fracture Frequency Per Meter
SB-2	11.0'-21.0'	1314	3048	3048	43.1	Poor	14

Terracon

Rock Quality Designation (RQD) of Rock Core ASTM D 6032

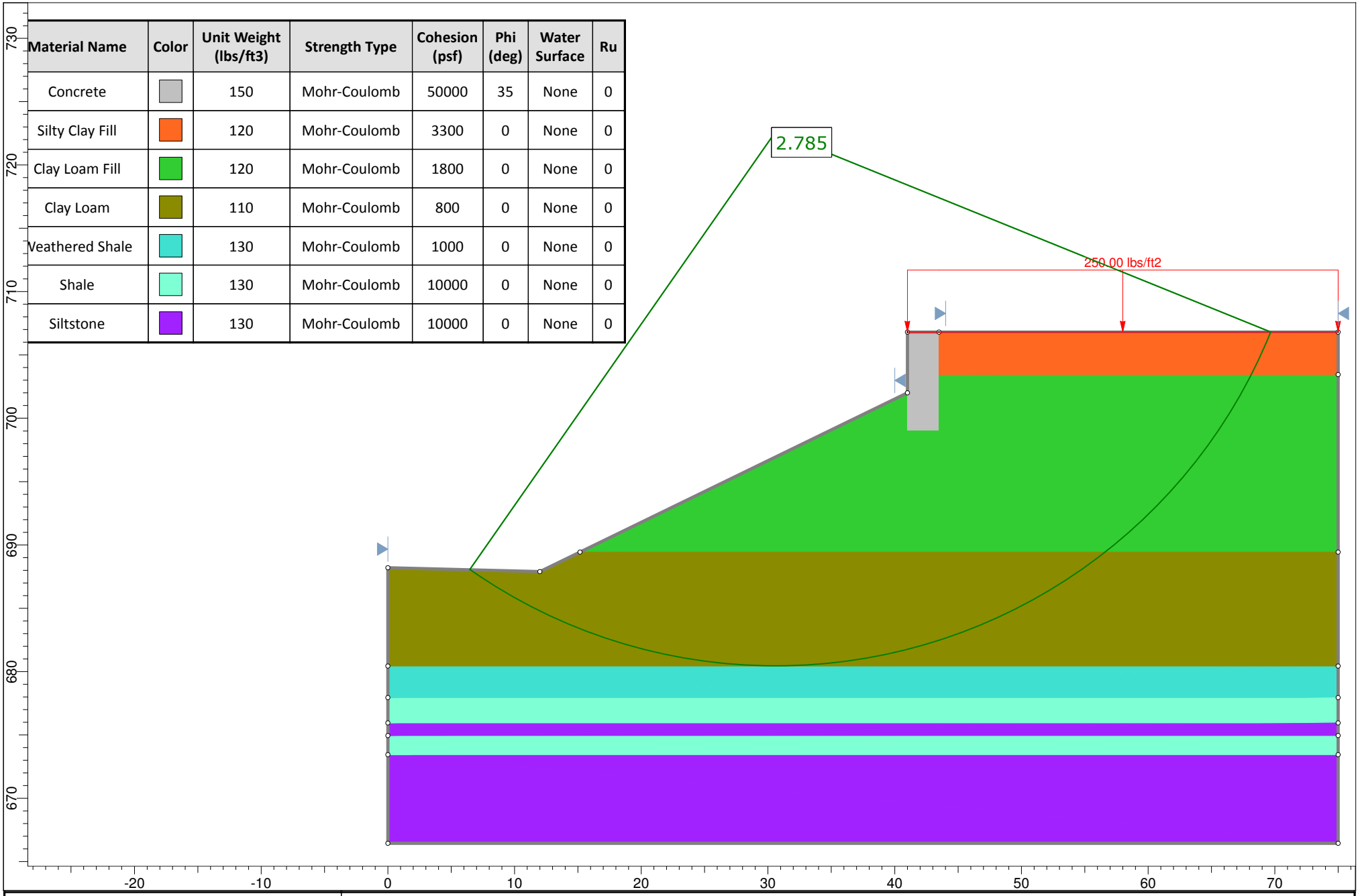
Laboratory Services Group *192 Exchange Boulevard Glendale Heights, Illinois 60139* *Phone: (630) 717-4263*

Project No.: MR185327 **Date: 1/3/19**
Project Name: WO 40 US 34 Bridge

Summary of Test Results

Boring No. / Run No.	Depth (ft)	Total Length >100mm	Total Length of Core (mm)	Recovery (mm)	RQD (%)	Rock Quality Classification	Fracture Frequency Per Meter
SB-7	6.5'-16.5'	533	3048	2184	17.5	Very Poor	9

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
Concrete		150	Mohr-Coulomb	50000	35	None	0
Silty Clay Fill		120	Mohr-Coulomb	3300	0	None	0
Clay Loam Fill		120	Mohr-Coulomb	1800	0	None	0
Clay Loam		110	Mohr-Coulomb	800	0	None	0
Weathered Shale		130	Mohr-Coulomb	1000	0	None	0
Shale		130	Mohr-Coulomb	10000	0	None	0
Siltstone		130	Mohr-Coulomb	10000	0	None	0



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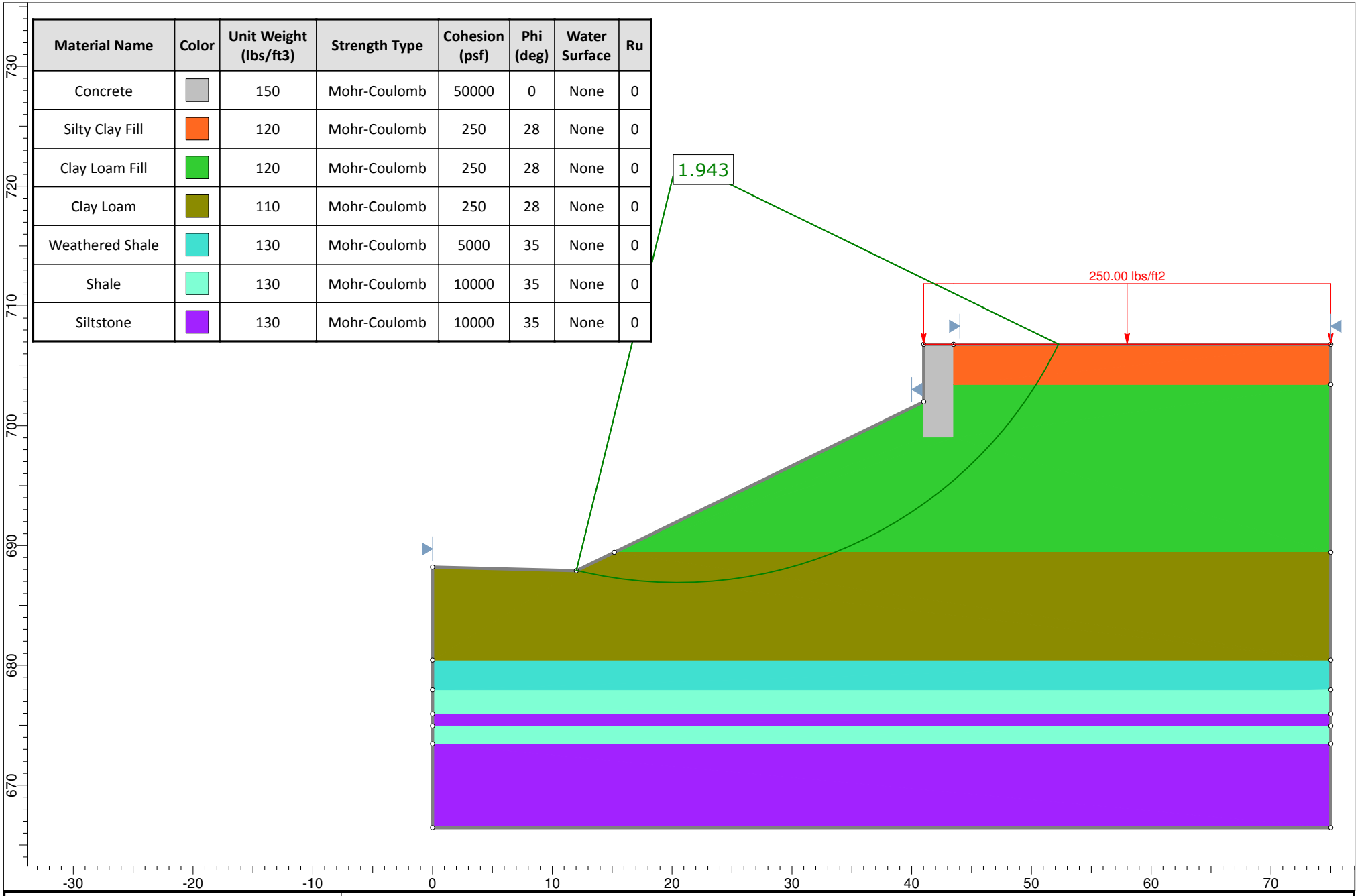
SLIDEINTERPRET 8.013

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description	Static		
Drawn By		Scale 1:122	Company
Date	6/7/2019		File Name short term.slmd

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
Concrete		150	Mohr-Coulomb	50000	0	None	0
Silty Clay Fill		120	Mohr-Coulomb	250	28	None	0
Clay Loam Fill		120	Mohr-Coulomb	250	28	None	0
Clay Loam		110	Mohr-Coulomb	250	28	None	0
Weathered Shale		130	Mohr-Coulomb	5000	35	None	0
Shale		130	Mohr-Coulomb	10000	35	None	0
Siltstone		130	Mohr-Coulomb	10000	35	None	0



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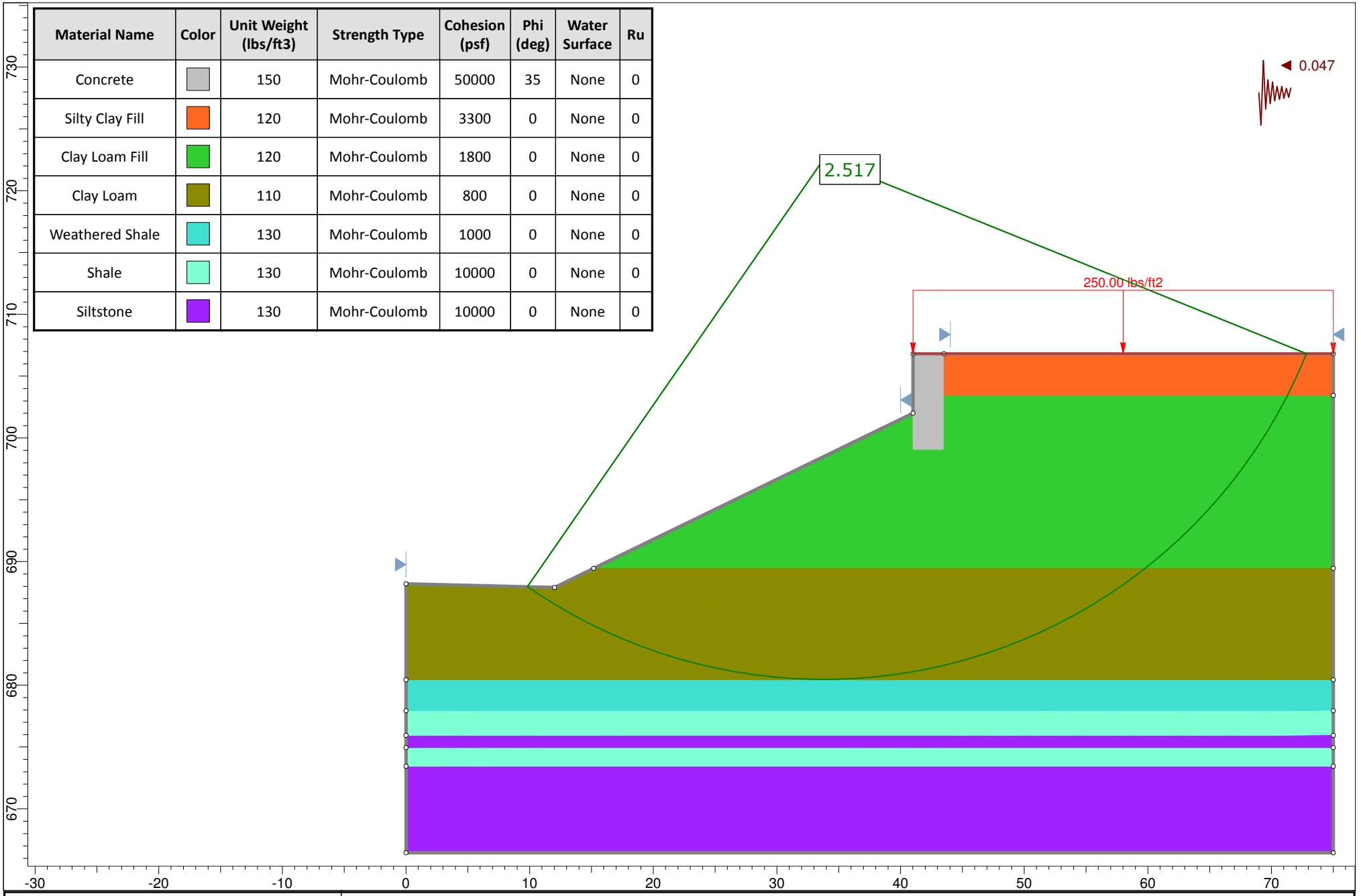
SLIDEINTERPRET 8.013

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description	Static		
Drawn By		*Scale* 1:129	*Company*
Date	6/7/2019		*File Name* long term.slmd

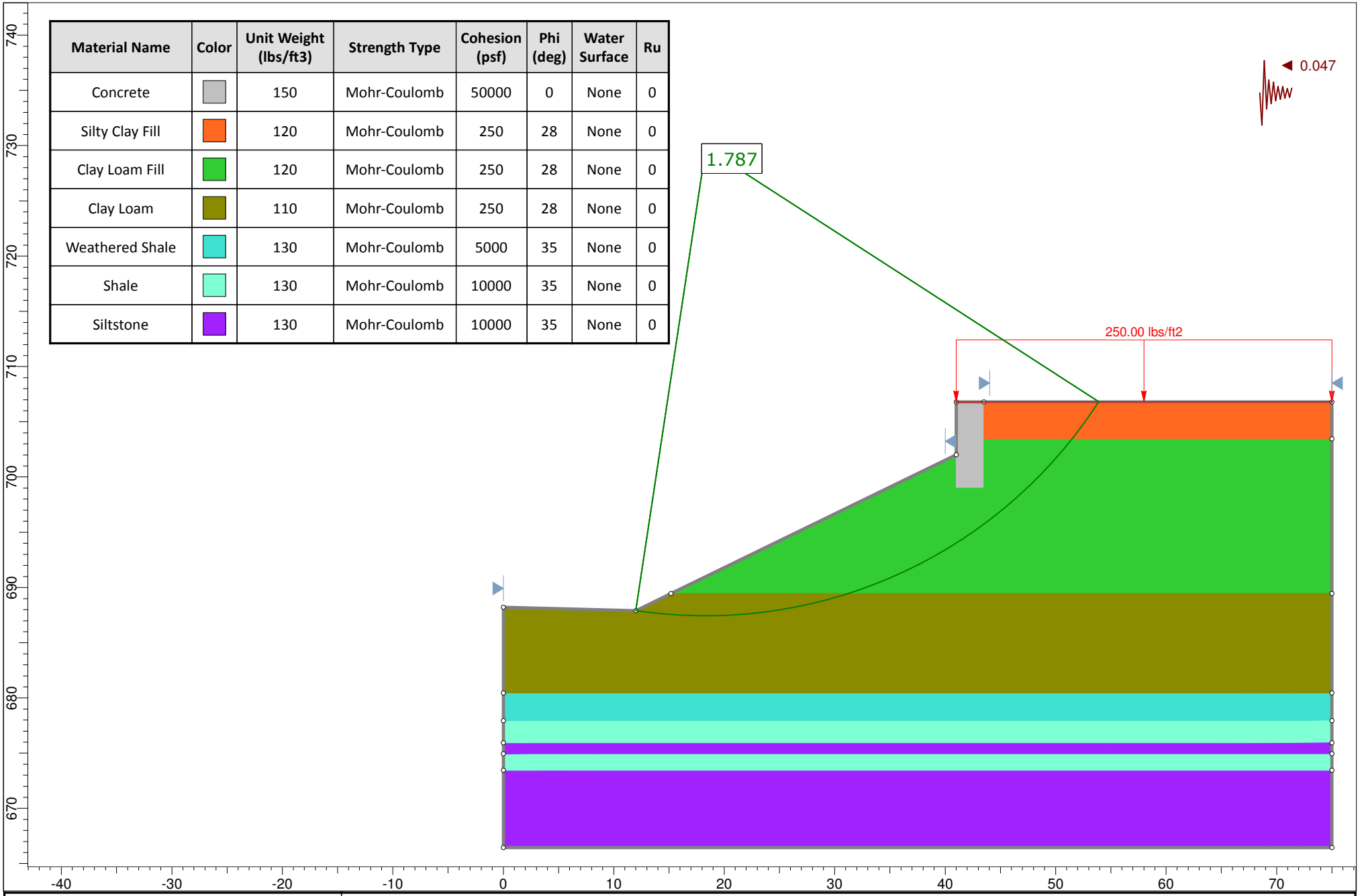
Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
Concrete		150	Mohr-Coulomb	50000	35	None	0
Silty Clay Fill		120	Mohr-Coulomb	3300	0	None	0
Clay Loam Fill		120	Mohr-Coulomb	1800	0	None	0
Clay Loam		110	Mohr-Coulomb	800	0	None	0
Weathered Shale		130	Mohr-Coulomb	1000	0	None	0
Shale		130	Mohr-Coulomb	10000	0	None	0
Siltstone		130	Mohr-Coulomb	10000	0	None	0



Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description	Seismic		
Drawn By		Scale 1:125	Company
Date	6/7/2019		File Name short term.slmd

SLIDEINTERPRET 8.013

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Ru
Concrete		150	Mohr-Coulomb	50000	0	None	0
Silty Clay Fill		120	Mohr-Coulomb	250	28	None	0
Clay Loam Fill		120	Mohr-Coulomb	250	28	None	0
Clay Loam		110	Mohr-Coulomb	250	28	None	0
Weathered Shale		130	Mohr-Coulomb	5000	35	None	0
Shale		130	Mohr-Coulomb	10000	35	None	0
Siltstone		130	Mohr-Coulomb	10000	35	None	0



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SLIDEINTERPRET 8.013

Project	SLIDE - An Interactive Slope Stability Program		
Analysis Description	Seismic		
Drawn By		Scale 1:140	Company
Date	6/7/2019		File Name long term.slmd