STRUCTURE GEOTECHNICAL REPORT

Interstate 80 Bridge over FAU Route 354 (Richards Street)

Station 730+57.48, Section 2013-008B

IDOT Job Number D-91-061-09 (PTB 152, Item 004)

Proposed SN 099-0900 (EB) & SN 099-0901 (WB)

Existing SN 099-0064 (EB) & SN 099-0065 (WB)

Joliet, Will County, Illinois

Submitted to:

HBP Illinois Partners, JV
c/o HNTB
One South Wacker Drive
Suite 900
Chicago, Illinois 60606

Prepared by:

Geo Services, Inc.
805 Amherst Court
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(630) 305-9186

GSI Job No. 13125

October 3, 2014

Geo Services, Inc.
Geotechnical, Environmental and Civil Engineering
An MBE - DBE Firm

Revised: October 3, 2014
September 22, 2014
April 30, 2014

HBP Illinois Partners, JV
c/o HNTB
One South Wacker Drive, Suite 900
Chicago, Illinois 60606

Attn: Mr. Bob Tessiatore, P.E., S.E.
Patrick Engineering

Job No. 13125

Re: Structure Geotechnical Report
Interstate 80 Bridge over FAU Route 354 (Richards Street)
Station 730+57.48, 2013-008B,
Existing SN 099-0064 (EB) and 099-0065 (WB)
Proposed SN 099-0900 (EB) and 099-0901 (WB)
Joliet, Will County, Illinois
IDOT Job Number: D-91-061-09 (PTB 152, Item 004)

Dear Mr. Tessiatore:

The following report presents the geotechnical analysis and recommendations for the reconstruction and widening of the existing bridge structures carrying Interstate 80 Bridge over Richards Street. A total of eight (8) structural soil borings (BSB-25 through BSB-32) were completed. Copies of these boring logs, along with plan and profiles are included in this report.

If there are any questions regarding the information submitted herein, please do not hesitate to contact us.

Very truly yours,

GEO SERVICES, Inc.

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SECTION 01: INTRODUCTION

This report presents the results of the geotechnical investigation for the bridge widening of the Interstate 80 Bridge over Richards Street Project, IDOT Job Number: D-91-061-09 (PTB 152, Item 004). The results of the eight (8) structure borings (BSB-25 through BSB-32) completed by Geo Services, along with plan and profile drawings, are included with this report.

Boring locations were selected by Geo Services, Inc. and were reviewed and approved by HBP Illinois Partners, JV and the Illinois Department of Transportation (IDOT). Boring locations were located in the field by Geo Services, Inc. (GSI) personnel after review of accessibility and utility locations. Estimated elevations of the as-drilled borings were taken from the topographic and cross-section drawings provided by HBP. The as-drilled locations for the borings are shown on the Boring Location Diagram found in Appendix C section of the report.

This report includes a description of subsurface conditions, location diagram, profiles and boring logs, as well as recommendations pertaining to the design and construction of the new bridge foundations, earth embankment, and general construction considerations for the site.

SECTION 02: PROJECT DESCRIPTION

The existing bridges (SN 099-0064 EB and SN 099-0065 WB) were built in 1963 and were repaired in 1990, 1998, and 2001. The existing dual bridges each consist of three simple spans measuring approximately 166 feet from back to back of abutments. Out to out deck width of the existing bridges is approximately 36 feet at 8°-36'-00" left forward skew that is supported by two exterior W36 beams and four interior W30 beams at the end spans, and six W36 beams at the middle span. The spans are supported on concrete stub abutments bearing on bedrock, and piers and wingwalls are founded on spread footings bearing on bedrock.

It is intended to remove and replace the entire bridge superstructure. The existing bridges are proposed to be widened at each side of the median and outer lanes/shoulders to approximately 13 feet for the eastbound structure (SN 099-0064) and westbound structure (SN 099-0065). Based on the TSL drawings, no wingwalls are proposed. The approximate bottom of bearing elevations are shown in Table 4 of the report.

Based on the foundation loads provided by HBP, the total factored loads at the top of foundation are shown on the following Table 1 - Estimated Factored Loads for the Bridge Substructures:

Table 1 – Estimated Factored Loads for the Bridge Substructures

Location	Factored Loads (kips)
West Abutment	1,460
Pier 1	3,430
Pier 2	3,430
East Abutment	1,460

SECTION 03: SUBSURFACE INVESTIGATION PROCEDURES

The borings were performed during the months of October and November, 2013, with a truck-mounted drilling rig. Borings performed near the abutments (BSB-25, BSB-26, BSB-31, and BSB-32) were advanced by means of hollow stem augers and continued with rotary drilling techniques. The remainder of the borings (BSB-27 thru BSB-30) were performed below the bridge abutments along Richards Street using hollow stem augers and continued with rotary drilling techniques. Representative soil samples were obtained employing split spoon sampling procedures in accordance with AASHTO Method T-206. Bedrock cores were obtained in the bridge structure borings using an NX-size double tube core barrel with a diamond impregnated bit. Samples obtained in the field were returned to our laboratory for further examination and testing.

Split spoon sampling involves driving a 2.0-inch outside diameter split-barrel sampler into the soil with a 140-pound weight falling freely through a distance of 30 inches. Blow counts are recorded at 6" intervals and the blow counts are shown on the boring logs. The number of blows required to advance the sampler the last 12 inches is termed the Standard Penetration Resistance (N). The N value is an indication of the relative density of the soil.

SECTION 04: LAB TESTING PROGRAM

The test procedures were performed in accordance with test procedures discussed in the IDOT Geotechnical Manual. All split-spoon samples obtained from the drilling operation were visually classified in the field. Cohesive samples were tested for unconfined compressive strength using an IDOT modified RIMAC test device and/or calibrated penetrometer in the field.

The soil testing program included performing water content, density and either unconfined compression and/or calibrated penetrometer tests on the cohesive samples recovered. Water content tests were performed on the non-cohesive samples recovered. These tests were performed upon representative portions of the samples obtained in the field. In addition, unconfined compressive testing was performed on rock cores obtained from the field and are indicated on the rock core logs.

The results of the above testing, along with a visual classification of the material based upon both the Illinois textural classification and the AASHTO Soil Classification System, are indicated on the boring logs.

SECTION 05: SUBSURFACE CONDITIONS

Boring logs can be found in Appendix C. The stratification lines shown on the boring logs represent the approximate boundary between soil types, and the actual transition may be gradual.

Surface conditions at the boring locations along the roadway or shoulder areas of Interstate 80 varied from existing asphalt and/or concrete pavement to crushed stone to underlying mixed topsoil, stiff to very stiff clay loam, and dense to very dense sand, gravel and crushed stone fill materials (ranging from 5 to 16 feet deep) for borings performed at the existing abutments, At the median area of Interstate 80 where borings BSB-31 and BSB-32 were drilled, surficial soils consisted of topsoil and stone fill to depths of approximately 1 to 3 feet. A stratum of very stiff clay loam was encountered beneath the fill materials at borings BSB-31 and BSB-32 to varying depths at approximately 6 feet below ground surface.

Surface conditions at boring locations along the roadway or shoulder areas of Richards Street (below the existing bridge abutments) consisted of 4 to 12 inches of concrete underlain by fill materials consisting of very dense sand, gravel, crushed stone and fractured rock, and stiff clay loam soils (ranging from 1 to 4 feet deep).

The stiff clay loam fill soils had moisture contents within the range of 14% to 23% with an average of 18%. The dense to very dense granular fill soils had moisture contents within the range of 1% to 14% with an average of 6%.

Below the surface and fill materials, shallow bedrock was encountered at depths ranging from 1 to 16 feet below ground surface. The rock cores obtained indicated Silurian System, Niagaran Dolomite. A summary of the bedrock information obtained during our exploration is tabulated in Table 2.

Table 2 – Bedrock Information Summary

Boring	Station	Offset	Top of Bedrock Elevation (feet)	RQD	Compressive Strength (tsf)
BSB-25	Sta. 729+67	42.6' Left	538.0	84.0%	932
BSB-26	Sta. 729+47	43.2' Right	541.0	26.0%	1,136
BSB-27	Sta. 730+31	74.6' Left	533.2	34.0%	806
BSB-28	Sta. 730+30	5.0' Right	535.3	31.0%	1,380
BSB-29	Sta. 731+09	64.2' Left	534.2	21.0%	1,110
BSB-30	Sta. 730+88	61.8' Right	533.8	31.0%	1,608
BSB-31	Sta. 731+59	0.4' Left	548.0	44.0%	847
BSB-32	Sta. 731+51	59.8' Right	551.9	27.0%	910

SECTION 06: WATER TABLE CONDITIONS

Groundwater was not encountered in the borings above the top of bedrock and before switching to rotary drilling techniques. Due to the nature of rotary-wash drilling, it was not possible to obtain accurate water levels below 10 feet of depth or after drilling. Perched water levels may occur within granular layers above the rock or the upper zone of weathered and broken rock. Fluctuations in the amount of water accumulated and in the hydrostatic water table can be anticipated depending on variations in precipitation and surface runoff.

SECTION 07: ANALYSIS

Mining Activity

According to readily available ISGS sources, there are no documented coal mining operations in near vicinity to the project site and seismic activity is noted to be very low.

Site Seismic Parameters

For LFRD design, according to the AASHTO LRFD Bridge Design Specification 2012 (with 2013 Interims), the project site has a horizontal Response Spectral Acceleration of 0.039 at a period of 1.0 second and 5% critical dampening (S_1). The site also has a horizontal Response Spectral Acceleration of 0.11 at a period of 0.2 seconds and 5% critical dampening (S_s). The following table shows recommended seismic design data in accordance to the AASHTO LRFD Bridge Design Specification 2012 (with 2013 Interims).

Table 3 – Seismic Design (Approximately 1000-Year Return Period)

Seismic Performance Zone (SPZ)	1
Spectral Acceleration at 1 second (S_{D1})	0.066
Design Spectral Acceleration at 0.2 seconds (S_{Ds})	0.132
Soil Site Class	C

The project site is considered to be in a low seismic area and is considered a non-extreme event. Liquefiable layers, scour and downdrag are not expected to impact the design of the new bridge.

Settlement

Based on the TSL/cross-sections, the proposed bridge profile will be raised an estimated height of 1 foot. For this purpose, we estimate about 1 foot of fill is anticipated for the abutments over the stiff to very stiff clay and medium dense to dense sand, gravel and crushed stone fill soils at the abutments. Settlement is calculated to be less than 0.4 inches at the abutments. For the piers founded on shallow bedrock, settlement is estimated to be less than 0.4 inches. No settlement issues are expected for the bridge structure.

Slope Stability

The semi-integral abutments will be supported with the use of spread footings or drilled caissons at the West Abutment, and shallow spread footing on rock at the East Abutment. The proposed bridge core will match the existing 2H:1V slopes. Pier spread footings will be founded shallow bedrock. No slope stability issues are associated with the bridge structures founded on rock.

SECTION 08: RECOMMENDATIONS

Foundation Recommendations

It is proposed that the bridge structures will have semi-integral abutments. Based on the results of the borings, type of structure, and estimated loading, feasible foundations for support include shallow spread footings (with footing extensions bearing to bedrock) for the Piers, and both East and West Abutments, and/or a deep foundation system consisting of end-bearing, rock-socketed, drilled caissons at both abutments section of the bridges. End-bearing, rock-socketed H-piles with individual pile encasements may be feasible at the West Abutment portion of the bridges; however, per AASHTO LRFD Bridge Design criteria, the use of H-piles is not recommended due to short pile lengths (less than 10 feet).

We recommend that an economic analysis for each foundation option presented below be considered before choosing a foundation system for the design.

Shallow Spread Footing Recommendations

Based on the information obtained from the borings and estimated loadings anticipated for the proposed structures, the new bridge may be supported on shallow spread footing foundations bearing on sound bedrock as summarized in the following Table 3. Due to the variation of the bedrock elevation, footing extensions at the West Abutments (similar to the concrete pedestal structure of the existing bridge), may be needed to extend the foundations to bear on sound bedrock material. The spread footing foundations may be socketed into the sound bedrock at elevations tabulated in Table 4, and can be designed for a factored bearing resistance of 125 ksf, which is anticipated to be adequate for the anticipated bridge loads. A bearing resistance factor of 0.45 was used to calculate the factored bearing resistance at strength limit according to AASHTO LRFD Bridge Design Specifications (Article 10.5.5.2.2). We recommend using a resistance factor against sliding of 0.8 for cast in-place concrete on sand and 0.50 for passive earth pressure component against sliding resistance for LRFD design per AASHTO LRFD Bridge Design Specifications (Article 10.5.5.2.2). A coefficient of friction of 0.67 is recommended for use to calculate the nominal sliding resistance value per AASHTO LRFD Bridge Design Specifications (Article 10.6.3.4).

Table 4 - Elevation of Sound Bedrock at the Substructure Areas

Substructure (Boring)	Top of Bedrock Elevation (feet)	Recommended Minimum Bearing Elevation/ Elevation to Sound Bedrock (feet) [1]
NW Abutment (BSB-25)	538.0	538.0
SW Abutment (BSB-26)	541.0	540.0
NW Pier (BSB-27)	533.2	533.0
SW Pier (BSB-28)	535.3	534.5
NE Pier (BSB-29)	534.2	534.0
SE Pier (BSB-30)	533.8	533.0
NE Abutment (BSB-31)	548.0	547.0
SE Abutment (BSB-32)	551.9	550.0

Note: 1. verify in field

Note that the bedrock typically had numerous vertical and horizontal fractures and the transition from the fractured and/or weathered rock to the sound bedrock may not be pronounced. It is strongly recommended that an experienced geotechnical engineer be onsite during the foundation excavation to make the final determination on fractured and/or sound bedrock elevations during construction.

If materials with less than adequate bearing strength are noted at the foundation level during footing construction, the weaker material encountered at the base of the footings should be undercut to reach suitable rock, and the undercut area filled with lean concrete.

To provide adequate frost protection, we recommend that footing foundations be situated at a minimum depth of 4 feet below final grade with the exception that if pressure grouting of the bedrock is performed beneath the footing foundations to “seal” the fractured bedrock from water infiltration, then minimum embedment to prevent frost heave may not need to be adhered to for design.

Straight-Shaft Rock-Socketed Caissons Recommendations

(West Abutment portion of the proposed bridges only)

The foundations at the West Abutment portion of the proposed bridges may be constructed using a foundation system of drilled straight-shaft rock-socketed caissons. Drilled shaft in rock should be designed for end-bearing resistance or side resistance per Bridge Manual Section 3.10.2.1. A factored end-bearing resistance of 125 ksf is

recommended for design for rock-socketed caissons, socketed 3 feet into sound bedrock. The factored bearing resistance of the bedrock is anticipated to be adequate for the anticipated bridge loads. From the AASHTO LRFD Bridge Design Specifications Manual Table 10.4.6.4-1, the bedrock is considered fair to good quality. The Carter and Kulhawy equation was used to compute the bearing and an Φb=0.5 was used for the factor of safety. To the extent rock-socketing is provided, factored resistance value of 3.0 tsf/ft for side resistance can be used for rock-socketed caissons over the depth of the rock-socket to resist uplift loads. A minimum diameter of 24 inches for the rock-socket size is recommended.

For the unit skin friction at the upper strata of the borings, the medium dense to dense sand and gravel will have estimated factored resistances of 500 psf per foot (or can be ignored). Note that the factored skin friction values will need to be neglected since temporary casing or drilling will be used for caisson installation. In addition, the overburden side resistance in soil will be ignored for drilled shafts in rock per Bridge Manual Section 3.10.2.1.

An experienced, geotechnical engineer should be present during excavation to check that suitable sound rock has been reached. The temporary casing should be extended beneath the granular strata to top of bedrock elevation at approximate elevation 538.

Based on the estimated bearing pressures and the magnitude of the loads expected, we estimate a maximum settlement of 0.40 inches or less for rock-socketed caisson foundations supported on bedrock as described above. Differential settlements would be dependent on the adjacent loads but is typically 1/2 to 2/3 of the total settlement. It should be noted that these settlement values are for compression of the bearing materials only and that elastic compression of the caisson concrete should be added to these values.

Approach Slab Recommendations

The new approach slab will be supported on either new or existing embankment fill. Shallow footings for the “sleeper” below the slab should be designed for a maximum applied service bearing pressure of 2,000 psf situated on new embankment fill. The new fill should be compacted per IDOT specifications for earth embankment. Any organics or soft, yielding subgrade (if any) should be removed prior to new fill placement. A qualified geotechnical engineer should observe the subgrade prior to any base course is placed. Settlement of the approach slab is calculated on the order of less than 0.4 inches.

SECTION 09: GENERAL CONSTRUCTION CONSIDERATIONS

Traffic will be maintained utilizing staged construction. Due to high blow count loams, sands, gravels, stone, and shallow bedrock, the IDOT Temporary Sheet Piling Design Charts may not be used. The contractor will likely need to design and install a temporary soil retention system. The soil and bedrock parameters for lateral resistance shown in Tables 5 and 6 below may be used for design of temporary retention system.

Table 5 – Soil Parameters for Lateral Resistance

Material (elevation, feet)	Unit Weight (pcf)	Drained (Long-term) Friction Angle (°)	Undrained (Short-term) Cohesion (psf)	Lateral Modulus of Subgrade Reaction (pci) [1]	Strain [1]
Clay Loam Fill (Top to 535)	125	30	2,000	700	0.006
Dense to Very Dense Sand, Gravel, and Crushed Stone Fill, and Fractured Rock (535 to 561)	135	34	-	250	-

Note: 1. Values recommended for use in design from L-pile Software Manual.

Table 6 – Bedrock Parameters for Lateral Resistance

Material (elevation, feet)	Unit Weight (pcf)	Young's Modulus (psi)	Uniaxial Compressive Strength (psi)	RQD (%)	Strain (k_m)
Bedrock (548-538)	150	2×10^6	See Lab Data on Rock Core Logs	21% to 84%	0.0001

At the abutments, it is recommended that a lateral active earth pressure of 40 psf per foot of depth be used above the water table assuming a free-draining granular backfill is utilized. For non-yielding walls with granular backfill, a lateral at-rest pressure of 60 psf per foot should be used, assuming proper drainage. Allowances should be made for any surcharge loads adjacent to the retaining structure. Drainage should be provided behind the abutment.

All soils which become softened or loosened at the base of foundation excavation areas or subgrade areas should be carefully recompacted or removed prior to placement of foundation concrete or fill material. No foundation concrete or structural fill should be placed in areas of ponded water or frozen soil.

During excavation for the proposed improvements, movement of adjacent soils into the excavation should be prevented. All excavations should be performed in accordance with the latest Occupational Safety and Health Administration (OSHA) requirements. Allowances should be made for any surcharge loads adjacent to the retaining structures.

SECTION 10: GENERAL QUALIFICATIONS

The analysis and recommendations presented in this report are based upon the data obtained from the soil borings performed at the indicated locations and from any other information discussed in this report. This report does not reflect any variations that may occur between borings or across the site. In addition, the soil samples cannot be relied on to accurately reflect the strata variations that usually exist between sampling locations. The nature and extent of such variations may not become evident until construction. If variations appear evident, it will be necessary to reevaluate the recommendations of the report. In addition, it is recommended that Geo Services, Inc. be retained to perform construction observation and thereby provide a complete professional geotechnical engineering service through the observational method.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No other warranties, either expressed or implied, are intended or made. In the event that any changes in the nature, design or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report modified or verified in writing by the geotechnical engineer. Also note that Geo Services, Inc. is not responsible for any claims, damages, or liability associated with any other party's interpretation of this report's subsurface data or reuse of the report's subsurface data or engineering analyses without the express written authorization of Geo Services, Inc.

APPENDIX A

GENERAL NOTES

GENERAL NOTES

CLASSIFICATION

American Association of State Highway & Transportation Officials (AASHTO) System used for soil classification.

Cohesionless Soils

Relative Density	No. of Blows per foot N
Very Loose	0 to 4
Loose	4 to 10
Medium Dense	10 to 30
Dense	30 to 50
Very Dense	Over 50

TERMINOLOGY

Streaks are considered to be paper thick. **Lenses** are considered to be less than 2 inches thick. **Layers** are considered to be less than 6 inches thick. **Stratum** are considered to be greater than 6 inches thick.

Cohesive Soils

Consistency	Unconfined Compressive Strength - qu (tsf)
Very Soft	Less than 0.25
Soft	0.25 - 0.5
Medium Stiff	0.5 - 1.0
Stiff	1.0 - 2.0
Very Stiff	2.0 - 4.0
Hard	Over 4.0

DRILLING AND SAMPLING SYMBOLS

SS:	Split Spoon 1-3/8" I.D., 2" O.D.	HS:	Housel Sampler
ST:	Shelby Tube 2" O.D., except where noted	WS:	Wash Sample
AS:	Auger Sample	FT:	Fish Tail
DB:	Diamond Bit - NX: BX: AX	RB:	Rock Bit
CB:	Carboloy Bit - NX: BX: AX	WO:	Wash Out
OS:	Osterberg Sampler		

Standard "N" Penetration: Blows per foot of a 140 lb. hammer falling 30" on a 2" O.D. Split Spoon

WATER LEVEL MEASUREMENT SYMBOLS

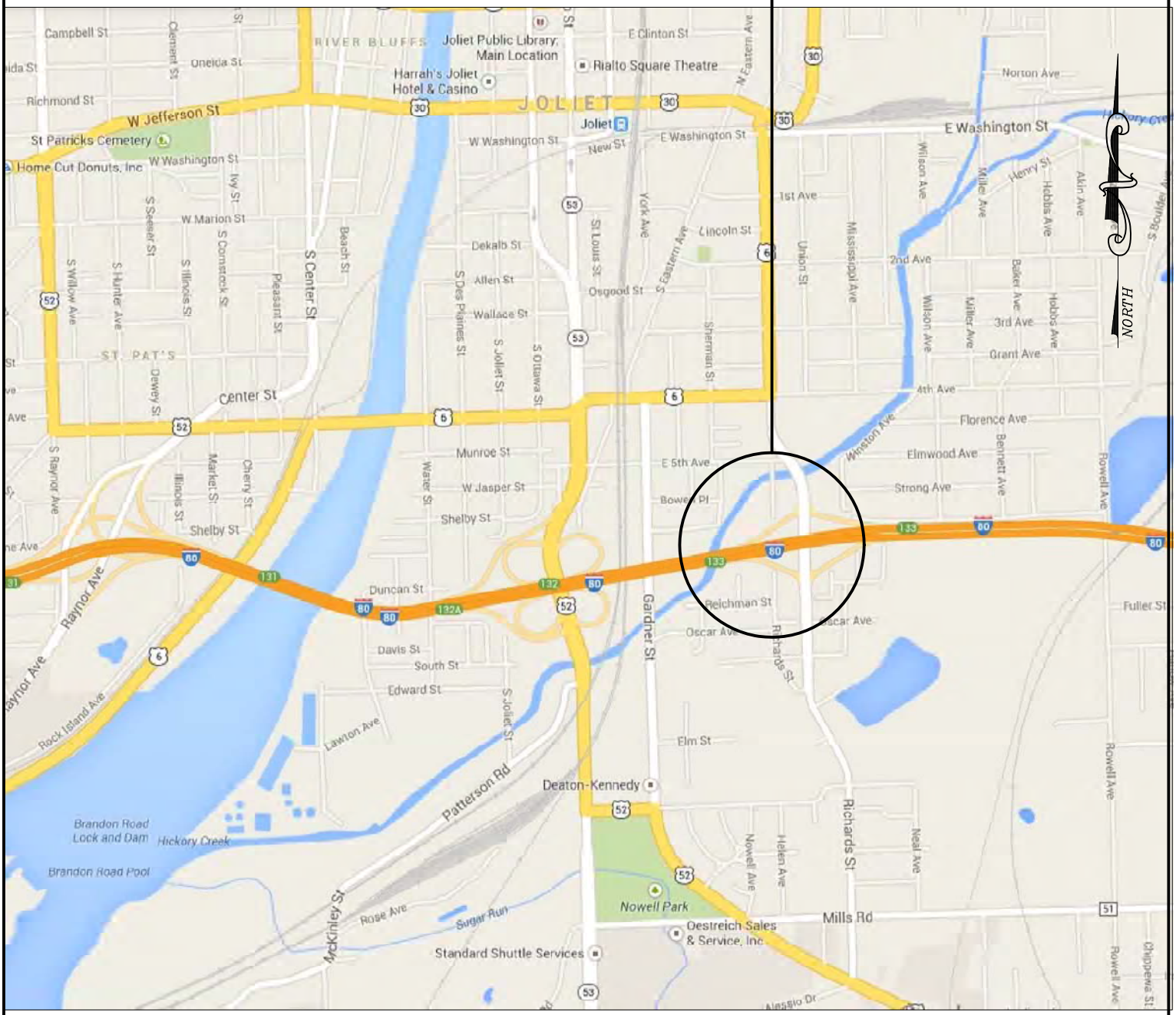
WL:	Water	WD:	While Drilling
WCI:	Wet Cave In	BCR:	Before Casing Removal
DCI:	Dry Cave In	ACR:	After Casing Removal
WS:	While sampling	AB:	After Boring

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days observation, and additional evidence on ground water elevations must be sought.

APPENDIX B

SITE LOCATION MAP

PROJECT SITE LOCATION

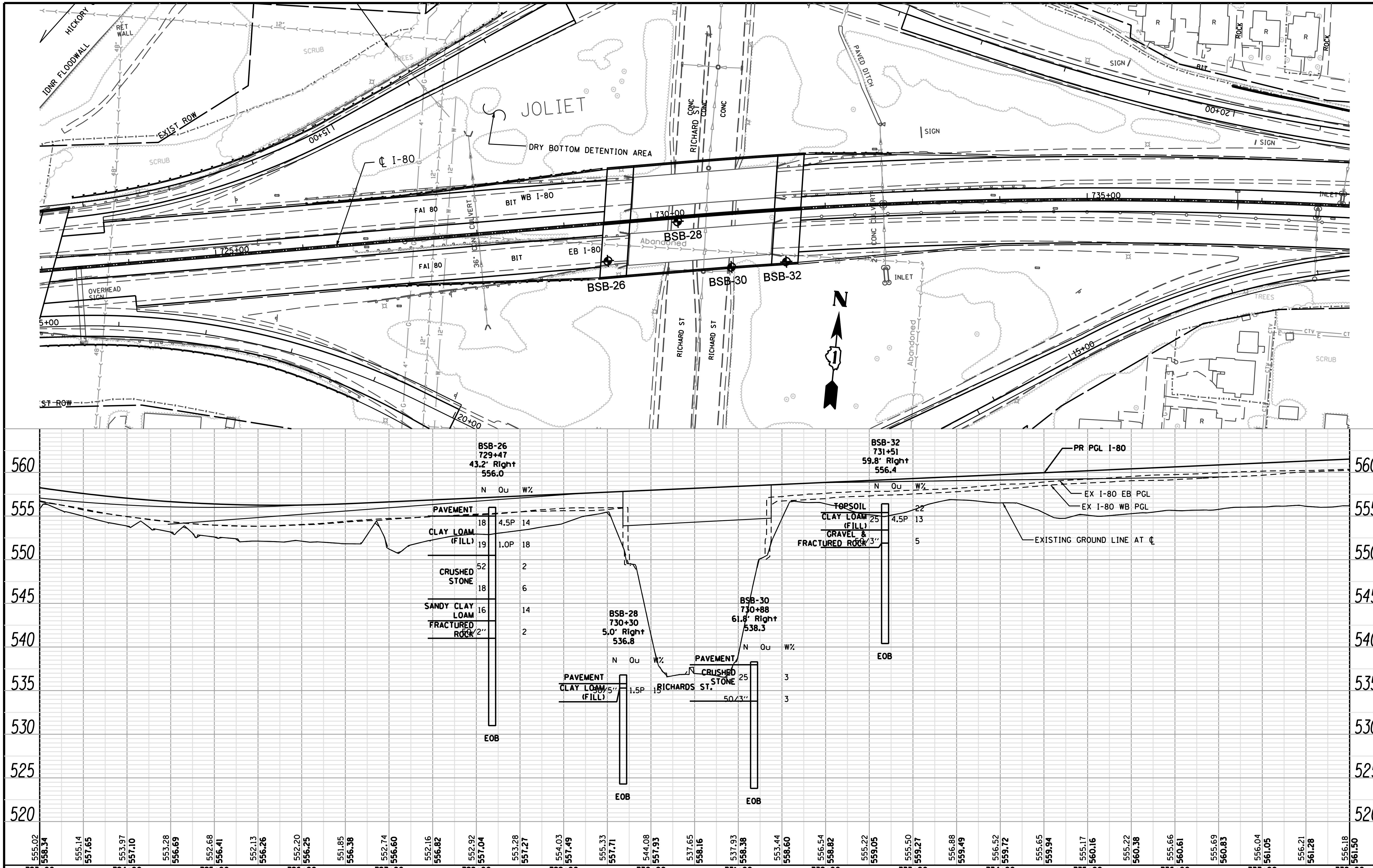


SITE LOCATION MAP	
Structural Geotechnical Report Interstate 80 Bridge over Richards Street Section 9-4HB-1, Sta. 730+57.48 IDOT Job No. D-91-196-09 Joliet, Will County, Illinois	
Geo Services, Inc. Geotechnical, Environmental & Civil Engineering 805 Amherst Court, Suite 204 Naperville, Illinois 60565 (630) 355-2838	

DRAWN BY	RR
APPROVED BY	AJP
DATE	April 30, 2014
GSI JOB No.	13125
SCALE	NTS

APPENDIX C

BORING LOCATION PLAN & PROFILE



Geo Services, Inc. Geotechnical, Environmental & Civil Engineering 805 Amherst Court, Suite 204 Naperville, Illinois 60565 (630) 355-2838	USER NAME =	DESIGNED - RWC	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	EB INTERSTATE 80 OVER F.A.U. RTE 354 (RICHARDS ST.) STRUCTURE NO. 099-0064 SOIL BORING PLAN & PROFILE	F.A.I RTE. 80	SECTION 99-4HB-1	COUNTY WILL	TOTAL SHEETS 2	SHEET NO. 1
		DRAWN - RWC	REVISED -							
	PLOT SCALE =	CHECKED - AJP	REVISED -					CONTRACT NO.		
	PLOT DATE =	DATE - 4/24/2014	REVISED -		SCALE: 1"=50'H 1"=5'V | SHEET NO. 1 OF 1 SHEETS | STA. 729+74.23 TO STA. 731+41.58		ILLINOIS FED. AID PROJECT			

PLAN
SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED
CADD FILE NAME
NOTE BOOK
NO.
BY
DATE

PROFILE
SURVEYED
PLOTTED
CROSS SECTIONS CHECKED
BM. NOTED
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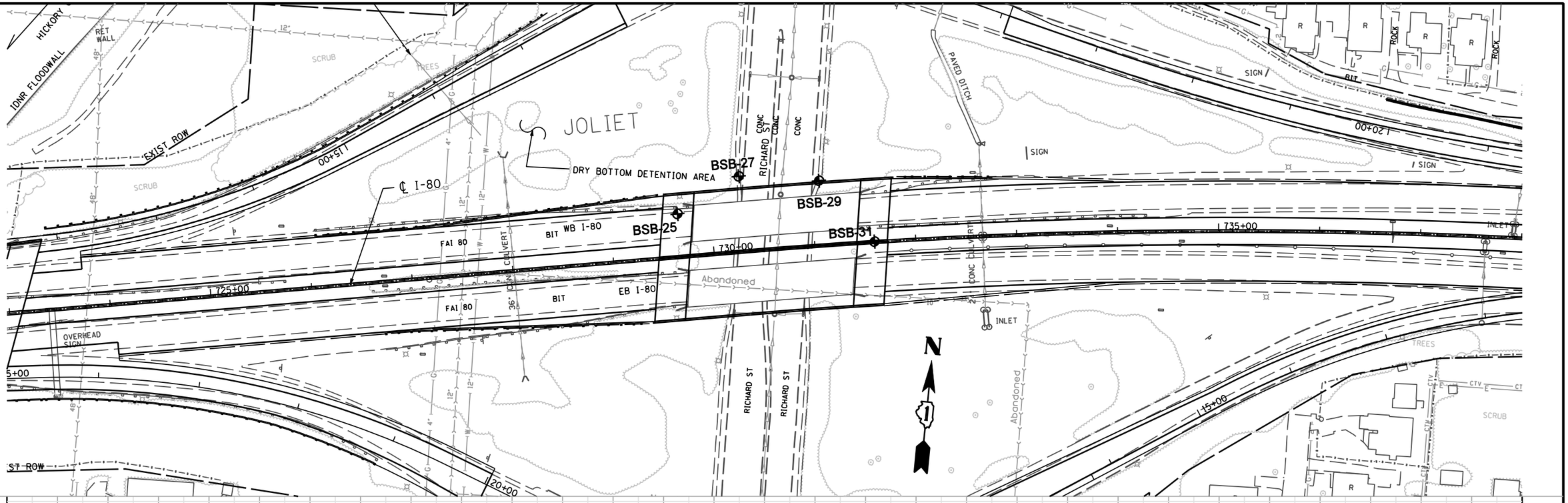
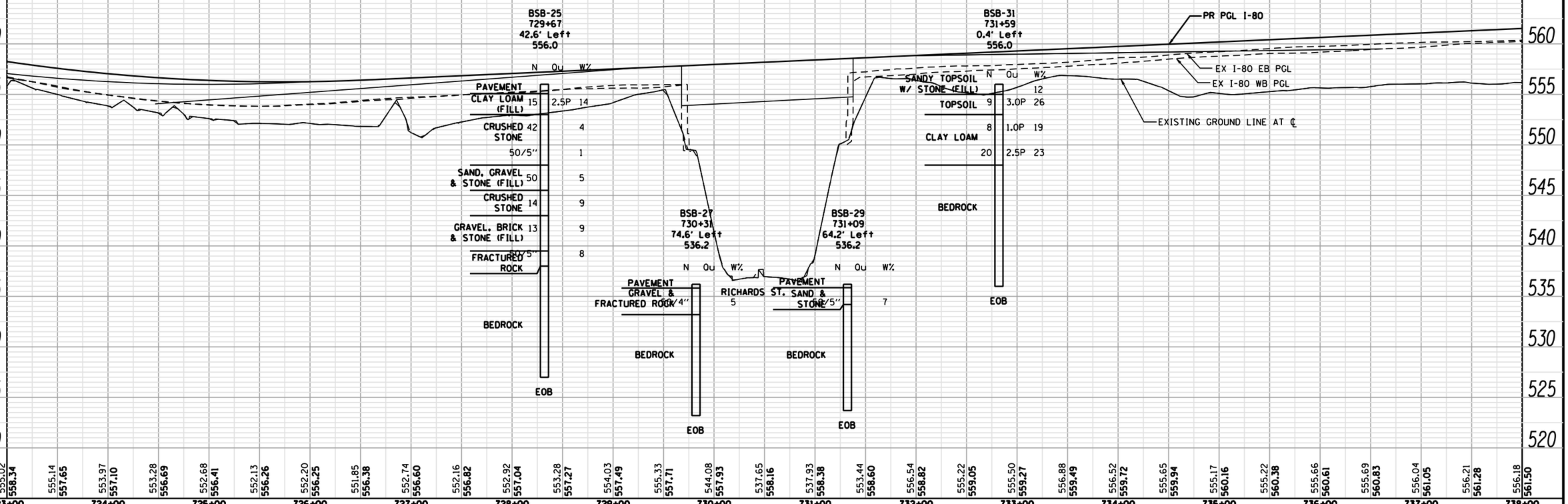
NOTE BOOK
NO.
BY
DATE





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USER NAME =	DESIGNED - RWC	REVISED -	
	DRAWN - RWC	REVISED -	
PLOT SCALE =	CHECKED - AJP	REVISED -	
PLOT DATE =	DATE - 4/24/2014	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

WB INTERSTATE 80 OVER F.A.U. RTE 354 (RICHARDS ST.)
STRUCTURE NO. 099-0065
SOIL BORING PLAN & PROFILE
SCALE: 1"=50'H 1"=5'V | SHEET NO. 1 OF 1 SHEETS | STA. 729+74.23 TO STA. 731+41.58

F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
80	99-4HB-1	WILL	2	2
		CONTRACT NO.		
		ILLINOIS FED. AID PROJECT		

APPENDIX D

BORING & ROCK CORE LOGS

Geo Services, Inc.
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805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2828

SOIL BORING LOG

GSI Job No. 13125

Date 11/7/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** F.A.I. RTE. 80 Over F.A.U. 354 (Richards St.) **LOGGED BY** TZ

SECTION 99-4HB-1 **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **DRILLING METHOD** Hollow Stem Auger/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. W.B. 099-0065
Station 730+57.48

BORING NO. BSB-25
Station 729+67
Offset 42.60ft Left
Ground Surface Elev. 556.00 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter Dry to 18.5' ft
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
11.0" ASPHALT			
555.08			
CLAY LOAM-brown & gray-very stiff (Fill)	6		
	7 8	2.5 P	14
553.00			
CRUSHED STONE-dense to very dense (Fill)	17		
	19		4
-5	23		
	50/5"		
			1
548.00			
SAND, GRAVEL & STONE-dense (Fill)	19		
	23		5
-10	27		
545.50			
CRUSHED STONE with BRICK-medium dense (Fill)	5		
	6 8		9
543.00			
SAND, GRAVEL, STONE & BRICK-brown & gray-medium dense (Fill)	5		
	6		9
-15	7		
539.50	7		
Drillers Observation: Weathered & fractured rock	50/5"		8
538.00			
Drillers Observation: Apparent Bedrock			
537.00			
Borehole continued with rock coring.			
-20			

Z:\PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125_LOG.GPJ 5/1/14

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)

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ROCK CORE LOG

DATE 11/7/2013

LOGGED BY JK

GSI JOB No. 13125

ROUTE F.A.I RTE. 80

DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

SECTION 99-4HB-1

LOCATION SEC 15, T35N, R10E, SW 1/4, 3rd PM

COUNTY Will

CORING METHOD Rotary Wash

STRUCT. NO. W.B.099-0065

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station 730+57.48

Core Diameter 2.0 in

BORING NO. **BSB-25**

Top of Rock Elev. 538.0

Station 729+67

Begin Core Elev. 537.0

Offset 42.6' Left

Ground Surface Elev. 556.0

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE RUN 1 (-19.0' to -29.0') Light gray with horizontal bedding. Slightly porous with horizontal fractures & some small vugs.	1	100.0	84.0	n/a	932 @ -19.4'
-24					
-29					

Color pictures of the cores Yes Cores will be stored for examination for –

The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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GSI Job No. 13125

SOIL BORING LOG

Page 1 **of** 1

Date 11/7/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** F.A.I. RTE. 80 Over F.A.U. 354 (Richards St.) **LOGGED BY** TZ

SECTION 99-4HB-1 **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **DRILLING METHOD** Hollow Stem Auger/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. E.B. 099-0064
Station 730+57.48

BORING NO. BSB-26
Station 729+47
Offset 43.20ft Right
Ground Surface Elev. 556.00 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter Dry to 15.0' ft
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				4.0" ASPHALT 555.67
				8.0" CONCRETE 555.00
	6			CLAY LOAM-brown & gray-stiff to hard (Fill)
	8	4.5	14	
	10	P		
	7			
	9	1.0	18	
-5	10	P		
				550.50
				CRUSHED STONE-medium dense to dense (Fill)
	37			
	25		2	
	27			
	12			
	9		6	
-10	9			
				545.50
				SANDY CLAY LOAM-dark brown to black-medium dense (Fill)
	6			
	7		14	
	9			
				543.00
				FRACTURED ROCK-very dense
	50/2"			
			2	
-15				541.00
				Borehole continued with rock coring.
-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, from 137 (Rev. 8-99)

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ROCK CORE LOG

DATE 11/7/2013

LOGGED BY JK

GSI JOB No. 13125

ROUTE F.A.I RTE. 80

DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

SECTION 99-4HB-1

LOCATION SEC 15, T35N, R10E, SW 1/4, 3rd PM

COUNTY Will

CORING METHOD Rotary Wash

STRUCT. NO. E.B.099-0064

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station 730+57.48

Core Diameter 2.0 in

BORING NO. **BSB-26**

Top of Rock Elev. 541.0

Station 729+47

Begin Core Elev. 541.0

Offset 43.2' Right

Ground Surface Elev. 556.0

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	26.0	n/a	1136 @ -16.6'
-20					
-25					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-15.0' to -25.0')
Light gray with horizontal bedding. Highly fractured to -23.0' with numerous intersecting horizontal & vertical fractures.

Color pictures of the cores Yes Cores will be stored for examination for -

The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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SOIL BORING LOG

GSI Job No. 13125

Date 10/17/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** F.A.I. RTE. 80 Over F.A.U. 354 (Richards St.) **LOGGED BY** TZ

SECTION 99-4HB-1 **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **DRILLING METHOD** Hollow Stem Auger/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. W.B. 099-0065
Station 730+57.48

BORING NO. BSB-27
Station 730+31
Offset 74.60ft Left
Ground Surface Elev. 536.20 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter Dry to 3.0' ft
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
4.5" CONCRETE 535.83			
GRAVEL & FRACTURE ROCK-very dense	25		
	50/4"		5
533.20			
Borehole continued with rock coring.			
-5			
-10			
-15			
-20			

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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)

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ROCK CORE LOG

DATE 10/17/2013

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GSI JOB No. 13125

ROUTE F.A.I RTE. 80

DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

SECTION 99-4HB-1

LOCATION SEC 15, T35N, R10E, SW 1/4, 3rd PM

COUNTY Will

CORING METHOD Rotary Wash

STRUCT. NO. W.B.099-0065

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station 730+57.48

Core Diameter 2.0 in

BORING NO. **BSB-27**

Top of Rock Elev. 533.2

Station 730+31

Begin Core Elev. 533.2

Offset 74.6' Left

Ground Surface Elev. 536.2

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	34.0	n/a	806 @ -3.5'
-8					
-13					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-3.0' to -13.0')
Light gray to gray with horizontal to wavy bedding. Porous with some small vugs. Weathered with rust staining becoming highly weathered & fractured from -5.9' with some chert replacement nodules.

Color pictures of the cores Yes Cores will be stored for examination for -

The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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SOIL BORING LOG

GSI Job No. 13125

Date 10/17/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** F.A.I. RTE. 80 Over F.A.U. 354 (Richards St.) **LOGGED BY** TZ

SECTION 99-4HB-1 **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **DRILLING METHOD** Hollow Stem Auger/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. E.B. 099-0064
Station 730+57.48

BORING NO. BSB-28
Station 730+30
Offset 5.00ft Right
Ground Surface Elev. 536.80 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter Dry to 2.5' ft
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
12.0" CONCRETE				
535.80				
CLAY LOAM-dark brown-stiff (Fill)		7		
535.30				
Drillers Observation: Apparent Bedrock		50/5"	1.5 P	15
534.30				
Borehole continued with rock coring.				
	-5			
	-10			
	-15			
	-20			

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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)

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ROCK CORE LOG

DATE 10/17/2013

LOGGED BY JK

GSI JOB No. 13125

ROUTE F.A.I RTE. 80

DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

SECTION 99-4HB-1

LOCATION SEC 15, T35N, R10E, SW 1/4, 3rd PM

COUNTY Will

CORING METHOD Rotary Wash

STRUCT. NO. E.B.099-0064

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station 730+57.48

Core Diameter 2.0 in

BORING NO. **BSB-28**

Top of Rock Elev. 535.3

Station 730+30

Begin Core Elev. 534.3

Offset 5.0' Right

Ground Surface Elev. 536.8

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	31.0	n/a	1380 @ -3.0'
-7.5					
-12.5					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE

RUN 1 (-2.5' to -12.5')

Light gray to gray with horizontal to wavy bedding. Porous & weathered with some chert nodules. Highly fractured & weathered from -4.5' with intersecting horizontal & vertical fractures.

Color pictures of the cores Yes Cores will be stored for examination for -

The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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GSI Job No. 13125

SOIL BORING LOG

Page 1 **of** 1

Date 10/18/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** F.A.I. RTE. 80 Over F.A.U. 354 (Richards St.) **LOGGED BY** TZ

SECTION 99-4HB-1 **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **DRILLING METHOD** Hollow Stem Auger/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. W.B. 099-0065
Station 730+57.48

BORING NO. BSB-29
Station 731+09
Offset 64.20ft Left
Ground Surface Elev. 536.20 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter Dry to 2.5' ft
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
4.0" CONCRETE 535.87				
SAND & STONE-brown (Fill)				
	7			
534.20	50/5"		7	
Drillers Observation: Apparent Bedrock 533.70				
Borehole continued with rock coring.				
-5				
-10				
-15				
-20				

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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, from 137 (Rev. 8-99)

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ROCK CORE LOG

DATE 10/18/2013

LOGGED BY JK

GSI JOB No. 13125

ROUTE F.A.I RTE. 80

DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

SECTION 99-4HB-1

LOCATION SEC 15, T35N, R10E, SW 1/4, 3rd PM

COUNTY Will

CORING METHOD Rotary Wash

STRUCT. NO. W.B.099-0065

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station 730+57.48

Core Diameter 2.0 in

BORING NO. **BSB-29**

Top of Rock Elev. 534.2

Station 731+09

Begin Core Elev. 533.7

Offset 64.2' Left

Ground Surface Elev. 536.2

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	21.0	n/a	1110 @ -4.7'
-7.5					
-12.5					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-2.5' to -12.5')
Light gray & porous with horizontal bedding. Weathered & cherty with some vugs. Highly fractured throughout with vertical fractures from -2.5' to -4.0'.

Color pictures of the cores Yes Cores will be stored for examination for -

The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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GSI Job No. 13125

SOIL BORING LOG

Page 1 **of** 1

Date 10/18/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** F.A.I. RTE. 80 Over F.A.U. 354 (Richards St.) **LOGGED BY** TZ

SECTION 99-4HB-1 **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **DRILLING METHOD** Hollow Stem Auger/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. E.B. 099-0064
Station 730+57.48

BORING NO. BSB-30
Station 730+88
Offset 61.80ft Right
Ground Surface Elev. 538.30 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter Dry to 4.5' ft
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
4.0" CONCRETE 537.97				
CRUSHED STONE-medium dense to dense (Fill)		7		
		11		3
		14		
		26		
533.80		50/3"		3
Borehole continued with rock coring.	-5			
	-10			
	-15			
	-20			

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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)

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ROCK CORE LOG

DATE 10/18/2013

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GSI JOB No. 13125

ROUTE F.A.I RTE. 80

DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

SECTION 99-4HB-1

LOCATION SEC 15, T35N, R10E, SW 1/4, 3rd PM

COUNTY Will

CORING METHOD Rotary Wash

STRUCT. NO. E.B.099-0064

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station 730+57.48

Core Diameter 2.0 in

BORING NO. **BSB-30**

Top of Rock Elev. *533.8*

Station 730+88

Begin Core Elev. *533.8*

Offset 61.8' Right

Ground Surface Elev. *538.3*

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	31.0	n/a	1608 @ -5.2'
-9.5					
-14.5					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-4.5' to -14.5')
Light gray & with horizontal bedding becoming cherty, porous & weathered with numerous horizontal fractures throughout. Vertical fracture with intersecting horizontal fractures from -12.6' to -14.5'.

Color pictures of the cores Yes Cores will be stored for examination for -

The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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GSI Job No. 13125

SOIL BORING LOG

Page 1 **of** 1

Date 11/7/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** F.A.I. RTE. 80 Over F.A.U. 354 (Richards St.) **LOGGED BY** TZ

SECTION 99-4HB-1 **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **DRILLING METHOD** Hollow Stem Auger/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. W.B. 099-0065
Station 730+57.48

BORING NO. BSB-31
Station 731+59
Offset 0.40ft Left
Ground Surface Elev. 556.00 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter Dry to 8.0' ft
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				SANDY TOPSOIL & STONE (Fill)
555.00			12	
	6			TOPSOIL-dark brown to black
	5 4	3.0 P	26	
553.00				
	3			CLAY LOAM-brown & gray-very stiff
	4 4	1.0 P	19	
-5				
	5			
	6 14	2.5 P	23	
548.00				
				Drillers Observation: Apparent Bedrock
546.00 -10				
				Borehole continued with rock coring.
-15				
-20				

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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)

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ROCK CORE LOG

DATE 11/7/2013

LOGGED BY JK

GSI JOB No. 13125

ROUTE F.A.I RTE. 80

DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

SECTION 99-4HB-1

LOCATION SEC 15, T35N, R10E, SW 1/4, 3rd PM

COUNTY Will

CORING METHOD Rotary Wash

STRUCT. NO. W.B.099-0065

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station 730+57.48

Core Diameter 2.0 in

BORING NO. **BSB-31**

Top of Rock Elev. 548.0

Station 731+59

Begin Core Elev. 546.0

Offset 0.4' Left

Ground Surface Elev. 556.0

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	99.0	44.0	n/a	847 @ -15.0'
-15					
-20					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-10.0' to -20.0')
Light gray & slightly porous with horizontal bedding. Light rust staining to -13.5'.
Numerous horizontal fractures throughout.

Color pictures of the cores Yes Cores will be stored for examination for -

The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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SOIL BORING LOG

Page 1 **of** 1

Date 10/21/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** F.A.I. RTE. 80 Over F.A.U. 354 (Richards St.) **LOGGED BY** TZ

SECTION 99-4HB-1 **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **DRILLING METHOD** Hollow Stem Auger/Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO. E.B. 099-0064
Station 730+57.48

BORING NO. BSB-32
Station 731+51
Offset 59.80ft Right
Ground Surface Elev. 556.40 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft

Groundwater Elev.:
First Encounter Dry to 6.0' ft
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material Description
				12.0" TOPSOIL-black
555.40			22	
	10			CLAY LOAM-dark brown & black-hard (Fill)
	10	4.5	13	
	15	P		
553.40				
				SILTY GRAVEL & FRACTURED ROCK-brown-medium dense
	13			
551.90	16		5	
-5	50/3"			Drillers Observation: Apparent Bedrock
550.40				
				Borehole continued with rock coring.
-10				
-15				
-20				

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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, from 137 (Rev. 8-99)

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ROCK CORE LOG

DATE 10/21/2013

LOGGED BY JK

GSI JOB No. 13125

ROUTE F.A.I RTE. 80

DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

SECTION 99-4HB-1

LOCATION SEC 15, T35N, R10E, SW 1/4, 3rd PM

COUNTY Will

CORING METHOD Rotary Wash

STRUCT. NO. E.B.099-0064

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station 730+57.48

Core Diameter 2.0 in

BORING NO. **BSB-32**

Top of Rock Elev. 551.9

Station 731+51

Begin Core Elev. 550.4

Offset 59.8' Right

Ground Surface Elev. 556.4

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	27.0	n/a	910 @ -11.2'
-11.0					
-16.0					

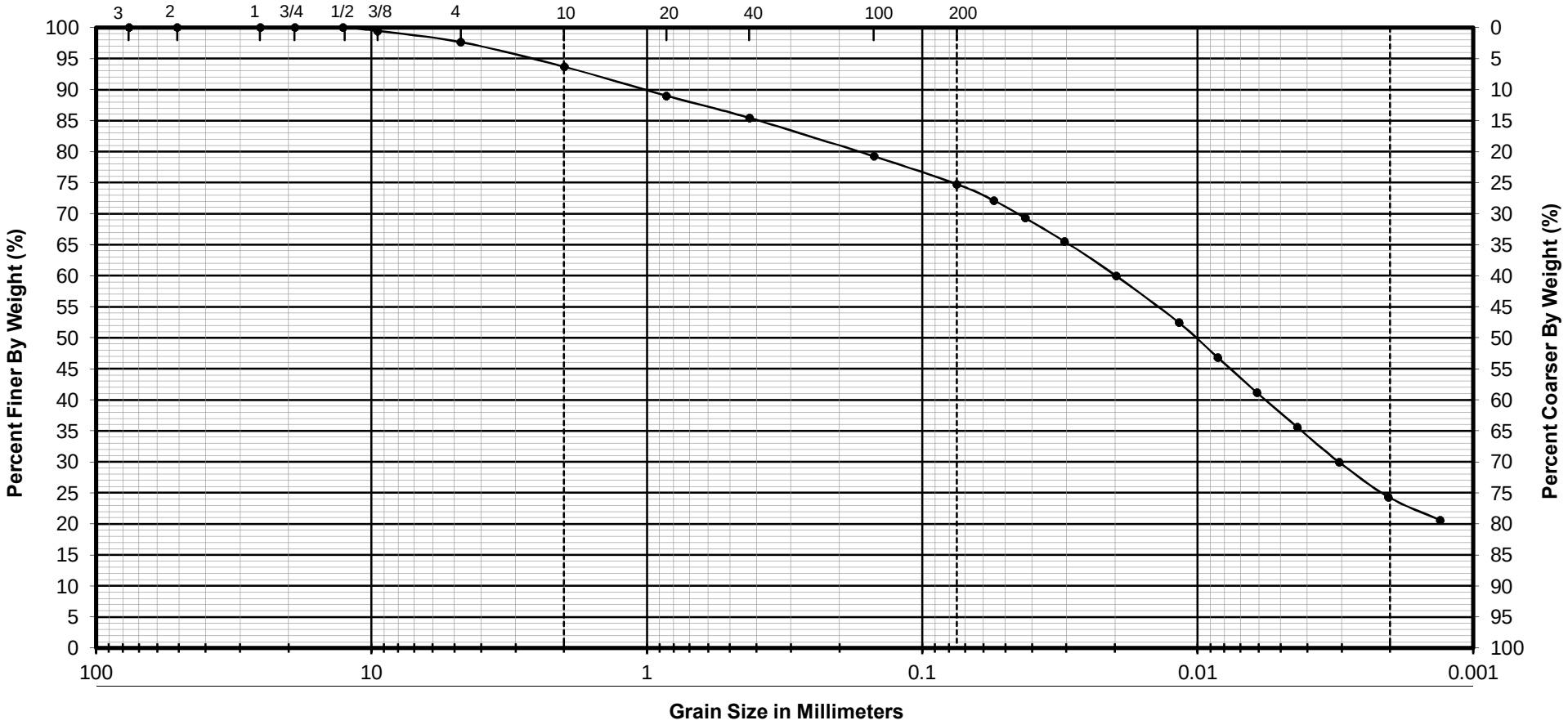
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-6.0' to -16.0')
Light gray & fine grained with horizontal bedding. Weathered with numerous horizontal fractures throughout.

Color pictures of the cores Yes Cores will be stored for examination for -

The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

APPENDIX E

LAB TEST RESULTS



GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	BSB-31	CLASSIFICATION		PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	2			
Depth	1.0'-2.5'	SILTY CLAY LOAM		I-80 Phase II
Liquid Limit	28	A-6		Will County, Illinois
Plastic Limit	16	brown		
Plasticity Index	12	Group Index	7	
Test By	MT	% Gravel	6.3	
Date	11/26/13	% Sand	18.9	
Reviewed By	RR	% Silt	50.4	
Job No	13125	% Clay	24.4	

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UNCONFINED COMPRESSIVE STRENGTH of INTACT ROCK CORE SPECIMENS - ASTM D 7012

Project: I-80 Reconstruction (Near Term Phase 2)
Location: Various
County: Will
IDOT Job No.: D-91-196-09
Sample Type: Drilled Bedrock Core Sample

Date: 11/7/13
Job No.: 13125
Tested By: RWC

Sample No.	Depth (ft)	Length (in)	Diameter (in)	Weight (g)	Load (lbs)	Area (in^2)	Unit Weight ($lbs\ ft^3$)	Compressive Strength (tsf)	(psi)
BSB-25 Run 1	19.4	4.102	2.055	583.0	42920	3.32	163.2	932	12940
BSB-26 Run 1	16.6	4.106	2.050	585.6	52070	3.30	164.5	1136	15776
BSB-27 Run 1	35.0	4.110	2.051	566.3	36990	3.30	158.8	806	11196
BSB-28 Run 1	3.0	4.109	2.048	572.7	63140	3.29	161.1	1380	19167
BSB-29 Run 1	4.7	4.111	2.050	578.7	50880	3.30	162.4	1110	15415
BSB-30 Run 1	5.2	4.093	2.050	584.4	73700	3.30	164.7	1608	22329
BSB-31 Run 1	15.0	4.112	2.061	589.0	39260	3.34	163.5	847	11768
BSB-32 Run 1	11.2	4.103	2.051	576.5	41770	3.30	161.9	910	12643

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Liquid Limit, Plastic Limit, and Plasticity Index of Soils
AASHTO T89/T90

Project Name I-80 Phase II Job No 13125

Location Will County, Illinois Date 11/27/13

SAMPLE NO.	BSB-31						
DEPTH	1.0'-2.5'						
LIQUID LIMIT (LL)	28						
PLASTIC LIMIT (PL)	16						
PLASTICITY INDEX (PI)	12						

Test by MT