STRUCTURE GEOTECHNICAL REPORT

Interstate 80 Bridge over Chicago St. Ramp B, BNSF R.R., UP R.R. and Gardner St.

Section (TBD)

IDOT Job Number D-91-204-19 (PTB 198, Item 003)

Existing SN 099-0060 (EB) & 099-0061 (WB)

Proposed SN 099-0902 (EB) & 099-0903 (WB)

Joliet, Will County, Illinois

Submitted to:

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EXP US Services Inc.
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Chicago, Illinois 60601

Attn: Mr. Thomas Hough, P.E.
EXP

Job No. 13125

Re: Structure Geotechnical Report
Interstate 80 Bridge over BNSF R.R., UP R.R. and Gardner St.
Section (TBD)
Proposed SN 099-0902 (EB) and 099-0903 (WB)
Existing SN 099-0060 (EB) and 099-0061 (WB)
IDOT Job Number: D-91-204-19 (PTB 198, Item 003)
Joliet, Will County, Illinois

Dear Mr. Hough:

The following report presents the geotechnical analysis and recommendations for the replacement and widening of the bridge structures carrying Interstate 80 over the BNSF R.R., UP R.R. and Gardner St. A total of nineteen (19) structural soil borings (BSB-01 thru BSB-16, BSB-01A, BSB-54 and BSB-55) were completed. In addition, two (2) survey borings (BSB-52 through BSB-53) were also completed to supplement the boring information of the geotechnical investigation. 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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exp 11/30/22

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SECTION 01: INTRODUCTION

This report presents the results of the geotechnical investigation for the bridge replacement and widening of the Interstate 80 over the Chicago St. Ramp B, BNSF R.R., UP R.R. and Gardner St. Project, IDOT Job Number: D-91-204-19 (PTB 198, Item 003). The results of the nineteen (19) structure borings (BSB-01 thru BSB-16, BSB-01A, BSB-54 and BSB-55), and two (2) survey borings (BSB-52 and BSB-53) 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 (HBP), and the Illinois Department of Transportation (IDOT). Boring locations were marked in the field by Geo Services, Inc. (GSI) personnel after review of accessibility and utility locations. Estimated ground surface elevations at the as-drilled boring locations 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, retaining walls and general construction considerations for the site.

SECTION 02: PROJECT DESCRIPTION

The existing bridges (SN 099-0060 EB and SN 099-0061 WB) were constructed in 1964 and were repaired in 1990, 1998, 2001, and 2011. The existing dual structures consist of a seven span structure composed of a three-span unit, single span and a three-span unit. The existing bridge structures are composed of reinforced concrete deck, which is carried by W36 rolled steel beams supported by pile bent abutments, and multi-column concrete piers founded on steel piles. The EB bridge measures 483’-5” back to back abutments, and the WB bridge measures 477’-1” back to back abutments. Out to out deck width of the existing bridges is approximately 48’-0” feet and skews of approximately 13° and 9° per the existing drawings.

It is intended to remove and replace the bridge structure. The bridges are proposed to be widened at each side of the median lanes/shoulders to approximately ± 75 feet for the eastbound structure and ± 75 feet for the westbound structure.

The new bridges (SN 099-0902 EB and SN 099-0903 WB) will be 4-span bridge superstructures that have an overall width of approximately 150 feet, out to out with an approximate length of 536 feet, back-to-back abutments. The new bridges are proposed to be supported on semi-integral abutments, and a deep foundation system. In addition, the proposed bridge superstructure will have an MSE retaining wall that sets

parallel to the abutment with dog-ear configuration wingwalls. Per TS&L, the estimated substructure pile cap and foundation footing elevations were provided by EXP. The estimated substructure elevations at the bridge and walls are shown on the following Tables 1 and 2.

Table 1 – Estimated Bridge Substructure Elevations

Substructure	Approximate Station	Estimated Bottom of substructure elevation (feet) [1]
West Abutment	Sta. 710+01	568.9
Pier 1	Sta. 711+21	543.5
Pier 2	Sta. 712+72	539.5
Pier 3	Sta. 714+23	529.1
East Abutment	Sta. 715+35	567.1

Notes: 1. Piles assumed to be embedded 1.0-ft into the pile cap.

Table 2 – Estimated Retaining Wall Elevations

Wall Location	Estimated bottom of footing/leveling pad elevation (feet)
West Abutment (WB & EB)	555.0
East Abutment (WB & EB)	545.0

Based on the foundation loads provided by EXP, the total service loads at the top of foundation are shown on the following Table 3 - Preliminary Factored Loads for the Substructures:

Table 3 – Preliminary Factored Loads for the Bridge Substructures

Location	Total Dead Load (kips)	Total Live Load (kips)	Estimated Total Factored Loads (kips)
West Abutment	1,260	669	1,930
Pier 1	4,339	1,392	5,731
Pier 2	4,568	1,457	6,026
Pier 3	4,168	1,392	5,560
East Abutment	1,260	669	1,930

SECTION 03: SUBSURFACE INVESTIGATION PROCEDURES

The borings were performed during the months of October, 2013, March to May, 2014, June, 2015, and March, 2022 with a truck-mounted drilling rig. Borings were performed at the top of the bridge deck (BSB-01, BSB-01A, BSB-02 thru BSB-04, BSB-15, BSB-16, BSB-54, and BSB-55), below the bridge structure outside Gardner Street, BNSF and UP R.R. (BSB-05 thru BSB-14), and in the median portion of the existing East Abutment (BSB-52 and BSB-53). All of the borings were advanced by means of 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 all of 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 to the regular lab testing program, Organic Content (AASHTO T-194) test was performed on select samples from borings, and unconfined compressive testing was performed on rock cores obtained from the field as 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 taken along the roadway or shoulder areas of Interstate 80 consisted of existing asphalt and concrete pavement over crushed stone base and then stiff to hard clay to clay loam fill materials that extended to elevations ranging from approximately 530 to 577 feet for borings performed at the existing abutments. Below the Interstate 80 Bridge near Gardner Street, BNSF and UP railroads where borings BSB-05 to BSB-14 were drilled, surface conditions varied from concrete pavement, sand, gravel and/or topsoil to underlying crushed stone, sand, cinders and stone fill to an approximate elevation of 525 feet. Beneath the surficial materials, interstratified layers of fill materials including medium dense sand and gravel, medium stiff to stiff clay, and clay loam were encountered to elevations varying from approximately 507 to 512 feet. A 5-foot-thick layer of organic silty loam was noted below the fill at boring BSB-15 beginning at approximate elevation 528 feet. Also, a 3-foot-thick layer of buried topsoil (organic content = 6.7%) was encountered below the fill at boring BSB-53 beginning at approximate elevation 526 feet.

The fill soils had moisture contents within the range of 12% to 23% with an average of 19%. Moisture contents of the cohesive soils are within the range of 26% to 44% with an average of 35%. The granular soils had moisture contents within the range of 6% to 18% with an average of 7%. Buried topsoil had a moisture content of 35%. Organic soil had moisture contents within the range of 31% to 67% with an average of 49%.

Below the native overburden soils, bedrock was encountered at elevations varying from approximately 479 to 518 feet. The rock cores obtained indicated Silurian System, Niagaran Dolomite. A summary of the bedrock information obtained during our exploration is tabulated in Table 4.

Table 4 – Bedrock Information Summary

Boring (Run)	Station	Offset	RQD	Approximate Top of Bedrock Elevation (feet)	Approximate Elevation of Qu Test (feet)	Unconfined Compressive Strength, Q_u (tsf)
BSB-01 (Run 1)	Sta. 711+03	55.2' Left	n/a	n/a	n/a	n/a
BSB-01A (Run 1)	Sta. 710+93	55.2' Left	40.0%	513.1	509.0	950
BSB-01A (Run 2)	Sta. 710+93	55.2' Left	0.0%		n/a	n/a
BSB-01A (Run 3)	Sta. 710+93	55.2' Left	18.0%		488.1	845
BSB-02 (Run 1)	Sta. 710+92	10.6' Right	21.0%	511.4	510.2	439
BSB-03 (Run 1)	Sta. 711+69	23.0' Left	52.0%	505.7	502.6	843
BSB-04 (Run 1)	Sta. 711+50	52.6' Right	45.5%	510.4	509.7	618
BSB-04 (Run 2)	Sta. 711+50	52.6' Right	10.6%		493.7	594
BSB-04 (Run 3)	Sta. 711+50	52.6' Right	14.0%		491.6	382
BSB-05 (Run 1)	Sta. 712+72	65.3' Left	58.0%	512.8	511.8	1,038
BSB-06 (Run 1)	Sta. 712+70	9.2' Right	41.0%	511.0	506.8	938
BSB-07 (Run 1)	Sta. 713+13	11.2' Left	21.0%	513.7	512.9	1,088
BSB-08 (Run 1)	Sta.713+00	67.1' Right	23.0%	514.4	507.6	1,209
BSB-09 (Run 1)	Sta. 713+77	66.2' Left	43.0%	512.2	509.3	280
BSB-10 (Run 1)	Sta. 713+67	7.7' Right	0.0%	514.4	n/a	n/a
BSB-10 (Run 2)	Sta. 713+67	7.7' Right	45.0%		507.4	337
BSB-10 (Run 3)	Sta. 713+67	7.7' Right	0.0%		n/a	n/a
BSB-11 (Run 1)	Sta. 714+35	6.9' Left	33.0%	509.1	508.1	434
BSB-12 (Run 1)	Sta. 714+21	67.5' Right	32.0%	512.4	509.9	561
BSB-13 (Run 1)	Sta. 715+06	67.3' Left	50.0%	509.1	508.0	663
BSB-14 (Run 1)	Sta. 714+93	11.0' Right	39.0%	512.2	503.5	1,452
BSB-15 (Run 1)	Sta. 715+97	23.2' Left	64.0%	512.2	510.2	1,332
BSB-16 (Run 1)	Sta. 715+78	50.7' Right	81.0%	517.8	513.2	876
BSB-054 (Run 1)	Sta. 709+72	60.1' Left	85.0%	510.8	510.2	542
BSB-054 (Run 2)	Sta. 709+72	60.1' Left	35.0%		500.3	482
BSB-055 (Run 1)	Sta. 709+71	62.2' Right	50.0%	509.3	508.0	720
BSB-055 (Run 2)	Sta. 709+71	62.2' Right	12.0%		498.2	571

SECTION 06: WATER TABLE CONDITIONS

Groundwater was encountered before switching to rotary drilling techniques in 7 of the borings at elevations ranging from approximately 561 feet to 572 feet for the abutment borings (BSB-01 and BSB-16), and elevations ranging from approximately 517 feet to 529 feet for the borings drilled below the bridge (BSB-05, BSB-10, BSB-12, BSB-13, and BSB-14). Due to the nature of rotary-wash drilling, it was not possible to obtain accurate water levels after drilling. Perched water levels may occur within granular layers above the 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. In the aforementioned borings which encountered water levels, the water levels can be found on the logs as the “First Encountered” water level as shown in Appendix D. No 24-hr groundwater level was taken as borings were drilled using rotary method introducing water into boreholes.

SECTION 07: ANALYSIS

Mining Activity

According to readily available ISGS sources, there are no documented coal mining operations in the vicinity of 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 (S_1) of 0.040 at a period of 1.0 second and 5% critical dampening. The site also has a Horizontal Response Spectral Acceleration (S_s) of 0.104 at a period of 0.2 seconds and 5% critical dampening. The following table shows recommended seismic design data in accordance with the AASHTO LRFD Bridge Design Specification 2012 (with 2013 Interims).

Table 5 – Seismic Design (Approximately 1000-Year Return Period)

Seismic Performance Zone (SPZ)	1
Design Spectral Acceleration at 1 second (S_{D1})	0.068
Design Spectral Acceleration at 0.2 seconds (S_{Ds})	0.125
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 are not expected to impact the design of the new bridge and wall structures.

Settlement, Bearing Capacity, and Slope Stability

The proposed bridge structure will have an MSE wall structure at the abutments and widening areas at the shoulders and median portions of the bridge. Approximate maximum exposed heights (top of leveling pad to top of approach slab) of 32'-10" at the West Abutment and 35'-9" at the East Abutment have been evaluated for settlement, bearing capacity, and slope stability. The leveling pads for the MSE walls are proposed at elevation 546.5 feet at the West Abutment and 540.4 feet at the East Abutment.

For bearing resistance, widening fill areas with maximum fill heights of 32'-10" feet at the West Abutment and 35'-9" feet at the East Abutment have been analyzed. A resistance factor of 0.65 has been used for the LRFD soil bearing resistance calculations per AASTHO Table 11.5.7-1. The factored bearing resistances of the soils, as shown in the following Table 6, are insufficient to support the high embankment loads at the east abutment due to the low unconfined compressive strengths of the clay to clay loam fills and organic silty loam at the abutment areas. Aggregate Column Ground Improvement (ACGI) at the east abutment will be needed to support the new embankment loads. The width of aggregate column ground improvement zone will be about 25 feet and will span along the length of the east abutment walls until wall height is less than 10 feet. Recommended limits of the ACGI will be about 100 feet offset at left and right from the I-80 centerline.

For estimated settlements, borings BSB-03, which had strata of medium stiff clay loam fill, and BSB-15 which had strata of clay to clay loam fill to organic silty loam were used as "worst-case scenario" for analysis. Settlement at both the East & West Abutments were calculated to be approximately 0.5 inches or less. Consequently, downdrag is expected not to affect the design of the piles at both abutments. See subsection ***Pile Foundation Considerations*** for more discussion.

A slope stability program (STABL v3.0) was utilized to calculate factors of safety (FOS) at the walls using wall heights of 32'-10" feet at the West Abutment and 35'-9" feet at the East Abutment, and a vertical geometry with a slope of 1.5H:1V. At boring BSB-15 location, which has been used as "worst-case scenario" for slope stability analysis, we calculate factor of safety of less than 1.5 for drained conditions. In order to satisfy the Factor of Safety requirement (FOS≥1.5) per IDOT requirements, ground improvements in the area of boring BSB-15 at the East Abutment WB portion of the proposed bridge and walls will be required to increase the FOS. No slope stability issues were identified at the West Abutment.

The following Table 6 shows the summary of the estimated bearing resistances, settlements, and slope stability factor of safety calculated at abutment/footing locations:

Table 6 – Factored Bearing Resistance, Settlement, and Slope Stability Summary for the Retaining Walls

Analyses	West Abutment			East Abutment		
	Estimated Equivalent Uniform Bearing Pressure	Without Ground Improve-ments	With Ground Improve-ment	Estimated Equivalent Uniform Bearing Pressure	Without Ground Improve-ments	With Ground Improve-ments
Factored Bearing Resistance (psf) [1]	8,500	8,700	n/a	9,000	6,100	9,000+
Estimated Settlement (inches)	n/a	<1.0”	n/a	n/a	<0.5”	<0.5”
Slope Stability (FOS)	n/a	1.53 (Undrained) 1.52 (Drained)	n/a	n/a	2.0 (Undrained) 1.37 (Drained)	2.01 (Undrained) 2.01 (Drained)

Note: 1. Factored Bearing Resistance is computed for a resistance factor of 0.65 as required for MSE walls. The factored bearing resistance indicated in the table is prior to remedial treatments. Minimum depth of foundation is approximately 3.5 feet below proposed grade.

To increase bearing resistances and decrease settlement for support of the new embankment fill of the MSE walls at the East Abutment portions of the bridge, ground improvements, such as the use of Aggregate Column Ground Improvements (ACGI) will be needed. Settlement is estimated to be less than 1 inch after ground improvements. By incorporating ground improvements in the slope stability analysis, the FOS was increased to ≥1.5 at the East Abutment.

Other means of remedial treatments such as undercutting/replacement or preloading may be feasible; however, these are not recommended. Undercutting is not recommended due to deep undercutting to about 20 feet below the MSE wall footing foundation, and the need for a temporary earth retention system to construct the ground improvement. Preloading due to the construction of the proposed MSE wall on the early phase of stage construction may be able to reduce the excessive and/or differential settlements at the abutments; however, inadequate bearing at the East Abutment remains an issue, and ground improvements (i.e. aggregate columns) will be necessary to improve bearing capacity and reduce settlement at the East Abutment.

Overturning, Sliding, and Eccentricity

The contractor should provide a design for the MSE wall's internal stability by a qualified and approved vendor. Per AASHTO, the wall block, which extends a distance of 0.7H (H= exposed wall height) from the outside face of the wall, is to be considered a solid reinforced soil mass. The reinforced mass minimum dimensions needed to provide the external stability (based on overturning and sliding analyses) of the proposed MSE wall are satisfied. In addition, the 0.7H width of the reinforced mass is adequate based on the global and external stability analyses for the proposed MSE wall.

Overturning, sliding, and eccentricity have been checked using the reinforced block. At worst-case scenario, the borings BSB-03 at the West Abutment and BSB-15 at the East Abutment were selected for analyses. Maximum wall heights of 32'-10" feet at the West Abutment and 35'-9" feet at the East Abutment were also used in the calculations. The point of pivot was considered at the toe and the adjacent embankment and traffic pressures were applied. Table 7 is a summary of the factors of safety for overturning, sliding, and calculated eccentricities. The computed factors of safety (FS) satisfy the requirements set for overturning and sliding friction.

Table 7 – Factors of Safety for MSE Wall Soil Block Overturning, Sliding and Eccentricity

Location	Factor of Safety for MSE Wall Soil Block Overturning at Toe [1]	Factor of Safety for MSE Wall Soil Block Sliding [2]	Calculated Eccentricity (feet) [3]
West Abutment	3.4	3.6	3.3
East Abutment	3.5	3.6	3.5

Notes: 1. Required FS=2.0
2. Required FS=1.5
3. Eccentricity must be no greater than B/6 (where B is estimated as 0.7H)

SECTION 08: BRIDGE FOUNDATION RECOMMENDATIONS

Foundation Recommendations

Based on the results of the borings, type of structure, and estimated loading, feasible foundations for support include deep foundation systems consisting of driven Metal H-piles at both abutments and at the pier sections of the bridges. Driven Metal H-piles are preferred over drilled shafts due to anticipated shaft drilling difficulties through very

dense granular materials, and the need for extended steel casing due to non-cohesive soils.

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

Pile Recommendations

Based on the results of the borings and proposed foundation loadings, H-piles (driven to refusal) may be used for the support of the proposed substructures. Based on IDOT Pile Calculation spreadsheets for the pier and abutments sections of the bridge, the maximum allowable stress while driving Metal Shell piles occurred at shallow depth (less than about 10 to 12 feet); therefore, Metal Shell piles are not recommended at the bridge substructures.

The selection of pile type should be determined by economic considerations if either pile types are feasible for the design of the bridge. Pile data for the H-piles is included in Appendix E. Pile capacities and lengths were calculated to the piles' Maximum Nominal Required Bearing and Factored Resistance Available, based on a LRFD resistance factor of 0.55. We anticipate hard driving to occur starting at elevation ranges of 523 to 533 feet, and driving shoes are required to penetrate H-piles through the dense sand and gravel, and fractured rock.

For the new driven piles at the abutment and pier areas, it is estimated settlement of ¼ inch or less excluding the elastic shortening of the pile due to loading.

Tables and graphs for estimated pile lengths for various pile sizes and pile capacities at each substructure unit are summarized in the Appendix section of the report.

Pile Foundations Considerations

As per the IDOT Design Guide AGMU Memo 10.2, dated August 2011, the Washington State DOT (WSDOT) formula has replaced the FHWA Gates Formula as the standard method of construction verification. A modified IDOT static method was used to develop the SGR pile design tables. Nominal required bearing was calculated from LRFD skin-friction (with pile type correction factors) and end-bearing calculations. A value of 1.04 is used for Bias Factor Ratio (I_G). A geotechnical resistance factor (Φ_G) of 0.55 was used in calculations for the factored resistance available (FRA). Pile lengths were picked with respect to the loadings and geometry of the proposed structures.

When Steel H-piles are used, the Steel H-piles shall be according to AASHTO M270 Grade 50.

Settlement calculated due to the placement of fill was calculated to be 0.5 inches or less at both abutments. Due to this, downdrag is not expected to affect the design of the piles. Pile capacity tables have been included in Appendix E for both abutments and for all three piers. Installation of corrugated steel pipe sleeves from the bottom of the abutment to the bottom of the leveling pad within the MSE wall mass is recommended prior to constructing the MSE wall and driving piles. The annular space within the pile sleeves will be backfilled with dry, loose sand.

The pile tables, provided in Appendix E, are estimates and test piles should be used for final pile length selections. We recommend that a minimum of one test pile be performed at each substructure unit (especially at the north end of WB West Abutment) due to variability of the top of bedrock elevation (i.e. rock not found in boring B-1, but found nearby in boring B-1A). Variation in pile lengths should be expected. The piles should be driven until satisfactory driving resistance is developed in accordance with an appropriate pile driving formula. The test piles shall be driven to 110 percent of the Nominal Required Bearing indicated in the pile data information. The pile size and capacity selected should be based on economic considerations and the loads imposed on the structures.

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: RETAINING WALL RECOMMENDATIONS

Recommended Wall Types

It is proposed that an MSE type retaining wall be considered for the new fill required at the abutments. The maximum retaining wall height is to be approximately 36 feet. Based on the soil conditions shown on the boring logs, and wall/site geometry, the proposed wall structures are feasible and recommended for use. Other wall systems such as T-type cantilever wall can also be considered for embankment support.

Economic, construction and scheduling factors should be evaluated for the decision of retaining wall design. The following provides a general discussion of soil conditions as they relate to the retaining wall construction.

Shallow Foundation Recommendations

The proposed walls around the bridge abutments are proposed to be an MSE retaining wall system bearing on shallow foundations, which is considered a viable option for design of the retaining wall. Based on our analyses of soil bearing resistance and estimated settlements, aggregate column ground improvements are recommended for support of the retaining walls at the East Abutment. Per our preliminary analysis, we estimate a triangular spacing of 7 feet (center-to-center) and a diameter of 30 inches may be appropriate for the aggregate column ground improvements. The aggregate columns are anticipated to extend to top of bedrock at approximate elevation 513 feet at the East Abutment. In addition, the width of aggregate column ground improvement zone will be about 25 feet and will span along the length of the east abutment walls until wall height is less than 10 feet (about 100 feet offset left and right from the I-80 centerline). If ground improvements are performed, the factored bearing resistances summarized in Table 6 will increase to provide the required bearing capacity needed. As noted at the bottom of each table, it will be important to observe the soils exposed during construction to determine the actual extent of undercutting that will be needed. Also, two (2) survey borings (BSB-52 and BSB-53) were completed to delineate the extent of the soft soils encountered in boring BSB-15 area. The results of the survey borings show that BSB-53 had noted about 3-foot of buried topsoil below the existing fill at approximate elevation 526 feet, which is near the elevation where the organic silt was encountered at boring BSB-15. Overexcavation may not be an economical solution since the soft soils encountered at borings BSB-15 and BSB-53 are about 14 to 20 feet below the MSE wall footing foundation. Consequently, it is recommended that aggregate column ground improvements be used at the MSE walls at the East Abutment.

Soil should be verified in the field at the time of construction by an experienced Geotechnical Engineer or representative. Actual extents of any remedial treatments will be determined at this time. If soils with less than adequate bearing strength are noted at the foundation level during footing construction, the weaker soils encountered at the base of the footings should be undercut to reach suitable bearing soils, and the undercut area filled with lean concrete or an approved compacted structural (granular) fill material. All placement of structural fill for footing support should be in accordance with the IDOT Standard Specifications and the Guide Bridge Special Provisions (GBSP).

Ground improvements, such as aggregate columns will be required to increase bearing resistances and reduce settlement for support of the new embankment fill in the area of the MSE walls at the East Abutment portions of the bridge. At the East Abutment area, bulging of the aggregate column elements in the organic silt layer may be a concern when the ACGI are constructed. In order to prevent the bulging issue of the constructed aggregate columns, we recommend installing either grouted or sleeved type aggregate columns to maintain the integrity of the aggregate column. Without a grouted or a sleeved aggregate column, the aggregate columns could laterally bulge into the high

moisture organic soils and prevent the aggregate column from being properly densified or compacted.

For excavations extending into the higher portions of the embankments and at the piers (if needed), a Temporary Soil Retention System (TSRS), or an option to use a temporary MSE wall, to be designed by the Contractor (or as directed by the Engineer) will likely also be required to support the embankment during excavation and wall construction. The retention system should be designed by an IL-licensed Structural Engineer.

To provide adequate frost protection, we recommend the bottom of the retaining wall be a minimum of 3.5 feet below final grade.

Embankment fill behind the retaining wall should be placed in compliance with Section 205 of the IDOT Standard Specifications for Road and Bridge Construction. Backfill behind the wall should consist of a compacted, free-draining granular material. The retaining wall should be checked and designed by an Illinois Licensed Structural Engineer.

SECTION 10: LATERAL SOIL PARAMETERS

On the following table is a summary of lateral soil parameters to be used for design of the deep foundation system, retaining walls at the abutments, and temporary soil retention system.

Table 8 – Soil Parameters for Lateral Resistance

Material (elevation, feet)	Unit Weight (pcf)	Drained Friction Angle (°)	Undrained Cohesion (psf)	Lateral Modulus of Subgrade Reaction (pci)	Strain
Stiff to Very Stiff Clay to Clay Loam Fill (577 to 530)	125	28	1,800	700	0.007
Organic Silty Loam/Buried Topsoil (528 to 522) [2]	100	20	-	30	0.020
Medium Dense to Dense Loams, Sand & Gravel (530 to 520)	125	32	-	100	-
Dense to Very Dense Loams, Sand, Gravel & Fractured Rock (520 to 509)	132	34	-	250	-

Notes: 1. Values recommended for use in design from L-pile Software Manual.
2. Organic Silty Loam and Buried Topsoil encountered at borings BSB-15 and BSB-53, respectively.

Table 9 – Bedrock Parameters for Lateral Resistance

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

Allowances should be made for any surcharge loads adjacent to the retaining structure. According to the NAVFAC Design Manual 7.02, for a concrete base on natural loams, sands and gravels or approved granular structural fill beneath the proposed gravity wall leveling pad area (or at other applicable areas of the proposed wall), a friction angle of 28 degrees may be used, leading to a coefficient value of 0.53. A value of 0.34 may be used for the coefficient of friction between the concrete base and drained cohesive soils (this assumes a concrete base on the stiff cohesive soils).
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 50 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 walls at the abutments.

SECTION 11: GENERAL CONSTRUCTION CONSIDERATIONS

Traffic will be maintained utilizing staged construction. Since the proposed wall construction is considered a fill situation, the use of IDOT Temporary Sheet Piling (TSP) Design Charts may not be feasible at the proposed abutment areas per IDOT Design Guide 3.13.1. Also, due to high blow count loams, sands, gravels, and stone, and the limitation of the usage of TSP system, the IDOT Temporary Sheet Piling Design Charts may not be feasible at the proposed pier areas. The contractor will likely need to design and install a Temporary Soil Retention System (TSRS) or temporary MSE wall. The soil and bedrock parameters for lateral resistance shown in Tables 8 and 9 (see Section 10) may be used for design of temporary retention system.

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 12: 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

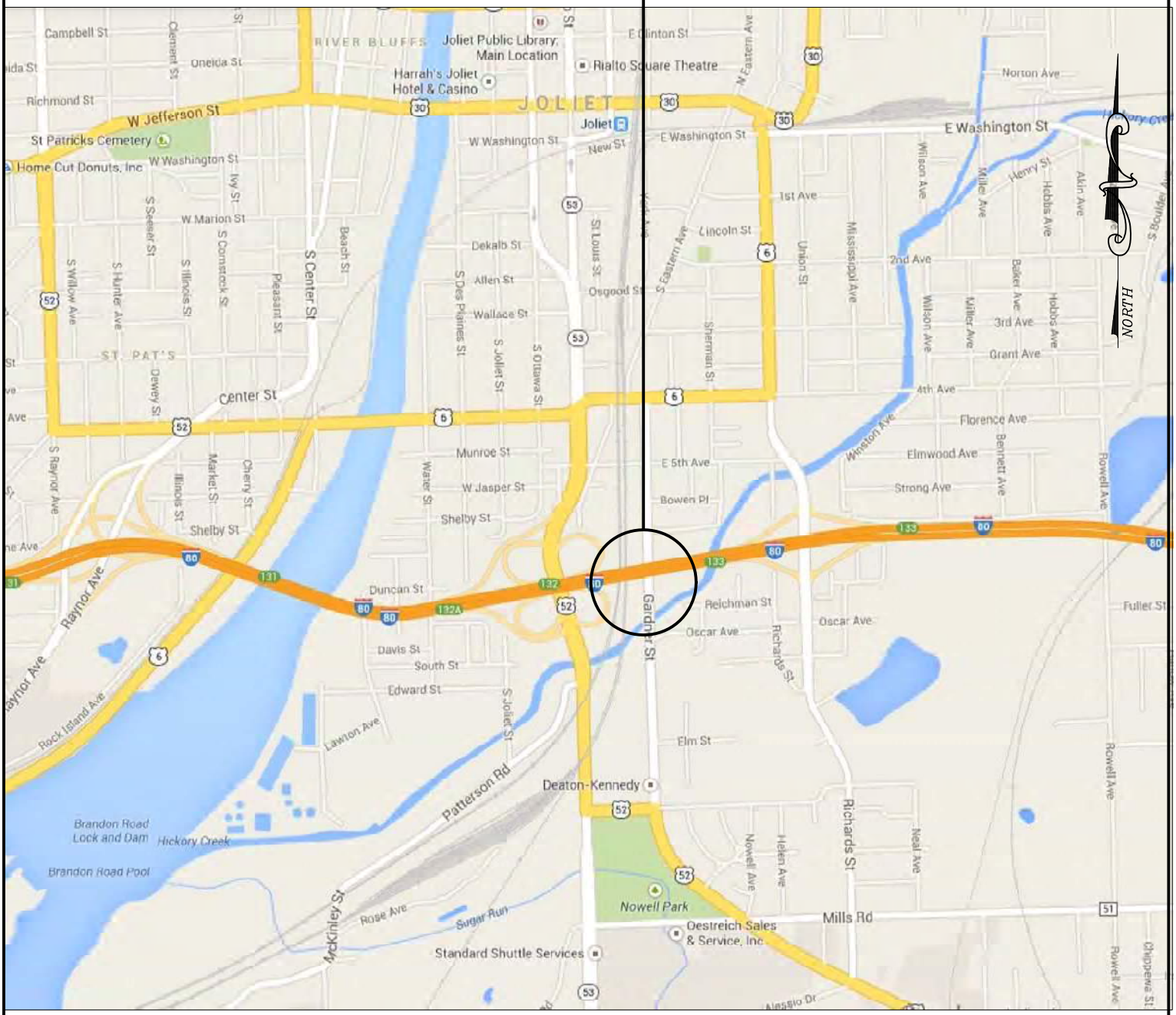
WL:	Water	WD:	While Drilling
WCI:	Wet Cave In	BCR:	Before Casing Removal
DCI:	Dry Cave In	ACR:	After Casing Removal
WS:	While sampling	AB:	After Boring

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

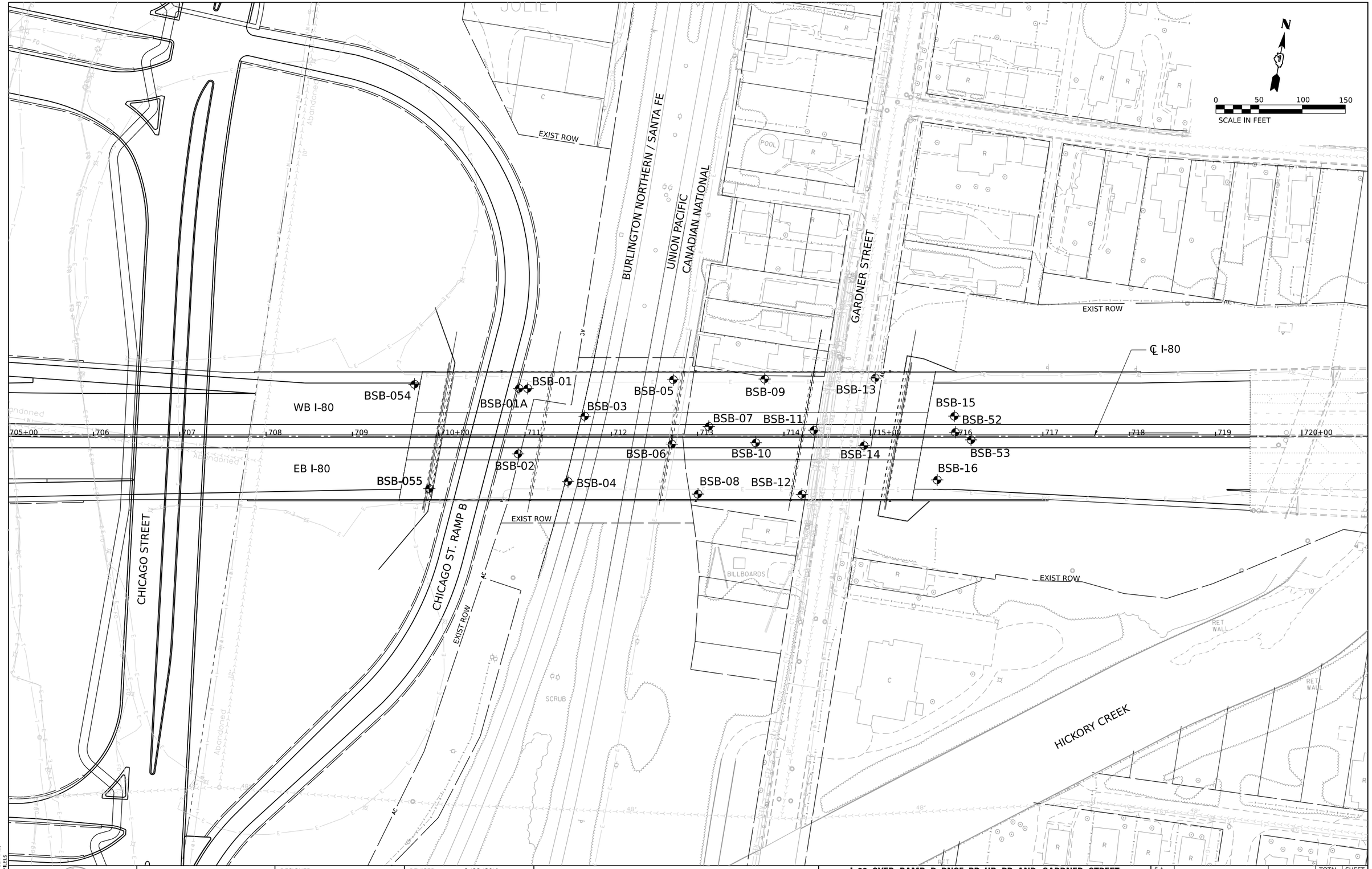
PROJECT SITE LOCATION



SITE LOCATION MAP			
STRUCTURE GEOTECHNICAL REPORT Interstate 80 Bridge over BNSF R.R., UP R.R. and Gardner St. Section 2013-008B & 2013-009B Proposed SN 099-0902 (EB) and 099-0903 (WB) Existing SN 099-0060 (EB) and 099-0061 (WB) Joliet, Will County, Illinois IDOT Job Number: D-91-196-09 (PTB 152, Item 004)	**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	June 13, 2014
		GSI JOB No.	13125
		SCALE	NTS

APPENDIX C

BORING LOCATION PLAN & PROFILE



MODEL: $MODELNAME$
FILE NAME: $FILE$

Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2838

USER NAME	DESIGNED -	REVISED -	6/26/2014
	DRAWN -	REVISED -	6/12/2015
PLOT SCALE	CHECKED -	REVISED -	5/5/2022
PLOT DATE	DATE - 6/11/2014	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

I-80 OVER RAMP B, BNSF RR, UP RR, AND GARDNER STREET
PROPOSED STRUCTURE NO. 099-0902 (EB) AND 099-0903 (WB)
SOIL BORING PLAN

SCALE: | SHEET 1 OF 1 SHEETS | STA. - | TO STA. -

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
80		WILL	3	1
IDOT JOB No. D-91-061-09		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

PLAN
SURVEYED
PLOTTED
DRAWN
CHECKED
R.O.W. CHECKED
B.M. NOTED
CADD FILE NAME
NOTE BOOK
NO.
BY
DATE

PROFILE
SURVEYED
PLOTTED
DRAWN
CHECKED
B.M. NOTED
STRUCTURE NO.
NOTE BOOK
NO.
BY
DATE

B-054
709+72
60.1' Left
574.8

BSB-01
711+03
55.2' Left
577.1

BSB-03
711+86
23.0' Left
577.2

BSB-05
712+72
65.3' Left
544.3

BSB-07
713+13
112' Left
532.7

BSB-09
713+77
66.2' Left
534.7

BSB-11
714+35
6.9' Left
533.1

BSB-13
715+06
67.3' Left
533.6

BSB-15
715+97
23.2' Left
574.7

EX GROUND LINE AT ℄
EX I-80 EB PGL
EX I-80 WB PGL
PR I-80 EB PGL
PAVEMENT
CHICAGO ST
ILL 53
CLAY LOAM (FILL)
VOID
SAND & GRAVEL (FILL)
SAND, GRAVEL & FRACTURED ROCK
SILTY SAND & STONE (FILL)
SANDY CLAY LOAM W/ GRAVEL (FILL)
SANDY TOPSOIL
SAND, GRAVEL & STONE (FILL)
SAND, CINDERS & STONE (FILL)
ORGANIC SILTY LOAM
SILTY LOAM W/ FRACTURED ROCK
COBBLES & BOULDERS
FRACTURED ROCK & GRAVEL
SAND, GRAVEL & FRACTURED ROCK
FRACTURED ROCK
GRAVEL W/ SAND
CLAYEY GRAVEL & FRACTURED ROCK
FRACTURED ROCK & SHALE
CLAY
SILTY CLAY
COBBLES, BOULDERS & FRACTURED ROCK
BEDROCK
EOB
UNION PACIFIC RAILROAD
BNSF RAILWAY
GARDNER ST

VERTICAL SCALE: 1"=5'-0"
HORIZONTAL SCALE: 1"=50'-0"

706+00 707+00 708+00 709+00 710+00 711+00 712+00 713+00 714+00 715+00 716+00 717+00 718+00 719+00 720+00

Geo Services, Inc.
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Naperville, Illinois 60565
(630) 355-2838

USER NAME =	DESIGNED - RWC	REVISED - 4/18/2022	
	DRAWN - RWC	REVISED -	
PLOT SCALE =	CHECKED - AJP	REVISED -	
PLOT DATE =	DATE - 6/11/2014	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

WB I-80 OVER BNSF R.R. AND UP R.R. AND GARDNER STREET
PROPOSED STRUCTURE NO. 099-0903 (WB)
SOIL BORING PROFILE

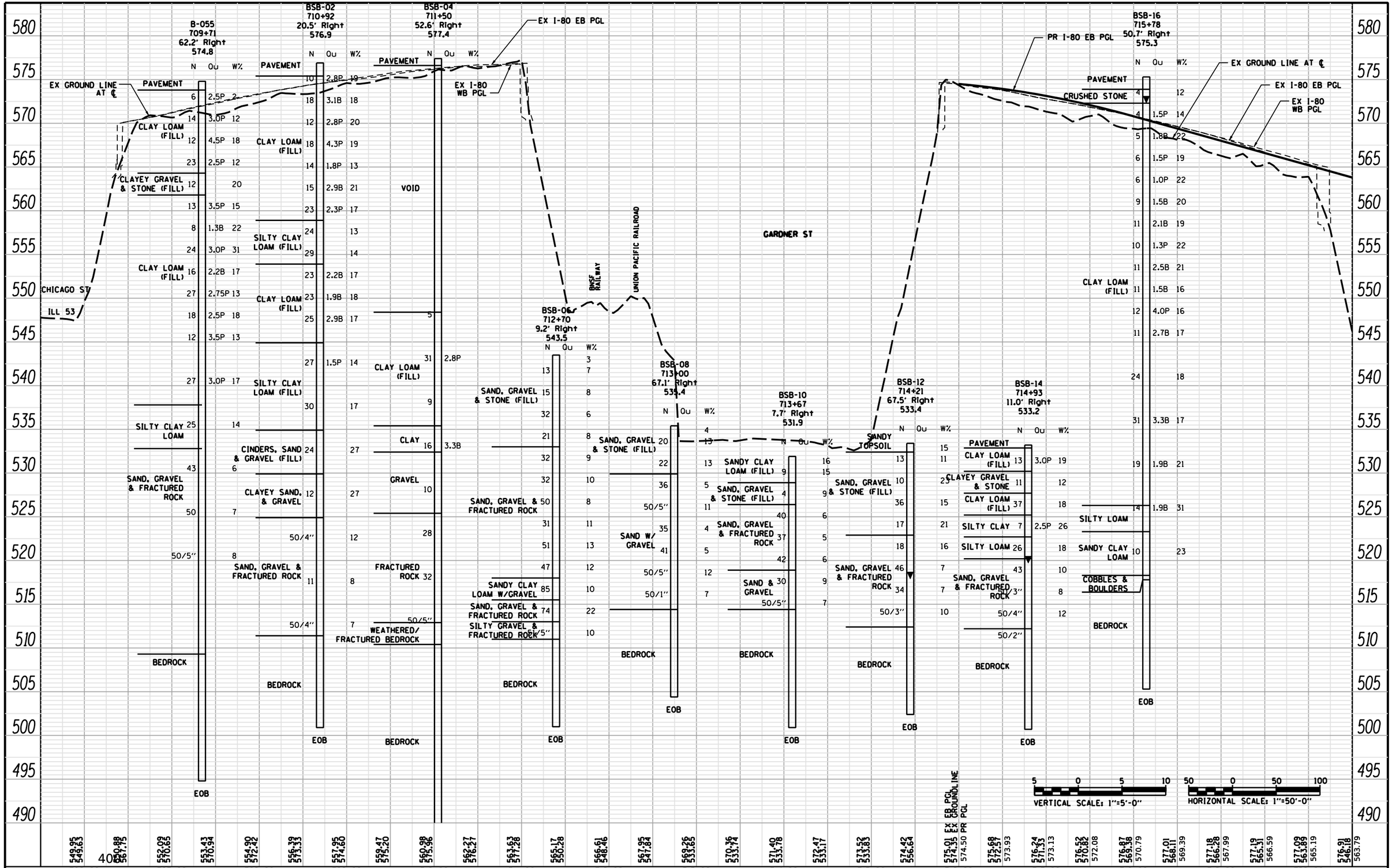
SCALE: 1"=50'H 1"=5'V | SHEET NO. 1 OF 1 SHEETS | STA. - | TO STA. -

F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
80		WILL	3	3
IDOT JOB No. D-91-061-09				
	ILLINOIS FED. AID PROJECT			

...\13125_bnsf rr, up rr & gardner street wb prf-01.dgn 4/18/2022 10:14:50 AM

PLAN: SURVEYED | PLOTTED | DRAWN | CHECKED | R.O.W. CHECKED | CADD FILE NAME | NOTE BOOK | NO. | BY | DATE

PROFILE: SURVEYED | PLOTTED | DRAWN | CHECKED | BM. NOTED | STRUCTURE NO/ATHNS CHKD | NOTE BOOK | NO. | BY | DATE



Geo Services, Inc.	USER NAME =	DESIGNED - RWC	REVISED - 4/18/2022
Geotechnical, Environmental & Civil Engineering		DRAWN - RWC	REVISED -
805 Amherst Court, Suite 204	PLOT SCALE =	CHECKED - AJP	REVISED -
Naperville, Illinois 60565	PLOT DATE =	DATE - 6/11/2014	REVISED -
(630) 355-2958			

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

EB I-80 OVER BNSF R.R. AND UP R.R. AND GARDNER STREET
PROPOSED STRUCTURE NO. 099-0902 (EB)
SOIL BORING PROFILE

SCALE: 1"=50'H 1"=5'V | SHEET NO. 1 OF 1 SHEETS | STA. - | TO STA. -

F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
80		WILL	3	2
IDOT JOB No. D-91-061-09				
ILLINOIS FED. AID PROJECT				

APPENDIX D

BORING & ROCK CORE LOGS

Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2818

GEO Job No. 13125

SOIL BORING LOG

Date 3/11/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** NW

SECTION (TBD) **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.
Station

BORING NO. BSB-01
Station 711+03
Offset 55.20ft Left
Ground Surface Elev. 577.10 ft

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

Groundwater Elev.:
First Encounter 561.1 ft
Upon Completion 574.1 ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
7.5" ASPHALT, 12.0" CONCRETE				
575.48				
CLAY LOAM-brown & gray-stiff to hard (Fill)	1			
	2 2	1.06 B	22	
▽	4			
-5	6 8	2.00 P	15	
	3			
	4 5	4.00 P	17	
	4			
-10	4 5	1.33 B	23	
	5			
	7 8		22	
	2			
-15	2 3		21	
▼	3			
	4 8	1.24 B	18	
	7			
-20	11 13		17	

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
CLAY LOAM-brown & gray-stiff to hard (Fill) *(continued)*				
	9			
	14 14	1.00 P	19	
	8			
-25	6 9	2.39 B	15	
	4			
	5 9	2.50 P	18	
	3			
-30	7 7	2.21 B	20	
545.10				
SAND & GRAVEL-brown-medium dense (Fill)	6			
-35	7 8		15	
540.10				
CLAY LOAM-brown & gray-very stiff (Fill)	8			
-40	11 17	2.00 P	17	

Z:\PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125_LOG.GPJ 5/4/22

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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2818

GEO Job No. 13125

SOIL BORING LOG

Date 3/11/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** NW

SECTION (TBD) **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.
Station

BORING NO. BSB-01
Station 711+03
Offset 55.20ft Left
Ground Surface Elev. 577.10 ft

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

Groundwater Elev.:
First Encounter 561.1 ft ▼
Upon Completion 574.1 ft ▽
After **Hrs.** ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
					CLAY LOAM-brown & gray-very stiff (Fill) *(continued)*
535.10					
					SAND, GRAVEL & FRACTURED ROCK-gray-dense to very dense
	50/4"				
			18		
-45					
	10				
	23		8		
	29				
-50					
	13				
	15		6		
	20				
-55					
	10				
	18		11		
	25				
-60					

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
					SAND, GRAVEL & FRACTURED ROCK-gray-dense to very dense *(continued)*
	46				
	50/3"		8		
-65					
510.10					
					FRACTURED ROCK-gray-medium dense
	4				
	5		24		
	6				
-70					
505.10					
					CLAY-medium stiff
	3				
	2	0.88	44		
	2	B			
-75					
	1				
	2	0.62	38		
	2	B			
-80					

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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Naperville, Illinois 60565
(630) 355-2818

SOIL BORING LOG

GEO Job No. 13125

Date 3/11/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** NW

SECTION (TBD) **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.
Station

BORING NO. BSB-01
Station 711+03
Offset 55.20ft Left
Ground Surface Elev. 577.10 ft

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

Groundwater Elev.:
First Encounter 561.1 ft ▼
Upon Completion 574.1 ft ▽
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	
					CLAY-medium stiff *(continued)*
493.10					End Of Boring @ -84.0'. Boring backfilled with cuttings. See Rock Core log for details.
-85					
-90					
-95					
-100					

Z:\PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125_LOG.GPJ 5/4/22

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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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Naperville, Illinois 60565
(630) 355-2838

ROCK CORE LOG

DATE 3/11/2014

LOGGED BY JK

GSI JOB No. 13125

ROUTE -- DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

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

COUNTY Will CORING METHOD Rotary Wash

STRUCT. NO. -- CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station -- Core Diameter 2.0 in

BORING NO. **BSB-01** Top of Rock Elev. n/a

Station 711+03 Begin Core Elev. n/a

Offset 55.2' Left

Ground Surface Elev. 577.1

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
RUN 1 (-84.0' to -92.0') (-84.0' to -89.3') Cobbles, boulders & fractured rock. (-89.3' to -91.0') Silty Clay with fractured rock. (-91.0' to -92.0') Clayey sand, gravel & fractured rock.	1	95.0	n/a	n/a	n/a
-89					
-92					

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)

Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2818

GEO Job No. 13125

SOIL BORING LOG

Date 4/4/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** NW

SECTION (TBD) **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.
Station

BORING NO. BSB-01A
Station 710+93
Offset 55.20ft Left
Ground Surface Elev. 577.10 ft

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

Groundwater Elev.:
First Encounter n/a ft
Upon Completion n/a ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
4.5" ASPHALT, 15.0" CONCRETE					Blind Drill *(continued)*				
575.48 Blind Drill									
-5					-25				
-10					-30				
-15					-35				
-20					-40				

Z:\PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125_LOG.GPJ 5/4/22

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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

Geo Services, Inc.
Geotechnical, Environmental & Civil Engineering
805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2818

SOIL BORING LOG

GEO Job No. 13125

Date 4/4/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** NW

SECTION (TBD) **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. _____
Station _____

BORING NO. BSB-01A
Station 710+93
Offset 55.20ft Left
Ground Surface Elev. 577.10 ft

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

Groundwater Elev.:
First Encounter n/a ft
Upon Completion n/a ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
					Blind Drill *(continued)*
					Drillers Note: Rough drilling from -41.0' to -64.0'
-45					
-50					
-55					
-60					
-65					Drillers Observation: Apparent bedrock
					509.10
					Borehole continued with rock coring.
-70					
-75					
-80					

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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ROCK CORE LOG

GEO Job No. 13125

Date 4/4/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** NW

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. _____ **CORING BARREL TYPE & SIZE** NX Double Swivel-10 ft
Station _____

Core Diameter 2 **in**
Top of Rock Elev. 513.10 **ft**
Begin Core Elev. 510.40 **ft**

BORING NO. BSB-01A
Station 710+93
Offset 55.20ft Left
Ground Surface Elev. 577.10 **ft**

		DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE - Run 1 Light gray & porous with horizontal bedding. Highly fractured & weathered from -71.2' to -78.0' with numerous intersecting horizontal & vertical fractures.	509.10		1	100	40		950.00
		-70					
		-75					
	499.10						
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE - Run 2 Light gray & porous with horizontal bedding. Highly fractured & weathered throughout with numerous intersecting horizontal & vertical fractures. Numerous clay seams throughout.			2	22	0		
		-80					
		-85					
	490.10						
			3	97	18		

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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ROCK CORE LOG

GEO Job No. 13125

Date 4/4/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** NW

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. _____ **CORING BARREL TYPE & SIZE** NX Double Swivel-10 ft
Station _____

Core Diameter 2 **in**
Top of Rock Elev. 513.10 **ft**
Begin Core Elev. 510.40 **ft**

BORING NO. BSB-01A
Station 710+93
Offset 55.20ft Left
Ground Surface Elev. 577.10 **ft**

	DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE - Run 3 Light gray & porous with horizontal bedding. Weathered & fractured throughout becoming highly weathered & fractured with clay seams from -93.5' to -95.0'. *(continued)*	-90					845.00
	482.10 -95					
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE - Run 4 Light gray & porous. Highly weathered & fractured throughout with some thin clay partings & chert nodules.		4	100	0		
	479.10					
End Of Boring @ -98.0'. Boring backfilled with cuttings.	-100					
	-105					

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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ROCK CORE LOG

DATE 4/5/2014

LOGGED BY JK

GSI JOB No. 13125

ROUTE -- DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

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

COUNTY Will CORING METHOD Rotary Wash

STRUCT. NO. -- CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station -- Core Diameter 2.0 in

BORING NO. **BSB-01A** Top of Rock Elev. 513.1

Station 710+93 Begin Core Elev. 509.1

Offset 55.2' Left

Ground Surface Elev. 577.1

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	40.0	n/a	950 @ -68.1'

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-68.0' to -78.0')
Light gray & porous with horizontal bedding. Highly fractured & weathered from -71.2' to -78.0' with numerous intersecting horizontal & vertical fractures.

-73

-78

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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DATE 4/5/2014

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GSI JOB No. 13125

ROUTE -- DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

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

COUNTY Will CORING METHOD Rotary Wash

STRUCT. NO. -- CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station -- Core Diameter 2.0 in

BORING NO. **BSB-01A** Top of Rock Elev. 513.1

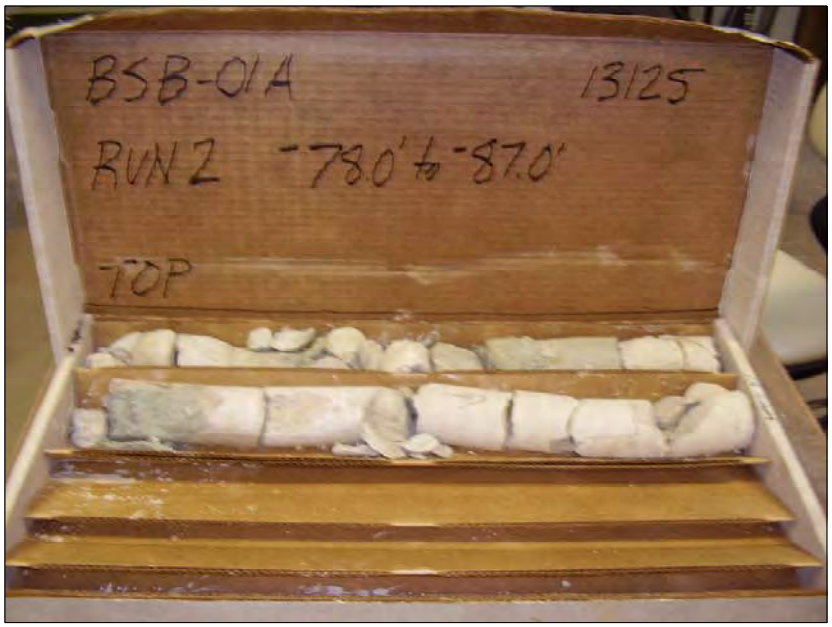
Station 710+93 Begin Core Elev. 509.1

Offset 55.2' Left

Ground Surface Elev. 577.1

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	2	44.0	0.0	n/a	n/a
-83					
-87					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 2 (-78.0' to -87.0')
Light gray & porous with horizontal bedding. Highly fractured & weathered throughout with numerous intersecting horizontal & vertical fractures. Numerous clay seams throughout.
Poor core recovery due to loss of drilling fluid.



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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ROCK CORE LOG

DATE 4/5/2014

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GSI JOB No. 13125

ROUTE --

DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

SECTION --

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

COUNTY Will

CORING METHOD Rotary Wash

STRUCT. NO. --

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station --

Core Diameter 2.0 in

BORING NO. **BSB-01A**

Top of Rock Elev. 513.1

Station 710+93

Begin Core Elev. 509.1

Offset 55.2' Left

Ground Surface Elev. 577.1

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	3	97.0	18.0	n/a	845 @ -89.0'
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE RUN 3 (-87.0' to -95.0') Light gray & porous with horizontal bedding. Weathered & fractured throughout becoming highly weathered & fractured with clay seams from -93.5' to -95.0'.					
-92					
-95					
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE RUN 4 (-95.0' to -98.0') Light gray & porous. Highly weathered & fractured throughout with some thin clay partings & chert nodules.	4	100.0	0.0	n/a	n/a

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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GEO Job No. 13125

SOIL BORING LOG

Date 3/26/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** NW

SECTION (TBD) **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.
Station

BORING NO. BSB-02
Station 710+92
Offset 20.50ft Right
Ground Surface Elev. 576.90 ft

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

Groundwater Elev.:
First Encounter Dry to 10.0' ft
Upon Completion n/a ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
6.0" ASPHALT, 12.0" CONCRETE				
575.40				
CLAY LOAM-brown & gray-stiff to hard (Fill)	5 5	2.75 P	19	
	5			
	7 11	3.10 B	18	
-5				
	4			
	5 7	2.75 P	20	
	7			
	7 11	4.25 P	19	
-10				
	5			
	6 8	1.75 P	13	
	3			
	6 9	2.90 B	21	
-15				
	7			
	9 14	2.25 P	17	
558.90				
SILTY CLAY LOAM-brown & gray-medium dense (Fill)	7			
	10 14		13	
-20				
SILTY CLAY LOAM-brown & gray-medium dense (Fill) *(continued)*	11			
	16 13		14	
553.90				
CLAY LOAM-brown & gray-stiff to very stiff (Fill)	8			
	10 13	2.20 B	17	
-25				
	6			
	9 14	1.90 B	18	
	8			
	11 14	2.90 B	17	
-30				
544.90				
SILTY CLAY LOAM-brown & gray-medium dense (Fill)	9			
	13 14	1.50 P	14	
-35				
	10			
	13 17		17	
-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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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GEO Job No. 13125

SOIL BORING LOG

Date 3/26/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** NW

SECTION (TBD) **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.
Station

BORING NO. BSB-02
Station 710+92
Offset 20.50ft Right
Ground Surface Elev. 576.90 ft

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

Groundwater Elev.:
First Encounter Dry to 10.0' ft
Upon Completion n/a ft
After **Hrs.** ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
					SILTY CLAY LOAM-brown & gray-medium dense (Fill) *(continued)*
534.90					
					CINDERS, SAND & GRAVEL-brown & black-medium dense (Fill)
	6				
	9		27		
-45	15				
529.90					
					CLAYEY SAND & GRAVEL-brown-medium dense (Apparent Fill)
	5				
	5		27		
-50	7				
524.90					
					SAND, GRAVEL & FRACTURED ROCK-brown & gray-medium dense to very dense
	26				
	50/4"		12		
-55					
	11				
	5		8		
-60	6				
					SAND, GRAVEL & FRACTURED ROCK-brown & gray-medium dense to very dense *(continued)*
	27				
	50/4"		7		
-65					
511.40					
510.90					Drillers Observation: Apparent bedrock
					Borehole continued with rock coring.
-70					
-75					
-80					

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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), GP-Geoprobe Hand Auger
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ROCK CORE LOG

GEO Job No. 13125

Page 1 **of** 1

Date 3/26/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** NW

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. _____
Station _____

BORING NO. BSB-02
Station 710+92
Offset 20.50ft Right
Ground Surface Elev. 576.90 **ft**

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft
Core Diameter 2 **in**
Top of Rock Elev. 511.40 **ft**
Begin Core Elev. 510.90 **ft**

		DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray to gray with horizontal bedding. Porous & weathered rust staining throughout. Highly fractured throughout with numerous intersecting horizontal & vertical fractures.	510.90		1	100	21		439.00
		-70					
		-75					
	500.90						
End Of Boring @ -76.0'. Boring backfilled with cuttings.		-80					
		-85					

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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ROCK CORE LOG

DATE 3/26/2014

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GSI JOB No. 13125

ROUTE -- DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

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

COUNTY Will CORING METHOD Rotary Wash

STRUCT. NO. -- CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station -- Core Diameter 2.0 in

BORING NO. **BSB-02** Top of Rock Elev. 511.4

Station 710+92 Begin Core Elev. 510.9

Offset 10.6' Right

Ground Surface Elev. 576.9

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	21.0	n/a	439 @ -66.7'
-71					
-76					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-66.0' to -76.0')
Light gray to gray with horizontal bedding. Porous & weathered rust staining throughout.
Highly fractured throughout 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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GEO Job No. 13125

SOIL BORING LOG

Date 5/15/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** MD

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **DRILLING METHOD** Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-03
Station 711+86
Offset 23.00ft Left
Ground Surface Elev. 577.20 ft

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

Groundwater Elev.:
First Encounter n/a ft
Upon Completion n/a ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
					3.25" ASPHALT, 7.0" CONCRETE BRIDGE DECK 576.35					
					VOID					
-5						-25				
					548.20					
-10					CLAY LOAM-brown & gray-medium stiff to stiff (Fill)	-30	2 7 2			
							3			
-15						-35	6 12	1.11 B	20	
							2			
-20						-40	3 4	0.75 B	24	

VOID *(continued)*

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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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GEO Job No. 13125

SOIL BORING LOG

Date 5/15/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** MD

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **DRILLING METHOD** Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-03
Station 711+86
Offset 23.00ft Left
Ground Surface Elev. 577.20 ft

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

Groundwater Elev.:
First Encounter n/a ft
Upon Completion n/a ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
CLAY LOAM-brown & gray-medium stiff to stiff (Fill) *(continued)*				
535.20				
FRACTURED ROCK-brown-dense to very dense				
	15			
	16		9	
-45	18			
	19			
	23		9	
-50	51			
	19			
	35		9	
-55	37			
	26			
	20		11	
-60	20			
FRACTURED ROCK-brown-dense to very dense *(continued)*				
	22			
	36		8	
-65	35			
508.70				
SILTY CLAY-gray-very dense	16			
	25		26	
-70	37			
505.70				
Drillers Observation: Apparent bedrock 505.20				
Borehole continued with rock coring.				
-75				
-80				

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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ROCK CORE LOG

GEO Job No. 13125

Page 1 **of** 1

Date 5/15/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** MD

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. _____ **CORING BARREL TYPE & SIZE** NX Double Swivel-10 ft
Station _____

Core Diameter 2 **in**
Top of Rock Elev. 505.70 **ft**
Begin Core Elev. 505.20 **ft**

BORING NO. BSB-03
Station 711+86
Offset 23.00ft Left
Ground Surface Elev. 577.20 **ft**

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray & porous with rust staining. Weathered with horizontal bedding. Vertical fractures from -72.0' to -73.9', -75.2' to -75.5' & from -76.6' to -77.5'. Some horizontal fractures throughout. 505.20	1	100	52		
-75					839.00
-80					
495.20					
End Of Boring @ -82.0'. Boring backfilled with cuttings.					
-85					
-90					

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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ROCK CORE LOG

DATE 5/15/2014

LOGGED BY JK

GSI JOB No. 13125

ROUTE -- DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

SECTION -- LOCATION --

COUNTY Will CORING METHOD Rotary Wash

STRUCT. NO. -- CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station -- Core Diameter 2.0 in

BORING NO. **BSB-03** Top of Rock Elev. 505.7

Station 711+69 Begin Core Elev. 505.2

Offset 23.0' Left

Ground Surface Elev. 577.2

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	52.0	n/a	839 @ -74.6'
-77					
-82					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-72.0' to -82.0')
Light gray & porous with rust staining. Weathered with horizontal bedding. Vertical fractures from -72.0' to -73.9', -75.2' to -75.5' & from -76.6' to -77.5'. Some 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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GEO Job No. 13125

SOIL BORING LOG

Date 5/21/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** MD

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **DRILLING METHOD** Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-04
Station 711+50
Offset 52.60ft Right
Ground Surface Elev. 577.40 ft

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

Groundwater Elev.:
First Encounter n/a ft
Upon Completion n/a ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
2.25" ASPHALT, 7.25" CONCRETE BRIDGE DECK 576.61				
VOID				
-5				
-10				
-15				
-20				
VOID *(continued)*				
-25				
548.40				
CLAY LOAM-brown & gray spotted black-loose to dense (Fill)	1			
-30	2 3	2.75 P	17	
	2			
-35	10 21		17	
	4			
-40	4 5		25	

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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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SOIL BORING LOG

GEO Job No. 13125

Date 5/21/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** MD

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **DRILLING METHOD** Mud Rotary **HAMMER TYPE** CME Automatic

STRUCT. NO.
Station

BORING NO. BSB-04
Station 711+50
Offset 52.60ft Right
Ground Surface Elev. 577.40 ft

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

Groundwater Elev.:
First Encounter n/a ft
Upon Completion n/a ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
					CLAY LOAM-brown & gray spotted black-loose to dense (Fill) *(continued)*
535.40					
					CLAY-gray-very stiff
	4				
	6 10	3.30 B	22		
532.40 -45					
					GRAVEL-gray-medium dense
	2				
	7 3		1		
-50					
525.40					
					FRACTURED ROCK-brown-medium dense to dense
	14				
	10 18		6		
-55					
	24				
	17 15		14		
-60					
					FRACTURED ROCK-brown-medium dense to dense *(continued)*
	45				
512.90	50/5"		9		
-65					Drillers Observation: Fractured/weathered rock
510.40					
509.90					Drillers Observation: Apparent Bedrock
					Borehole continued with rock coring.
-70					
-75					
-80					

Z:\PROJECTS\2013\13125 HNTB, I-80 PHASE II (NEAR TERM)\13125 BORING LOGS\13125_LOG.GPJ 5/4/22

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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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ROCK CORE LOG

GEO Job No. 13125

Date 5/21/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** MD

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. _____ **CORING BARREL TYPE & SIZE** NX Double Swivel-10 ft
Station _____

Core Diameter 2 in
Top of Rock Elev. 510.40 ft
Begin Core Elev. 509.90 ft

BORING NO. BSB-04
Station 711+50
Offset 52.60ft Right
Ground Surface Elev. 577.40 ft

	DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray with horizontal to wavy bedding. Highly fractured & weathered with clay seams throughout.	509.90	1	100	28		618.00
	-70					
	-75					
	501.90					
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray & porous with horizontal to wavy bedding. Highly fractured & weathered with clay seams throughout.		2	100	11		
	-80					
	493.40					594.00
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray & porous with horizontal to wavy bedding. Highly fractured & weathered with clay seams throughout.		3	100	14		
	-85					
						382.00

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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ROCK CORE LOG

GEO Job No. 13125

Date 5/21/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** MD

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. _____
Station _____

BORING NO. BSB-04
Station 711+50
Offset 52.60ft Right
Ground Surface Elev. 577.40 **ft**

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft
Core Diameter 2 **in**
Top of Rock Elev. 510.40 **ft**
Begin Core Elev. 509.90 **ft**

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray & porous with horizontal to wavy bedding. Highly fractured & weathered with clay seams throughout. *(continued)*					
488.40					
End Of Boring @ -89.0'. Boring backfilled with cuttings.					
-90					
-95					
-100					
-105					

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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ROCK CORE LOG

DATE 5/21/2014

LOGGED BY JK

GSI JOB No. 13125

ROUTE -- DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

SECTION -- LOCATION --

COUNTY Will CORING METHOD Rotary Wash

STRUCT. NO. -- CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station -- Core Diameter 2.0 in

BORING NO. **BSB-04** Top of Rock Elev. 510.4

Station 711+50 Begin Core Elev. 509.9

Offset 52.6' Right

Ground Surface Elev. 577.4

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE RUN 1 (-67.5' to -75.5') Light gray with horizontal to wavy bedding. Highly fractured & weathered with clay seams throughout.	1	100.0	45.5	n/a	618 @ -67.7'
-72.5					
-75.5					

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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ROCK CORE LOG

DATE 5/21/2014

LOGGED BY JK

GSI JOB No. 13125

ROUTE -- DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

SECTION -- LOCATION --

COUNTY Will CORING METHOD Rotary Wash

STRUCT. NO. -- CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station -- Core Diameter 2.0 in

BORING NO. **BSB-04** Top of Rock Elev. 510.4

Station 711+50 Begin Core Elev. 509.9

Offset 52.6' Right

Ground Surface Elev. 577.4

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	2	100.0	10.6	n/a	594 @ -83.7'

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 2 (-75.5' to -84.0')
Light gray & porous with horizontal to wavy bedding. Highly fractured & weathered with clay seams throughout.

-80.5

-84.0

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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ROCK CORE LOG

DATE 5/21/2014

LOGGED BY JK

GSI JOB No. 13125

ROUTE -- DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

SECTION -- LOCATION --

COUNTY Will CORING METHOD Rotary Wash

STRUCT. NO. -- CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station -- Core Diameter 2.0 in

BORING NO. **BSB-04** Top of Rock Elev. 510.4

Station 711+50 Begin Core Elev. 509.9

Offset 52.6' Right

Ground Surface Elev. 577.4

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE RUN 3 (-84.0' to -89.0') Light gray & porous with horizontal to wavy bedding. Highly fractured & weathered with clay seams throughout.	3	100.0	14.0	n/a	382 @ -85.8'
-89					

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

GEO Job No. 13125

Page 1 **of** 1

Date 10/24/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **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. _____
Station _____

BORING NO. BSB-05
Station 712+72
Offset 65.30ft Left
Ground Surface Elev. 544.30 ft

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

Groundwater Elev.:
First Encounter 525.8 ft ▼
Upon Completion Dry ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
SAND & GRAVEL-dark dray (Fill)				
543.30				
SAND, GRAVEL & FRACTURED ROCK-brown & gray-medium dense to very dense	9			
	9 10		10	
	5			
-5	7 8		4	
	7			
	9 11		7	
	6			
-10	17 12		6	
	15			
	17 11		2	
	11			
-15	14 15		2	
	7			
	8 12		8	
▼	13			
-20	15 24		5	
SAND, GRAVEL & FRACTURED ROCK-brown & gray-medium dense to very dense *(continued)*	11			
	16 19		21	
	15			
-25	43 21		5	
	25			
	27 31		10	
	50/3"			
-30			5	
512.80				
Borehole continued with rock coring.				
-35				
-40				

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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ROCK CORE LOG

GEO Job No. 13125

Page 1 **of** 1

Date 10/24/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. _____ **CORING BARREL TYPE & SIZE** NX Double Swivel-10 ft
Station _____

Core Diameter 2 **in**
Top of Rock Elev. 512.80 **ft**
Begin Core Elev. 512.80 **ft**

BORING NO. BSB-05
Station 712+72
Offset 65.30ft Left
Ground Surface Elev. 544.30 **ft**

	DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray & fine grained with horizontal bedding. Numerous horizontal fractures to -39.5'. Vertical fractures with intersecting horizontal fractures from -34.9' to -36.1' & from -38.7' to -39.5'.	512.80	1	100	58		1038.00
	-35					
	-40					
End Of Boring @ -41.5'. Boring backfilled with cuttings.	502.80					
	-45					
	-50					

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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ROCK CORE LOG

DATE 10/24/2013

LOGGED BY JK

GSI JOB No. 13125

ROUTE -- DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

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

COUNTY Will CORING METHOD Rotary Wash

STRUCT. NO. -- CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station -- Core Diameter 2.0 in

BORING NO. **BSB-05** Top of Rock Elev. *512.8*

Station 712+72 Begin Core Elev. *512.8*

Offset 65.3' Left

Ground Surface Elev. *544.3*

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	58.0	n/a	1038 @ -32.5'
-36.5					
-41.5					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-31.5' to -41.5')
Light gray & fine grained with horizontal bedding. Numerous horizontal fractures to -39.5'. Vertical fractures with intersecting horizontal fractures from -34.9' to -36.1' & from -38.7' to -39.5'.

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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GEO Job No. 13125

SOIL BORING LOG

Page 1 **of** 1

Date 10/25/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **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.
Station

BORING NO. BSB-06
Station 712+70
Offset 9.20ft Right
Ground Surface Elev. 543.50 ft

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

Groundwater Elev.:
First Encounter Dry to 10.0' ft
Upon Completion n/a ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
					SAND, GRAVEL, ASPHALT & STONE-medium dense (Fill)
	5				
	6		7		
	7				
540.50					
					SAND, GRAVEL & STONE-brown-medium dense to dense (Fill)
	5				
	7		8		
-5	8				
	14				
	15		6		
	17				
	9				
	10		8		
-10	11				
533.00					
					SAND, GRAVEL & FRACTURED ROCK-brown-dense
	36				
	15		9		
	17				
	9				
	14		10		
-15	18				
	17				
	21		8		
	29				
	27				
	20		11		
-20	11				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
					SAND, GRAVEL & FRACTURED ROCK-brown-dense *(continued)*
	16				
	19		13		
	32				
	15				
	17		12		
-25	30				
518.00					
					SANDY CLAY LOAM with GRAVEL-gray-very dense
	37				
	39		10		
	46				
515.50					
					SAND, GRAVEL & FRACTURED ROCK-brown-very dense
	16				
	29		22		
-30	45				
513.00					
					SILTY GRAVEL & FRACTURED ROCK-gray-very dense
	51/5"				
			10		
511.00					
					Borehole continued with rock coring.
-35					
-40					

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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), GP-Geoprobe Hand Auger
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ROCK CORE LOG

GEO Job No. 13125

Page 1 **of** 1

Date 10/25/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. _____ **CORING BARREL TYPE & SIZE** NX Double Swivel-10 ft
Station _____

Core Diameter 2 **in**
Top of Rock Elev. 511.00 **ft**
Begin Core Elev. 511.00 **ft**

BORING NO. BSB-06
Station 712+70
Offset 9.20ft Right
Ground Surface Elev. 543.50 **ft**

		DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray with horizontal bedding. Highly fractured & weathered with clay seams from -32.5' to -36.5' & from -41.4' to -42.5'.	511.00		1	86	71		938.00
		-35					
		-40					
	501.00						
End Of Boring @ -42.5'. Boring backfilled with cuttings.		-45					
		-50					

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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ROCK CORE LOG

DATE 10/25/2013

LOGGED BY JK

GSI JOB No. 13125

ROUTE --

DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

SECTION --

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

COUNTY Will

CORING METHOD Rotary Wash

STRUCT. NO. --

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station --

Core Diameter 2.0 in

BORING NO. **BSB-06**

Top of Rock Elev. 511.0

Station 712+70

Begin Core Elev. 511.0

Offset 9.2' Right

Ground Surface Elev. 543.5

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	86.0	41.0	n/a	938 @ -36.7'
-37.5					
-42.5					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-32.5' to -42.5')
Light gray with horizontal bedding. Highly fractured & weathered with clay seams from -32.5' to -36.5' & from -41.4' to -42.5'.

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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GEO Job No. 13125

SOIL BORING LOG

Date 10/22/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **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.
Station

BORING NO. BSB-07
Station 713+13
Offset 11.20ft Left
Ground Surface Elev. 532.70 ft

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

Groundwater Elev.:
First Encounter Dry to 10.0' ft
Upon Completion n/a ft
After Hrs. ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
SILTY SAND & STONE-black (FILL) 531.70					
SAND, GRAVEL & FRACTURE ROCK-brown & gray-medium dense to very dense		12			
		16 6		8	
		11			
	-5	11 16		9	
		13			
		11 12		9	
		12			
	-10	9 9		7	
		20			
		50/2"		10	
		23			
	-15	11 12		8	
		23			
		30 26		9	
513.70		50/2"		7	
Borehole continued with rock coring.	-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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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ROCK CORE LOG

GEO Job No. 13125

Page 1 **of** 1

Date 10/22/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. _____ **CORING BARREL TYPE & SIZE** NX Double Swivel-10 ft
Station _____

Core Diameter 2 in
Top of Rock Elev. 513.70 ft
Begin Core Elev. 513.70 ft

BORING NO. BSB-07
Station 713+13
Offset 11.20ft Left
Ground Surface Elev. 532.70 ft

		DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray to gray & cherty with horizontal bedding. Highly fractured & weathered throughout with clay seams from -23.5' to -23.8' & from -24.8' to -26.5'.	513.70	-20	1	100	21		1088.00
	503.70	-25					
End Of Boring @ -29.0'. Boring backfilled with cuttings.		-30					
		-35					

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

BBS, form 138 (Rev. 8-99)

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ROCK CORE LOG

DATE 10/22/2013

LOGGED BY JK

GSI JOB No. 13125

ROUTE -- DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

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

COUNTY Will CORING METHOD Rotary Wash

STRUCT. NO. -- CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station -- Core Diameter 2.0 in

BORING NO. **BSB-07** Top of Rock Elev. 513.7

Station 713+13 Begin Core Elev. 513.7

Offset 11.2' Left

Ground Surface Elev. 532.7

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	21.0	n/a	1088 @ -19.8'
-24					
-29					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-19.0' to -29.0')
Light gray to gray & cherty with horizontal bedding. Highly fractured & weathered throughout with clay seams from -23.5' to -23.8' & from -24.8' to -26.5'.

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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SOIL BORING LOG

GEO Job No. 13125

Page 1 **of** 1

Date 10/28/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **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. _____
Station _____

BORING NO. BSB-08
Station 713+00
Offset 67.10ft Right
Ground Surface Elev. 535.40 ft

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

Groundwater Elev.:
First Encounter Dry to 20.0' ft
Upon Completion n/a ft
After **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
SAND, GRAVEL, ASPHALT & STONE-medium dense (Fill)				
	5			
	6 14		13	
	9			
	10 12		13	
-5				
529.90				
GRAVEL with SAND-brown-dense to very stiff	13			
	15 21		5	
	50/5"			
			11	
-10				
	15			
	16 19		4	
	9			
	14 27		5	
-15				
	30			
	36 50/5"		12	
	50/1"			
			7	
-20				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
GRAVEL with SAND-brown-dense to very stiff *(continued)*				
514.40				
Borehole continued with rock coring.				
-25				
-30				
-35				
-40				

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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ROCK CORE LOG

GEO Job No. 13125

Page 1 **of** 1

Date 10/28/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. _____ **CORING BARREL TYPE & SIZE** NX Double Swivel-10 ft
Station _____

Core Diameter 2 **in**
Top of Rock Elev. 514.40 **ft**
Begin Core Elev. 514.40 **ft**

BORING NO. BSB-08
Station 713+00
Offset 67.10ft Right
Ground Surface Elev. 535.40 **ft**

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray to gray with rust staining. Numerous horizontal fractures throughout with some clay seams. Vertical fractures from -22.7' to -23.3', -23.9' to -25.2', -26.0' to -27.2' & from -29.4' to -30.1'. 514.40	1	100	23		1209.00
-25					
-30					
504.40					
End Of Boring @ -31.0'. Boring backfilled with cuttings.					
-35					
-40					

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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ROCK CORE LOG

DATE 10/28/2013

LOGGED BY JK

GSI JOB No. 13125

ROUTE --

DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

SECTION --

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

COUNTY Will

CORING METHOD Rotary Wash

STRUCT. NO. --

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station --

Core Diameter 2.0 in

BORING NO. **BSB-08**

Top of Rock Elev. 514.4

Station 713+00

Begin Core Elev. 514.4

Offset 67.1' Right

Ground Surface Elev. 535.4

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	23.0	n/a	1209 @ -27.8'
-26					
-31					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-21.0' to -31.0')
Light gray to gray with rust staining. Numerous horizontal fractures throughout with some clay seams. Vertical fractures from -22.7' to -23.3', -23.9' to -25.2', -26.0' to -27.2' & from -29.4' to -30.1'.

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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GEO Job No. 13125

SOIL BORING LOG

Page 1 **of** 1

Date 10/23/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **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. _____
Station _____

BORING NO. BSB-09
Station 713+77
Offset 66.20ft Left
Ground Surface Elev. 534.70 ft

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

Groundwater Elev.:
First Encounter Dry to 24.0' ft
Upon Completion n/a ft
After **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Soil Description
					SANDY CLAY LOAM with GRAVEL-brown & black-loose (Fill)
	2				
	3		19		
	3				
531.70					
					SAND, GRAVEL & FRACTURED ROCK-brown & gray-medium dense to very dense
	6				
	12		6		
-5	14				
	9				
	10		6		
	15				
	10				
	14		5		
-10	18				
	23				
	50/3"		24		
	11				
	11		10		
-15	18				
	17				
	27		10		
	36				
	25				
	32		12		
-20	37				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Soil Description
					SAND, GRAVEL & FRACTURED ROCK-brown & gray-medium dense to very dense *(continued)*
	50/2"				
512.20					
					Drillers Observation: Apparent bedrock
510.70					
					Borehole continued with rock coring.
-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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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ROCK CORE LOG

GEO Job No. 13125

Page 1 **of** 1

Date 10/23/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. _____ **CORING BARREL TYPE & SIZE** NX Double Swivel-10 ft
Station _____

Core Diameter 2 **in**
Top of Rock Elev. 512.20 **ft**
Begin Core Elev. 510.70 **ft**

BORING NO. BSB-09
Station 713+77
Offset 66.20ft Left
Ground Surface Elev. 534.70 **ft**

		DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray with horizontal to wavy bedding & some chert inclusions. Horizontal fractures at -31.1', -31.2', -31.75' & -32.5'. Highly fractured & weathered from -24.0' to -24.8' & from -28.9' to -30.0'.	510.70		1	100	43		280.00
		-25					
		-30					
	500.70						
End Of Boring @ -34.0'. Boring backfilled with cuttings.		-35					
		-40					

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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ROCK CORE LOG

DATE 10/23/2013

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GSI JOB No. 13125

ROUTE -- DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

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

COUNTY Will CORING METHOD Rotary Wash

STRUCT. NO. -- CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station -- Core Diameter 2.0 in

BORING NO. **BSB-09** Top of Rock Elev. 512.2

Station 713+77 Begin Core Elev. 510.7

Offset 66.2' Left

Ground Surface Elev. 534.7

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	43.0	n/a	280 @ -25.4'
-29					
-34					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-24.0' to -34.0')
Light gray with horizontal to wavy bedding & some chert inclusions. Horizontal fractures at -31.1', -31.2', -31.75' & -32.5'. Highly fractured & weathered from -24.0' to -24.8' & from -28.9' to -30.0'.

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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GEO Job No. 13125

SOIL BORING LOG

Page 1 **of** 1

Date 10/22/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **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. _____
Station _____

BORING NO. BSB-10
Station 713+67
Offset 7.70ft Right
Ground Surface Elev. 531.90 ft

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

Groundwater Elev.:
First Encounter 518.4 ft ▼
Upon Completion n/a ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
SANDY CLAY LOAM-dark brown to black (Fill)				
	3			
	4 5		15	
528.90				
SAND, GRAVEL & COBBLES-black-very loose (Fill)	2			
	2 2		9	
-5				
526.40				
SAND, GRAVEL & FRACTURED ROCK-brown	6			
	14 26		6	
	6			
	16 21		5	
-10				
	18			
	19 23		6	
518.90				
SAND & GRAVEL-brown ▼	13			
	17 13		9	
-15				
	50/5"			
			7	
514.40				
Borehole continued with rock coring.				
-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), GP-Geoprobe Hand Auger
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ROCK CORE LOG

GEO Job No. 13125

Page 1 **of** 25

Date 10/22/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. _____ **CORING BARREL TYPE & SIZE** NX Double Swivel-10 ft
Station _____

Core Diameter 2 **in**
Top of Rock Elev. 510.90 **ft**
Begin Core Elev. 514.40 **ft**

BORING NO. BSB-10
Station 713+67
Offset 7.70ft Right
Ground Surface Elev. 531.90 **ft**

		DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
Rock Core - Run 1, SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray, cherty, & highly weathered & fractured throughout.	514.40		1	100	0		
	512.40						
Roller Bit Drillers Observation: Weathered & fractured rock.		-20					
	510.90						
Rock Core - Run 2, SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray to gray with horizontal to wavy bedding & chert nodules throughout. Highly weathered & fractured from -21.0' to -23.0' & from -27.0' to -29.0'. Clay seams from -27.0' to -29.0'.		-25	2	94			337.00
	502.90						
Rock Core - Run 3, SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray & highly weathered. Highly fractured with clay seams throughout.		-30	3	100	0		
	500.90						
End Of Boring @ -31.0'. Boring backfilled with cuttings.		-35					

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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ROCK CORE LOG

DATE 10/22/2013

LOGGED BY JK

GSI JOB No. 13125

ROUTE -- DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

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

COUNTY Will CORING METHOD Rotary Wash

STRUCT. NO. -- CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station --

BORING NO. **BSB-10**

Station 713+67

Offset 7.7' Right

Ground Surface Elev. 531.9

Core Diameter 2.0 in

Top of Rock Elev. 514.4

Begin Core Elev. 514.4

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE RUN 1 (-17.5' to -19.5') Light gray, cherty, & highly weathered & fractured throughout.	1	100.0	0.0	n/a	n/a
-19.5					
(19.5' to -21.0') Roller Bit Drillers Observation: Weathered & fractured rock.					
-21.0					
RUN 2 (-21.0' to -29.0') Light gray to gray with horizontal to wavy bedding & chert nodules throughout. Highly weathered & fractured from -21.0' to -23.0' & from -27.0' to -29.0'. Clay seams from -27.0' to -29.0'.	2	93.8	45.0	n/a	337 @ -24.5'

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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ROCK CORE LOG

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GSI JOB No. 13125

ROUTE -- DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

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

COUNTY Will CORING METHOD Rotary Wash

STRUCT. NO. -- CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station --

Core Diameter 2.0 in

BORING NO. **BSB-10**

Top of Rock Elev. 514.4

Station 713+67

Begin Core Elev. 514.4

Offset 7.7' Right

Ground Surface Elev. 531.9

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	3	100.0	0.0	n/a	n/a

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 3 (-29.0' to -31.0')
Light gray & highly weathered. Highly fractured with clay seams throughout.

-31

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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GEO Job No. 13125

SOIL BORING LOG

Page 1 **of** 1

Date 10/30/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **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. _____
Station _____

BORING NO. BSB-11
Station 714+35
Offset 6.90ft Left
Ground Surface Elev. 533.10 ft

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

Groundwater Elev.:
First Encounter Dry to 13.5' ft
Upon Completion n/a ft
After Hrs. _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
					12.0" SANDY TOPSOIL-black
532.10			20		
	10				CRUSHED STONE, GRAVEL & SAND-dark brown-loose to medium dense (Fill)
	12		14		
	9				
	8				
	10		13		
-5	12				
	3				
	4		12		
	5				
525.10					
	8				FRACTURED ROCK-gray-dense to very dense
	18		7		
-10	19				
	19				
	24		6		
	20				
	50/4"				
			6		
-15					
	50/0"				Cobbles & Boulders from -16.0' to -17.5'
	37				
	21		7		
-20	24				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
512.60					FRACTURED ROCK & SHALE-very dense
	50/5"				
			22		
509.10	50/2"		15		
-25					Borehole continued with rock coring.
-30					
-35					
-40					

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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), GP-Geoprobe Hand Auger
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ROCK CORE LOG

GEO Job No. 13125

Page 1 **of** 1

Date 10/30/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. _____
Station _____

BORING NO. BSB-11
Station 714+35
Offset 6.90ft Left
Ground Surface Elev. 533.10 **ft**

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft
Core Diameter 2 **in**
Top of Rock Elev. 509.10 **ft**
Begin Core Elev. 509.10 **ft**

	DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray to gray with horizontal to wavy bedding. Highly weathered & fractured with clay partings & some chert nodules from -24.0' to -29.7'.	509.10	1	100	33		434.00
	-25					
	-30					
	499.10					
End Of Boring @ -34.0'. Boring backfilled with cuttings.	-35					
	-40					

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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ROCK CORE LOG

DATE 10/30/2013

LOGGED BY JK

GSI JOB No. 13125

ROUTE -- DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

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

COUNTY Will CORING METHOD Rotary Wash

STRUCT. NO. -- CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station -- Core Diameter 2.0 in

BORING NO. **BSB-11** Top of Rock Elev. 509.1

Station 714+35 Begin Core Elev. 509.1

Offset 6.9' Left

Ground Surface Elev. 533.1

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	33.0	n/a	434 @ -25.0'
-29					
-34					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-24.0' to -34.0')
Light gray to gray with horizontal to wavy bedding. Highly weathered & fractured with clay partings & some chert nodules from -24.0' to -29.7'.

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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GEO Job No. 13125

SOIL BORING LOG

Date 10/30/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **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.
Station

BORING NO. BSB-12
Station 714+21
Offset 67.50ft Right
Ground Surface Elev. 533.40 ft

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

Groundwater Elev.:
First Encounter 517.9 ft ▼
Upon Completion n/a ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
					12.0" SANDY TOPSOIL
532.40			15		
	4				CRUSHED STONE, GRAVEL,SAND & CINDERS-black-medium dense to dense (Fill)
	6 7		11		
	3				
	5 5		23		
-5					
	12				
	16 20		15		
	5				
	7 10		21		
-10					
522.90					
	7				SAND, GRAVEL & FRACTURED ROCK-brown-medium dense to very dense
	8 10		16		
	15				
	22 24		7		
-15					
▼	13				
	15 19		7		
	19				
	50/3"		10		
-20					

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
512.40					Borehole continued with rock coring.
-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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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805 Amherst Court, Suite 204
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(630) 355-2838

ROCK CORE LOG

GEO Job No. 13125

Page 1 **of** 1

Date 10/30/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. _____ **CORING BARREL TYPE & SIZE** NX Double Swivel-10 ft
Station _____

Core Diameter 2 **in**
Top of Rock Elev. 512.40 **ft**
Begin Core Elev. 512.40 **ft**

BORING NO. BSB-12
Station 714+21
Offset 67.50ft Right
Ground Surface Elev. 533.40 **ft**

		DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray with rust staining & horizontal fractures throughout, becoming highly weathered & fractured with intersecting vertical fractures & clay seams from -26.2' to -31.0'.	512.40		1	97	32		561.00
		-25					
		-30					
End Of Boring @ -31.0'. Boring backfilled with cuttings.	502.40						
		-35					
		-40					

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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ROCK CORE LOG

DATE 10/30/2013

LOGGED BY JK

GSI JOB No. 13125

ROUTE --

DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

SECTION --

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

COUNTY Will

CORING METHOD Rotary Wash

STRUCT. NO. --

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station --

Core Diameter 2.0 in

BORING NO. **BSB-12**

Top of Rock Elev. 512.4

Station 714+21

Begin Core Elev. 512.4

Offset 67.5' Right

Ground Surface Elev. 533.4

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	97.0	32	n/a	561 @ -23.5'
-26					
-31					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-21.0' to -31.0')
Light gray with rust staining & horizontal fractures throughout, becoming highly weathered & fractured with intersecting vertical fractures & clay seams from -26.2' to -31.0'.

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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SOIL BORING LOG

GEO Job No. 13125

Page 1 **of** 1

Date 10/20/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **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.
Station

BORING NO. BSB-13
Station 715+06
Offset 67.30ft Left
Ground Surface Elev. 533.60 ft

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

Groundwater Elev.:
First Encounter 518.6 ft ▼
Upon Completion n/a ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
533.27					4.0" CONCRETE
532.60					8.0" CRUSHED STONE
	4				SAND, CINDERS & STONE-medium dense (Fill)
	5		21		
	6				
	5				
	6		18		
-5	7				
528.10					GRAVEL with SAND-brown-medium dense to very dense
	3				
	4		14		
	7				
	10				
	50/2"		6		
-10					
	24				
	17		7		
	19				
	17				
	18		10		
▼-15	21				
	14				
	26		9		
	30				
	50/2"				
			10		
-20					

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
513.10					CLAYEY GRAVEL & FRACTURED ROCK-gray-very dense
	31				
	35		13		
	50/0"				
509.10					Borehole continued with rock coring.
-25					
-30					
-35					
-40					

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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ROCK CORE LOG

GEO Job No. 13125

Page 1 **of** 1

Date 10/20/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. _____ **CORING BARREL TYPE & SIZE** NX Double Swivel-10 ft
Station _____

Core Diameter 2 **in**
Top of Rock Elev. 509.10 **ft**
Begin Core Elev. 509.10 **ft**

BORING NO. BSB-13
Station 715+06
Offset 67.30ft Left
Ground Surface Elev. 533.60 **ft**

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray mottled gray with horizontal to wavy bedding. Fine grained with some horizontal fractures becoming highly fractured & weathered with clay seams from -30.6' to -34.5'. 509.10	1	89	50		663.00
-25					
-30					
499.10					
End Of Boring @ -34.5'. Boring backfilled with cuttings.					
-35					
-40					

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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ROCK CORE LOG

DATE 10/20/2013

LOGGED BY JK

GSI JOB No. 13125

ROUTE --

DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

SECTION --

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

COUNTY Will

CORING METHOD Rotary Wash

STRUCT. NO. --

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station --

Core Diameter 2.0 in

BORING NO. **BSB-13**

Top of Rock Elev. 509.1

Station 715+06

Begin Core Elev. 509.1

Offset 67.3' Left

Ground Surface Elev. 533.6

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	89.0	50.0	n/a	663 @ -25.6'
-29.5					
-34.5					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-24.5' to -34.5')
Light gray mottled gray with horizontal to wavy bedding. Fine grained with some horizontal fractures becoming highly fractured & weathered with clay seams from -30.6' to -34.5'.

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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GEO Job No. 13125

SOIL BORING LOG

Page 1 **of** 1

Date 10/21/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **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.
Station

BORING NO. BSB-14
Station 714+93
Offset 11.00ft Right
Ground Surface Elev. 533.20 ft

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

Groundwater Elev.:
First Encounter 519.7 ft ▼
Upon Completion n/a ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Stratum
					4.0" CONCRETE 532.87
	5				CLAY LOAM-dark brown & black-very stiff (Fill)
	6 7	3.00 P	19		
					530.20
	4				CLAYEY GRAVEL & STONE-dark brown & black-medium dense (Fill)
	5 6		12		
-5					
					527.70
	15				CLAY LOAM-dark brown & black-dense (Fill)
	17 20		18		
					525.20
	2				SILTY CLAY-dark brown to black-very stiff
	3 4	2.50 P	26		
-10					
					522.70
	7				SILTY LOAM-brown-medium dense
	11 15		18		
					520.20
	19				SAND, GRAVEL & FRACTURE ROCK-brown & gray-very dense ▼
	20 23		10		
-15					
	26				
	50/3"		8		
	21				
	50/4"		12		
-20					

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Stratum
					SAND, GRAVEL & FRACTURE ROCK-brown & gray-very dense *(continued)* 512.20
	50/2"				Drillers Observation: Apparent bedrock 510.70
					Borehole continued with rock coring.
-25					
-30					
-35					
-40					

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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), GP-Geoprobe Hand Auger
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ROCK CORE LOG

GEO Job No. 13125

Page 1 **of** 1

Date 10/21/13

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TZ

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. _____ **CORING BARREL TYPE & SIZE** NX Double Swivel-10 ft
Station _____

Core Diameter 2 **in**
Top of Rock Elev. 512.20 **ft**
Begin Core Elev. 510.70 **ft**

BORING NO. BSB-14
Station 714+93
Offset 11.00ft Right
Ground Surface Elev. 533.20 **ft**

		DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray & fine grained with horizontal bedding.Weathered with numerous horizontal fractures throughout. Clay seams from -22.9' to -23.7', -25.0' to -25.4', -26.4' to -28.1' & from -28.4' to -28.6'.	510.70		1	99	39		
		-25					
		-30					1452.00
	500.70						
End Of Boring @ -32.5'. Boring backfilled with cuttings.		-35					
		-40					

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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ROCK CORE LOG

DATE 10/21/2013

LOGGED BY JK

GSI JOB No. 13125

ROUTE -- DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

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

COUNTY Will CORING METHOD Rotary Wash

STRUCT. NO. -- CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station -- Core Diameter 2.0 in

BORING NO. **BSB-14** Top of Rock Elev. 512.2

Station 714+93 Begin Core Elev. 510.7

Offset 11.0' Right

Ground Surface Elev. 533.2

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	99.8	39.0	n/a	1452 @ -29.7'
-27.5					
-32.5					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-22.5' to -32.5')
Light gray & fine grained with horizontal bedding. Weathered with numerous horizontal fractures throughout. Clay seams from -22.9' to -23.7', -25.0' to -25.4', -26.4' to -28.1' & from -28.4' to -28.6'.

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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GEO Job No. 13125

SOIL BORING LOG

Date 3/17/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** NW

SECTION (TBD) **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. _____
Station _____

BORING NO. BSB-15
Station 715+97
Offset 23.20ft Left
Ground Surface Elev. 574.70 ft

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

Groundwater Elev.:
First Encounter Dry to 10.0' ft
Upon Completion n/a ft
After **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
0				
573.70				
6.0" ASPHALT, 6.0" CRUSHED STONE				
CLAY to CLAY LOAM-brown & gray-stiff to hard (Fill)	1			
	2 3	1.00 B	18	
	9			
-5	13 4	2.50 P	21	
	10			
	9 9	2.30 B	19	
	6			
-10	7 7	0.97 B	22	
	4			
	7 7	1.00 P	25	
	4			
-15	5 8	1.68 B	21	
	3			
	3 4	1.50 P	22	
	5			
-20	7 10	1.86 B	17	
CLAY to CLAY LOAM-brown & gray-stiff to hard (Fill) *(continued)*	6			
	7 6	1.50 B	17	
	8			
-25	9 13	2.47 B	15	
	8			
	10 12	1.33 B	16	
	7			
-30	8 13	2.50 P	15	
	50/4"			
-35			15	
	8			
-40	13 19	1.50 B	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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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GEO Job No. 13125

SOIL BORING LOG

Date 3/17/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** NW

SECTION (TBD) **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. _____
Station _____

BORING NO. BSB-15
Station 715+97
Offset 23.20ft Left
Ground Surface Elev. 574.70 ft

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

Groundwater Elev.:
First Encounter Dry to 10.0' ft
Upon Completion n/a ft
After Hrs. _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
					CLAY to CLAY LOAM-brown & gray-stiff to hard (Fill) *(continued)*
	9				
	13	4.25	21		
-45	18	P			
527.70					
					ORGANIC SILTY LOAM-black (A-7)
	10				
	12		67		
-50	21				
522.70					
					SILTY LOAM with FRACTURED ROCK-brown & gray-very dense
	37				
	50/5"		14		
-55					
518.70					
					Drillers Observation: Cobbles & Boulders
	50/1"				
-60					

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
					Drillers Observation: Cobbles & Boulders *(continued)*
512.20					
					Drillers Observation: Apparent bedrock
510.70					
					Borehole continued with rock coring.
-65					
-70					
-75					
-80					

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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ROCK CORE LOG

GEO Job No. 13125

Page 1 **of** 1

Date 3/17/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** NW

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. _____ **CORING BARREL TYPE & SIZE** NX Double Swivel-10 ft
Station _____

Core Diameter 2 **in**
Top of Rock Elev. 512.20 **ft**
Begin Core Elev. 510.70 **ft**

BORING NO. BSB-15
Station 715+97
Offset 23.20ft Left
Ground Surface Elev. 574.70 **ft**

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE 510.70 Light gray with horizontal bedding. Highly fractured & weathered with clay partings from -65.5' to -68.7'. Some horizontal fractures.	1	100	64		1332.00
-65					
-70					
500.70					
End Of Boring @ -74.0'. Boring backfilled with cuttings.					
-75					
-80					

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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ROCK CORE LOG

DATE 3/17/2014

LOGGED BY JK

GSI JOB No. 13125

ROUTE -- DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

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

COUNTY Will CORING METHOD Rotary Wash

STRUCT. NO. -- CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station -- Core Diameter 2.0 in

BORING NO. **BSB-15** Top of Rock Elev. 512.2

Station 715+97 Begin Core Elev. 510.7

Offset 23.2' Left

Ground Surface Elev. 574.7

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	64.0	n/a	1332 @ -64.5'
-69					
-74					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-64.0' to -74.0')
Light gray with horizontal bedding. Highly fractured & weathered with clay partings from -65.5' to -68.7'. Some horizontal 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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GEO Job No. 13125

SOIL BORING LOG

Date 3/19/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** JH

SECTION (TBD) **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.
Station

BORING NO. BSB-16
Station 715+78
Offset 50.70ft Right
Ground Surface Elev. 575.30 ft

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

Groundwater Elev.:
First Encounter 572.3 ft ▼
Upon Completion n/a ft
After **Hrs.** ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
5.0" ASPHALT, 12.0" CONCRETE				
573.88	1			
CRUSHED STONE-very loose	2 2		12	
▼	1			
571.30				
CLAY to CLAY LOAM-brown & gray-stiff to hard (Fill)	2 2	1.50 P	14	
-5	3			
	2 3	1.77 B	22	
	1			
	3 3	1.50 P	19	
-10	2			
	3 3	1.00 P	22	
	3			
	3 6	1.50 B	20	
-15	3			
	5 6	2.12 B	19	
	2			
	4 6	1.25 P	22	
-20				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
CLAY to CLAY LOAM-brown & gray-stiff to hard (Fill) *(continued)*				
	3			
	4 7	2.47 B	21	
	3			
	5 6	1.50 B	16	
-25	4			
	5 7	4.00 P	16	
	5			
	5 6	2.65 B	17	
-30				
	8			
	10 14		18	
-35				
	8			
	14 17	3.27 B	17	
-40				

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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SOIL BORING LOG

GEO Job No. 13125

Date 3/19/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** JH

SECTION (TBD) **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.
Station

BORING NO. BSB-16
Station 715+78
Offset 50.70ft Right
Ground Surface Elev. 575.30 ft

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

Groundwater Elev.:
First Encounter 572.3 ft ▼
Upon Completion n/a ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	
CLAY to CLAY LOAM-brown & gray-stiff to hard (Fill) *(continued)*					
	7				
	8	1.94	21		
-45	11	B			
	18				
526.30					
SILTY LOAM-dark brown-stiff (A-6)	6	1.94	31		
-50	8	B			
523.30					
SANDY CLAY LOAM-brown-medium dense	5				
	4		23		
-55	6				
518.30					
Drillers Observation: Cobbles & Boulders 517.80					
Drillers Observation: Apparent Bedrock					
515.30 -60					

Borehole continued with rock coring.

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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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ROCK CORE LOG

GEO Job No. 13125

Page 1 **of** 1

Date 3/19/14

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** JH

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. _____
Station _____

BORING NO. BSB-16
Station 715+78
Offset 50.70ft Right
Ground Surface Elev. 575.30 **ft**

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft
Core Diameter 2 **in**
Top of Rock Elev. 517.80 **ft**
Begin Core Elev. 515.30 **ft**

		DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray & porous with horizontal bedding. Some horizontal fractures.	515.30		1	98	81		876.00
		-65					
	505.30	-70					
End Of Boring @ -70.0'. Boring backfilled with cuttings.		-75					
		-80					

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

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ROCK CORE LOG

DATE 3/20/2014

LOGGED BY MD

GSI JOB No. 13125

ROUTE -- DESCRIPTION I-80 Reconstruction (Near Term Phase 2)

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

COUNTY Will CORING METHOD Rotary Wash

STRUCT. NO. -- CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station -- Core Diameter 2.0 in

BORING NO. **BSB-16** Top of Rock Elev. 517.8

Station 715+78 Begin Core Elev. 515.3

Offset 50.7' Right

Ground Surface Elev. 575.3

DEPTH (ft)	CORE RUN (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	98.0	81.0	n/a	876 @ -62.1'
-65					
-70					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-60.0' to -70.0')
Light gray & porous with horizontal bedding. Some horizontal 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

GEO Job No. 13125

Date 6/1/15

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** NW

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

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

STRUCT. NO. _____
Station _____

BORING NO. BSB-52
Station 715+98
Offset 4.50ft Left
Ground Surface Elev. 574.50 ft

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

Groundwater Elev.:
First Encounter Dry to 10.0' ft
Upon Completion n/a ft
After _____ **Hrs.** _____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
Blind drill to -41.0'.				
-5				
-10				
-15				
-20				

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
Blind drill to -41.0'. *(continued)*				
-25				
-30				
-35				
-40				

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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SOIL BORING LOG

GEO Job No. 13125

Date 6/1/15

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** NW

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

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

STRUCT. NO. _____
Station _____

BORING NO. BSB-52
Station 715+98
Offset 4.50ft Left
Ground Surface Elev. 574.50 ft

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

Groundwater Elev.:
First Encounter Dry to 10.0' ft
Upon Completion n/a ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
					Blind drill to -41.0'. *(continued)*
533.50					
	10				CLAY LOAM-brown & gray-stiff (Fill)
	12	1.25	14		
	17	P			
531.50					
	42				CLAYEY CINDERS & STONE-dark brown & black-dense (Fill)
	19		11		
-45	13				
529.00					
	18				CLAY LOAM-dark brown & black-dense (Fill)
	21		15		
	25				
526.50					
	9				CLAYEY GRAVEL & STONE-dark brown & gray-medium dense to dense (Fill)
	17		18		
-50	15				
	6				
	9		25		
	13				
521.50					
	24				CLAYEY SAND & GRAVEL-brown & gray-dense
	22		17		
-55	19				
519.00					
	50/5"				GRAVEL with Sand-brown-very dense
			9		
516.50					
	50/5"				SILTY SAND & GRAVEL-brown-very dense
			11		
-60					
514.00					
	24				SILTY LOAM & FRACTURED ROCK-gray-very dense
	50/5"		18		
511.50					
511.00					Drillers Observation: Possible Bedrock
					End Of Boring @ -63.5'. Boring backfilled with cuttings.
-65					
-70					
-75					
-80					

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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), GP-Geoprobe Hand Auger
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SOIL BORING LOG

GEO Job No. 13125

Date 6/2/15

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** NW

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

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

STRUCT. NO. _____
Station _____

BORING NO. BSB-53
Station 716+17
Offset 4.30ft Right
Ground Surface Elev. 573.70 **ft**

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

Groundwater Elev.:
First Encounter Dry to 10.0' **ft**
Upon Completion n/a **ft**
After _____ **Hrs.** _____ **ft**

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
Blind drill to -41.0'.					Blind drill to -41.0'. *(continued)*				
-5					-25				
-10					-30				
-15					-35				
-20					-40				

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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), GP-Geoprobe Hand Auger
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GEO Job No. 13125

SOIL BORING LOG

Date 6/2/15

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** NW

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R10E, 3rd **PM**

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

STRUCT. NO.
Station

BORING NO. BSB-53
Station 716+17
Offset 4.30ft Right
Ground Surface Elev. 573.70 ft

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

Groundwater Elev.:
First Encounter Dry to 10.0' ft
Upon Completion n/a ft
After Hrs. ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
					Blind drill to -41.0'. *(continued)*
532.70					
	10				CLAY LOAM-dark brown & gray-hard (Fill)
	11 16	4.20 B	18		
530.70					
	28				SAND, GRAVEL, CINDERS & STONE-black-dense (Fill)
529.20	13		12		
-45	22				& GRAVEL-dark brown & gray-medium dense (Fill)
	12				
	13 14		8		
525.70					
	5				TOPSOIL-black
	6	1.40	35		Organic Content = 6.7%
-50	12	B			
523.20					
	6				SILTY CLAY LOAM with Gravel-dark brown & gray spotted black-medium stiff
	6 9		26		
520.70					
	25				SAND, GRAVEL & FRACTURED ROCK-brown-very dense
	22		10		
-55	39				
	35				
	34		10		
	28				
515.70					
	33				SANDY LOAM with Fractured Rock-gray-very dense
	27		13		
-60	21				
513.20					FRACTURED ROCK-gray-very dense
	50/5"				
511.70			8		Drillers Observation: Possible Bedrock
510.70					End Of Boring @ -63.0' . Boring backfilled with cuttings.
-65					
-70					
-75					
-80					

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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), GP-Geoprobe Hand Auger
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GEO Job No. 13125

SOIL BORING LOG

Date 3/21/22

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TC

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R30E, 3rd **PM**

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

STRUCT. NO. -
Station -

BORING NO. BSB-054
Station 709+72
Offset 60.10ft Left
Ground Surface Elev. 574.83 ft

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

Groundwater Elev.:
First Encounter Dry to -10.0' ft
Upon Completion n/a ft
After - Hrs. - ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
11.0" ASPHALT 573.91				
CLAY LOAM-brown & gray-stiff to hard (Fill)	25			
	6 4	4.50 P	19	
	12			
-5	11 8	4.00 B	11	
	5			
	7 6	3.10 B	18	
	5			
-10	7 6	3.00 P	16	
	2			
	2 28	1.00 P	26	
	8			
-15	9 8	1.00 P	23	
	5			
	5 8	1.20 B	19	
	6			
-20	7 8	1.50 B	16	
CLAY LOAM-brown & gray-stiff to hard (Fill) *(continued)*	6			
	8 10	3.00 P	16	
	6			
-25	13 13	3.00 P	16	
	6			
	9 6	1.00 B	18	
	8			
-30	20 17	1.00 P	19	
	5			
-35	7 13	1.30 B	19	
	8			
-40	29 20	4.50 P	16	

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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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GEO Job No. 13125

SOIL BORING LOG

Date 3/21/22

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TC

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R30E, 3rd **PM**

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

STRUCT. NO. -
Station -

BORING NO. BSB-054
Station 709+72
Offset 60.10ft Left
Ground Surface Elev. 574.83 ft

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

Groundwater Elev.:
First Encounter Dry to -10.0' ft
Upon Completion n/a ft
After - Hrs. - ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
CLAY LOAM-brown & gray-stiff to hard (Fill) *(continued)*				
532.83				
FRACTURED ROCK & GRAVEL-brown-dense to very dense				
	22			
	26		6	
-45	12			
	12			
	20		4	
-50	21			
	17			
	28		7	
-55	34			
	22			
	20		11	
-60	13			
FRACTURED ROCK & GRAVEL-brown-dense to very dense *(continued)*				
510.83				
Borehole continued with rock coring.				
-65				
-70				
-75				
-80				

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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), GP-Geoprobe Hand Auger
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ROCK CORE LOG

GEO Job No. 13125

Page 1 **of** 1

Date 3/21/22

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** TC

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R30E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. - **CORING BARREL TYPE & SIZE** NX Double Swivel-10 ft
Station -

Core Diameter 2 **in**
Top of Rock Elev. 510.83 **ft**
Begin Core Elev. 510.83 **ft**

BORING NO. BSB-054
Station 709+72
Offset 60.10ft Left
Ground Surface Elev. 574.83 **ft**

	DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
RUN 1 (-64.0' to -74.0') SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray & porous with horizontal bedding. Some horizontal fractures & rust staining throughout.	510.83	1	100	85		542.00
	-65					
	-70					
	500.83					
RUN 2 (-74.0' to -79.0') SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray & porous with horizontal bedding. Highly weathered & fractured throughout.		2	100	35		482.00
	-75					
	495.83					
End Of Boring @ -79.0'. Boring backfilled with cuttings.						
	-80					

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

BSB-54

13125

RUN 1 -640' to -740'

TOP

B 740'

BSB-54

BSB 13125 12

RUN2 -74.0° to -79.0

TOP

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GEO Job No. 13125

SOIL BORING LOG

Date 3/3/22

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** MM

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R30E, 3rd **PM**

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

STRUCT. NO. -
Station -

BORING NO. BSB-055
Station 709+71
Offset 62.20ft Right
Ground Surface Elev. 574.80 ft

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

Groundwater Elev.:
First Encounter Dry to -10.0' ft
Upon Completion n/a ft
After - Hrs. - ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
					6.0" ASPHALT, 6.0" CRUSHED STONE
					573.80
	5				CLAY LOAM-brown & gray-very stiff to hard (Fill)
	3 3	2.50 P	2		
	3				
-5	6 8	3.00 P	12		
	3				
	4 8	4.50 P	18		
	6				
-10	14 9	2.50 P	12		
	10				
	5 7		20		CLAYEY GRAVEL & STONE-brown & gray-medium dense (Fill)
	561.80				
	7				CLAY LOAM-brown-stiff to very stiff (Fill)
-15	6 7	3.50 P	15		
	2				
	3 5	1.30 B	22		
	8				
-20	10 14	3.00 P	31		

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)	Description
					CLAY LOAM-brown-stiff to very stiff (Fill) *(continued)*
	6				
	7 9	2.20 B	17		
	7				
-25	11 16	2.75 P	13		
	4				
	6 12	2.50 P	18		
	4				
-30	4 8	3.50 P	13		
	9				
-35	12 15	3.00 P	17		
	537.80				
					SILTY CLAY LOAM-gray-very stiff
	10				
-40	10 15		14		

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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), GP-Geoprobe Hand Auger
BBS, from 137 (Rev. 8-99)

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GEO Job No. 13125

SOIL BORING LOG

Date 3/3/22

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** MM

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R30E, 3rd **PM**

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

STRUCT. NO. -
Station -

BORING NO. BSB-055
Station 709+71
Offset 62.20ft Right
Ground Surface Elev. 574.80 ft

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

Groundwater Elev.:
First Encounter Dry to -10.0' ft
Upon Completion n/a ft
After - Hrs. - ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
SILTY CLAY LOAM-gray-very stiff *(continued)*				
532.80				
SAND, GRAVEL & FRACTURED ROCK-gray-dense to very dense				
	19			
	21		6	
-45	22			
	17			
	15		7	
-50	35			
	33			
	39		8	
-55	50/5"			
	20			
	19		12	
-60	15			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DRY DENSITY (pcf)
SAND, GRAVEL & FRACTURED ROCK-gray-dense to very dense *(continued)*				
	50/4"		5	
-65				
Diller observation-apparent bedrock 509.30				
Borehole continued with rock coring.				
-70				
-75				
-80				

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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), GP-Geoprobe Hand Auger
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ROCK CORE LOG

GEO Job No. 13125

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Date 3/3/22

ROUTE F.A.I RTE. 80 **DESCRIPTION** I-80 Phase II (Near Term) **LOGGED BY** MM

SECTION (TBD) **LOCATION** SW 1/4, **SEC.** 15, **TWP.** T35N, **RNG.** R30E, 3rd **PM**

COUNTY Will **CORING METHOD** Rotary Wash

STRUCT. NO. - **CORING BARREL TYPE & SIZE** NX Double Swivel-10 ft
Station -

Core Diameter 2 **in**
Top of Rock Elev. 509.30 **ft**
Begin Core Elev. 509.30 **ft**

BORING NO. BSB-055
Station 709+71
Offset 62.20ft Right
Ground Surface Elev. 574.80 **ft**

		DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
RUN 1 (-65.5' to -70.0') SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray & fine grained with horizontal bedding. Some horizontal fractures & rust staining throughout.	509.30		1	71	50		720.00
	504.80	-70					
RUN 2 (-70.0' to -80.0') SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE Light gray & porous with horizontal bedding. Highly weathered & fractured throughout.			2	82	12		571.00
		-75					
	494.80	-80					
End Of Boring @ -80.0'. Boring backfilled with cuttings.							
		-85					

Color pictures of the cores Yes
Cores will be stored for examination until 5 yrs after const.
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

BSB-55

13125

BOL

RUN 1

TOP

BSB-55

13125

RUN 2 -70.0' to -80.0'

TOP

APPENDIX E

PILE LENGTH AND CAPACITY TABLES

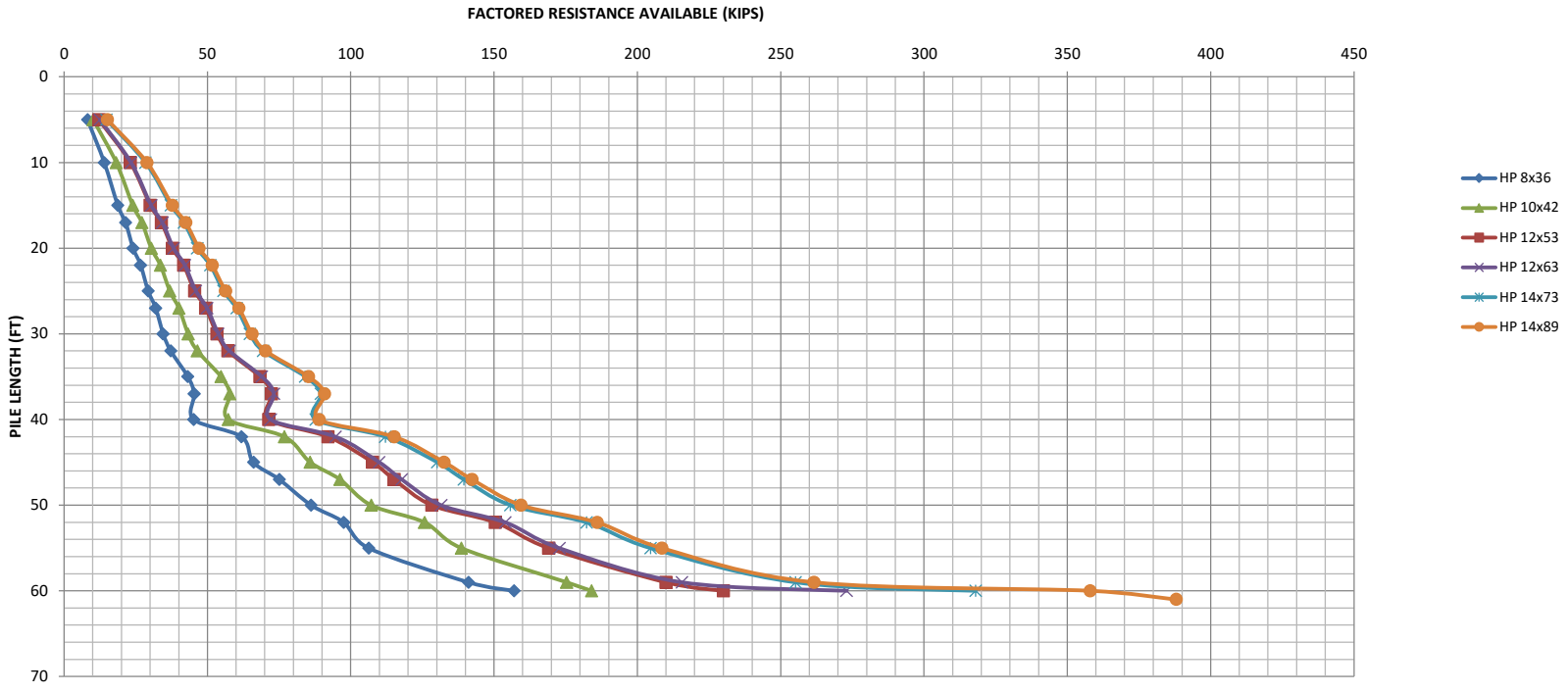
Estimated Pile Lengths and Capacities for the East Abutments of the Proposed I-80 over Gardner St. and BNSF RR

Boring BSB-13 East Abutment WB (Ground Surface Elevation against Pile during driving = 533.60 Pile Cutoff Elevation = 568.10)												
Estimated Pile Length (ft.)	HP 8x36		HP 10x42		HP 12x53		HP 12x63		HP 14x73		HP 14x89	
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Required Bearing NRB(Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)
5	8	15	10	18	12	22	12	23	15	27	15	28
10	14	26	18	33	23	42	23	42	28	52	29	53
15	19	34	24	44	30	55	30	55	37	68	38	69
17	21	39	27	49	34	62	34	62	42	76	42	77
20	24	44	30	55	38	69	38	69	46	84	47	86
22	27	48	34	61	42	76	42	77	51	93	52	94
25	29	53	37	67	46	83	46	84	56	101	56	102
27	32	58	40	73	49	90	50	91	60	109	61	111
30	35	63	43	79	53	97	54	98	65	118	66	119
32	37	68	47	85	57	104	58	105	69	126	70	128
35	43	79	55	100	68	124	69	125	84	153	85	155
37	45	82	58	105	72	132	73	133	90	163	91	165
40	45	82	57	104	71	130	72	131	88	160	89	162
42	62	113	77	140	92	167	95	172	112	204	115	209
45	66	120	86	156	108	196	110	200	130	237	133	241
47	75	137	96	175	115	209	118	214	139	254	142	259
50	86	157	107	195	128	233	132	239	156	283	159	290
52	98	177	126	229	150	274	154	280	182	331	186	338
55	106	193	139	252	169	307	173	314	205	372	209	379
59	141	257	175	319	210	382	216	392	255	464	262	476
60	157	286	184	335	230	418	273	497	318	578	358	651
61											388	705

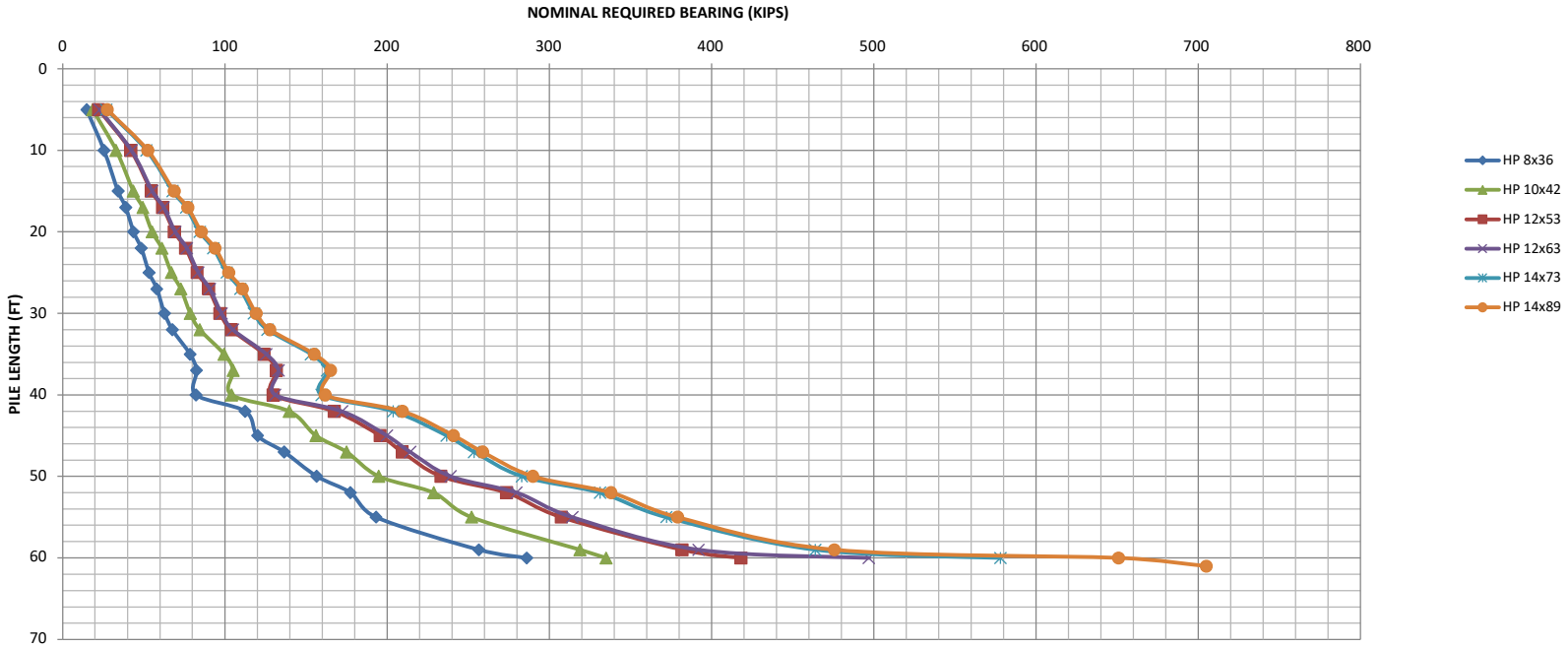
Note: All piles reach Max Available NRB based on Pile Driving Stresses through soil layers. RED denotes pile length in bedrock.

PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH

BORING BSB-13 East Abutment WB



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
BORING BSB-13 East Abutment WB



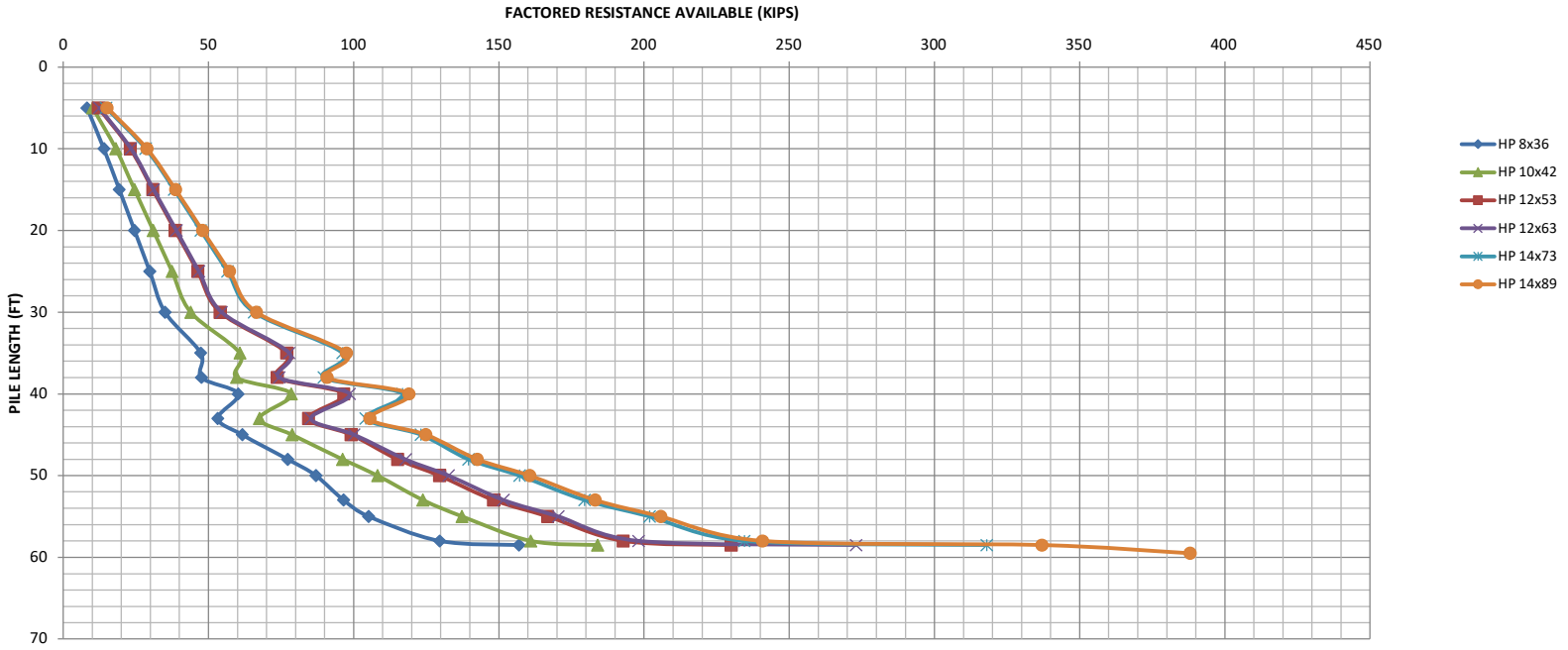
Estimated Pile Lengths and Capacities for the East Abutments of the Proposed I-80 over Gardner St. and BNSF RR

Boring BSB-14, East Abutment EB (Ground Surface Elevation against Pile during driving = 533.20, Pile Cutoff Elevation = 529.10)

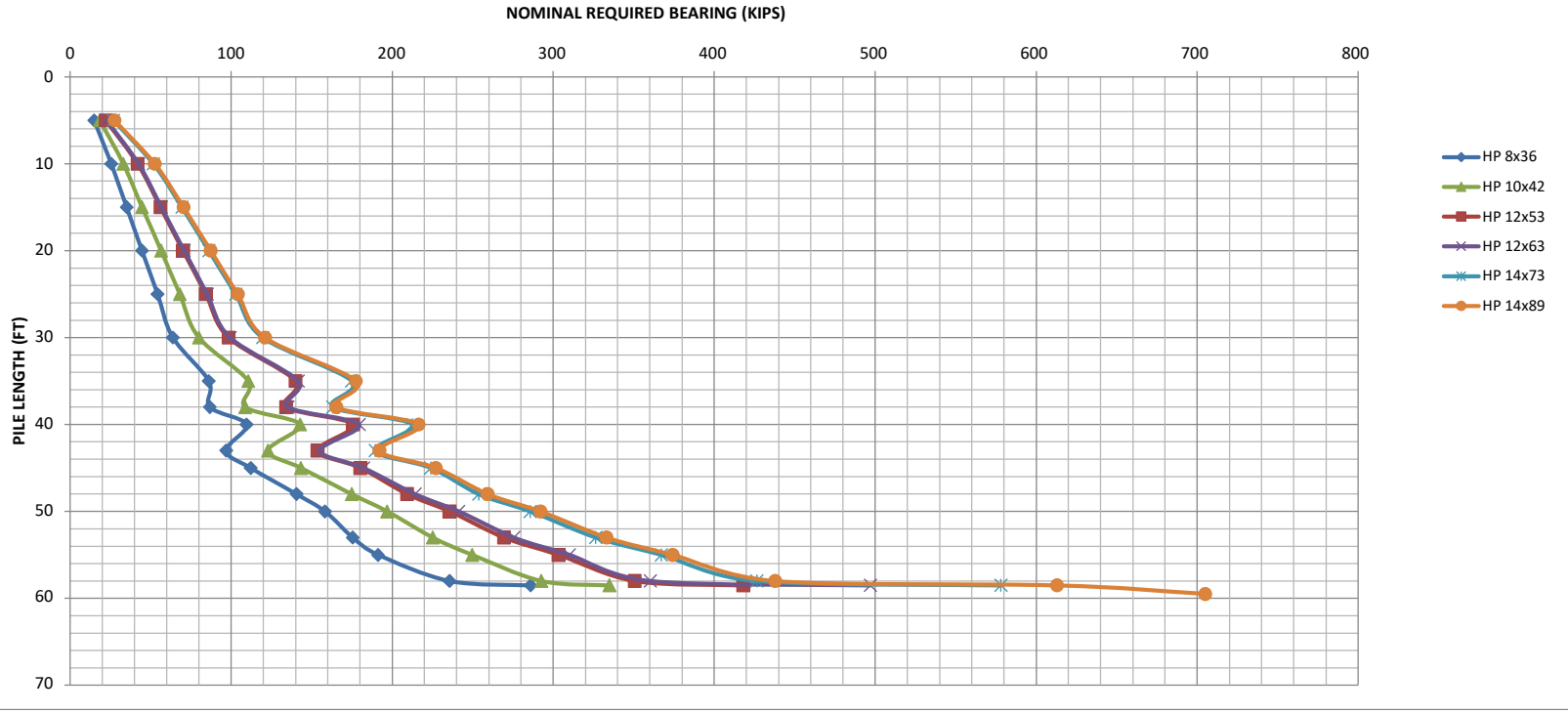
Estimated Pile Length (ft.)	HP 8x36		HP 10x42		HP 12x53		HP 12x63		HP 14x73		HP 14x89	
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Required Bearing NRB(Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)
5	8	15	10	18	12	22	12	23	15	27	15	28
10	14	26	18	33	23	42	23	42	28	52	29	53
15	19	35	25	45	31	56	31	57	38	69	39	70
20	25	45	31	56	39	70	39	71	47	86	48	87
25	30	54	37	68	46	84	47	85	57	103	57	104
30	35	64	44	80	54	98	55	99	66	120	67	121
35	47	86	61	111	77	140	78	142	96	175	98	177
38	48	87	60	109	74	134	74	135	90	163	91	165
40	60	110	78	143	97	176	99	179	117	212	119	216
43	53	97	68	123	84	154	85	155	104	189	106	192
45	62	112	79	143	99	180	100	182	123	224	125	227
48	77	141	96	175	115	209	118	214	140	254	143	259
50	87	158	108	197	130	236	133	241	157	286	161	292
53	97	176	124	225	148	269	152	276	180	326	183	333
55	105	191	137	250	167	303	171	310	202	367	206	374
58	130	236	161	293	193	351	198	360	235	426	241	438
58.5	157	286	184	335	230	418	273	497	318	578	337	613
59.5											388	705

Note: All piles reach Max Available NRB based on Pile Driving Stresses through soil layers. RED denotes pile length in bedrock.

PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH
BORING BSB-14 East Abutment EB



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
BORING BSB-14 East Abutment EB



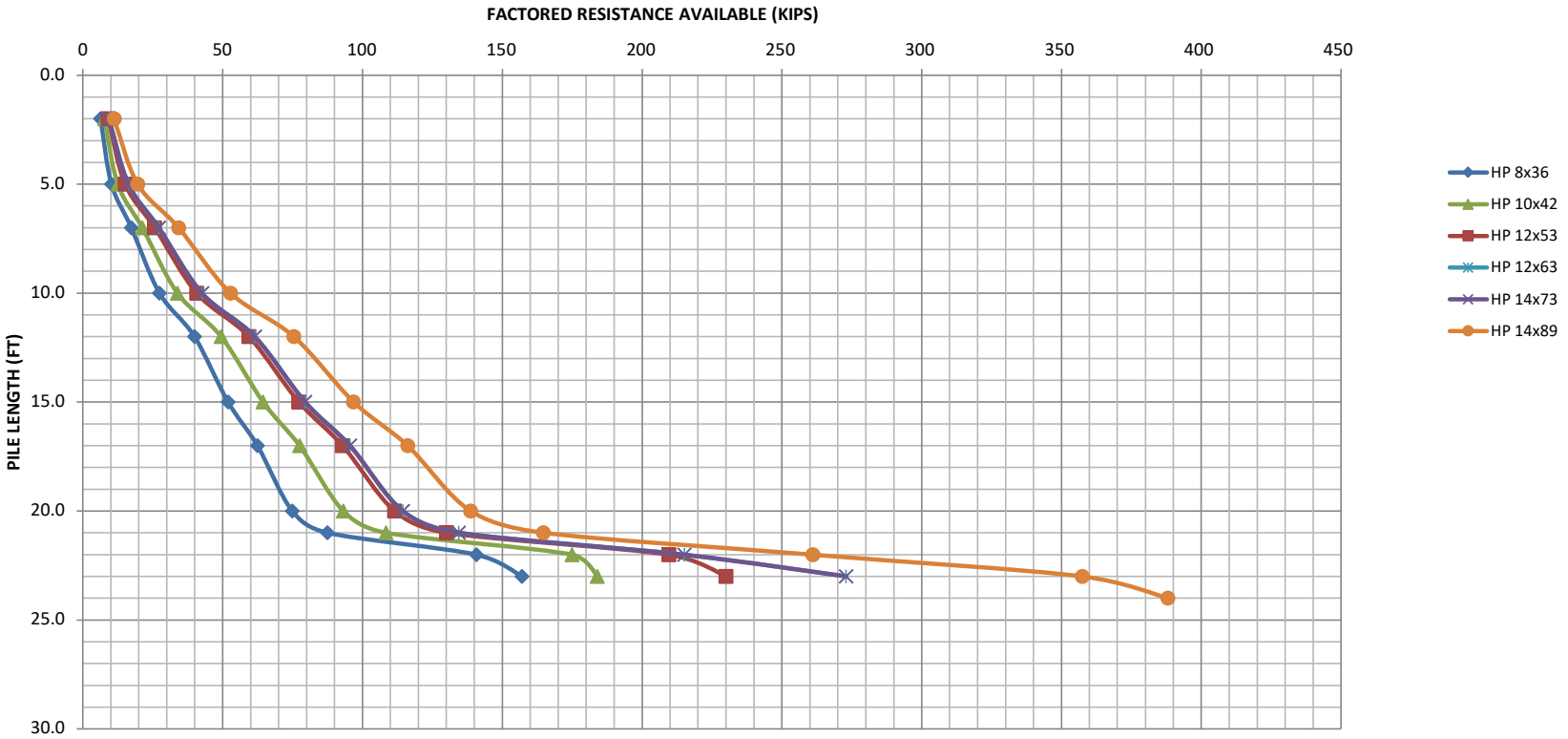
Estimated Pile Lengths and Capacities for the Pier 3 of the Proposed I-80 over Gardner St. and BNSF RR

Boring BSB-11 - Pier 3 WB (Ground Surface Elevation against Pile during driving = 533.10, Pile Cutoff Elevation = 530.1)												
Estimated Pile Length (ft.)	HP 8x36		HP 10x42		HP 12x53		HP 12x63		HP 14x73		HP 14x89	
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Required Bearing NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)
2.0	6	11	8	14	9	16	9	17	11	20	11	20
5.0	10	19	12	23	15	28	16	30	18	33	20	36
7.0	17	32	21	39	26	47	27	49	32	58	34	62
10.0	27	50	34	62	41	74	43	77	50	91	53	96
12.0	40	73	49	90	59	108	61	112	73	132	75	137
15.0	52	94	64	117	77	140	80	145	94	171	97	176
17.0	62	114	78	141	93	169	96	174	113	206	116	211
20.0	75	136	93	169	112	203	114	208	135	246	139	252
21.0	87	159	108	197	130	236	134	245	159	289	165	299
22.0	141	256	175	318	210	381	215	391	255	463	261	475
23.0	157	286	184	335	230	418	273	497	318	578	357	650
24.0											388	705

Note: All piles reach Max Available NRB based on Pile Driving Stresses through bedrock.

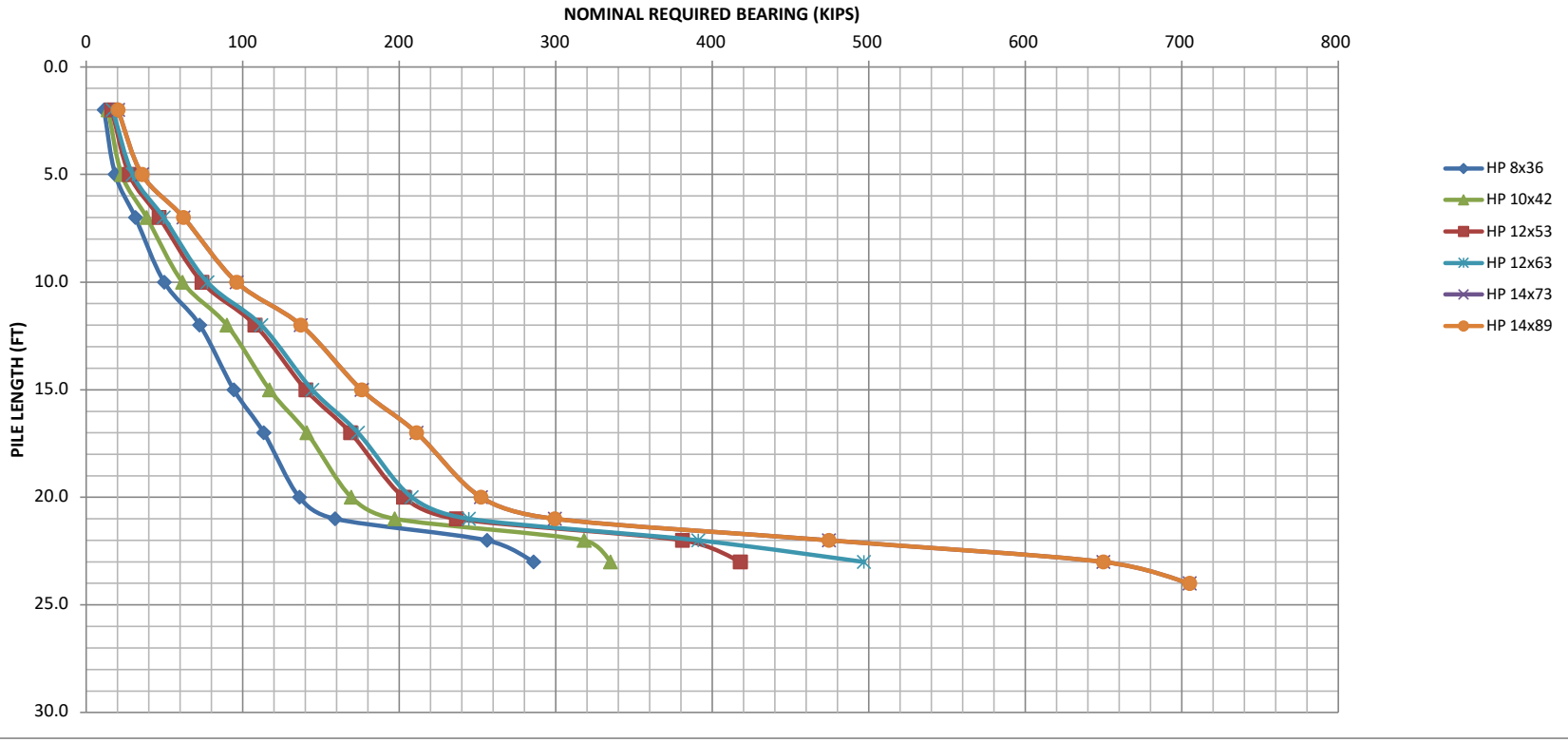
PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH

BORING BSB-11 Pier 3 WB



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH

BORING BSB-11 Pier 3 WB



Estimated Pile Lengths and Capacities for the Pier 3 of the Proposed I-80 over Gardner St. and BNSF RR

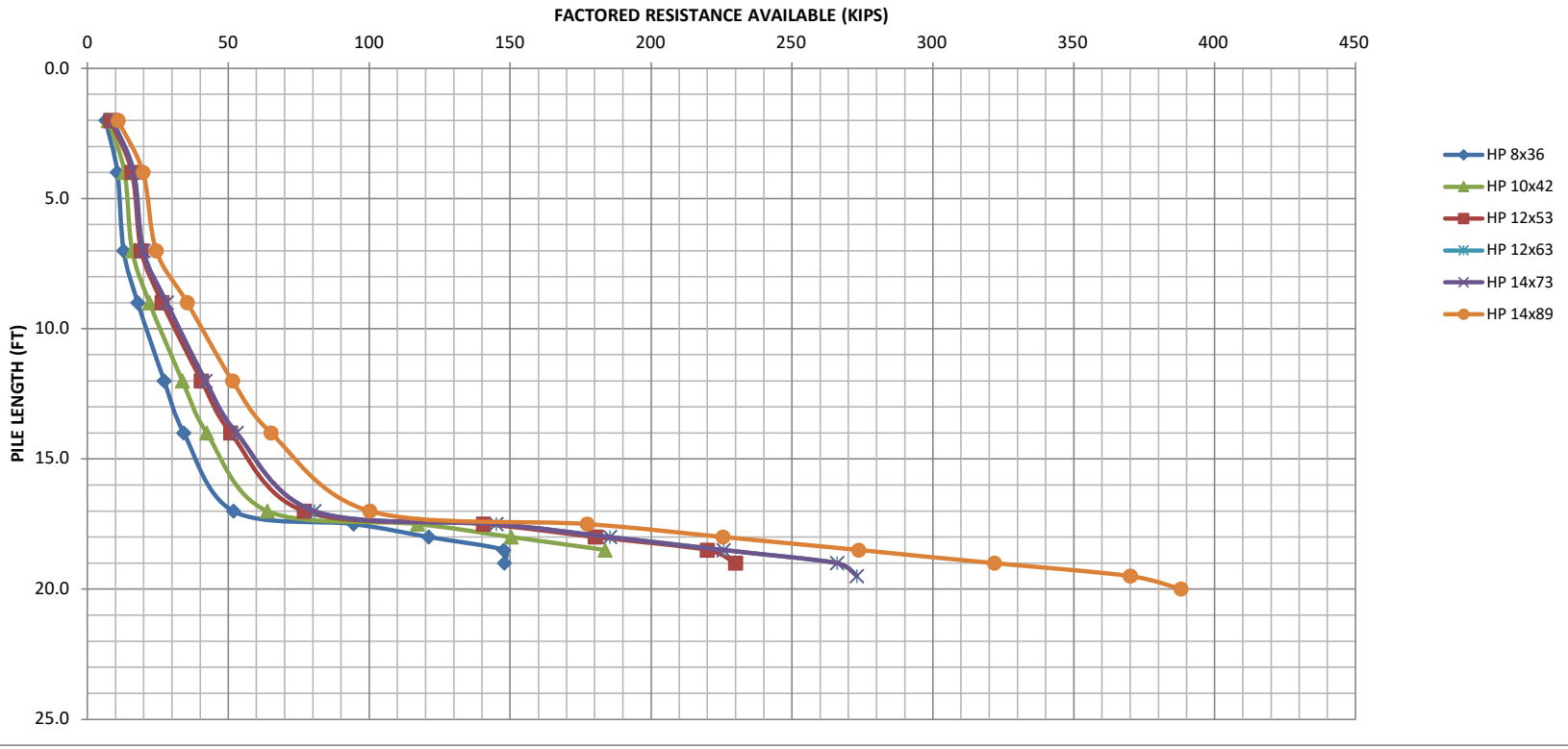
Boring BSB-12, Pier 3 EB (Ground Surface Elevation against Pile during driving = 533.40, Pile Cutoff Elevation = 530.10)

Estimated Pile Length (ft.)	HP 8x36		HP 10x42		HP 12x53		HP 12x63		HP 14x73		HP 14x89	
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)
2.0	7	12	7	13	8	15	9	16	10	18	11	20
4.0	11	19	13	24	16	29	16	30	19	34	20	36
7.0	13	23	16	29	19	35	20	36	23	43	24	44
9.0	18	33	22	40	27	48	28	51	33	60	35	64
12.0	27	49	34	61	40	74	42	76	50	90	51	94
14.0	34	62	42	77	51	93	53	96	63	114	65	119
17.0	52	94	64	116	77	140	81	146	95	173	100	182
17.5	94	172	117	213	140	255	145	264	172	312	177	322
18.0	121	220	150	273	180	328	185	337	219	399	225	410
18.5	148	269	184	334	220	400	226	410	267	486	274	498
19.0	148	286			230	418	266	484	315	573	322	585
19.5							273	497	318	578	370	673
20.0											388	705

Note: All piles reach Max Available NRB based on Pile Driving Stresses through bedrock. RED denotes pile length in bedrock.

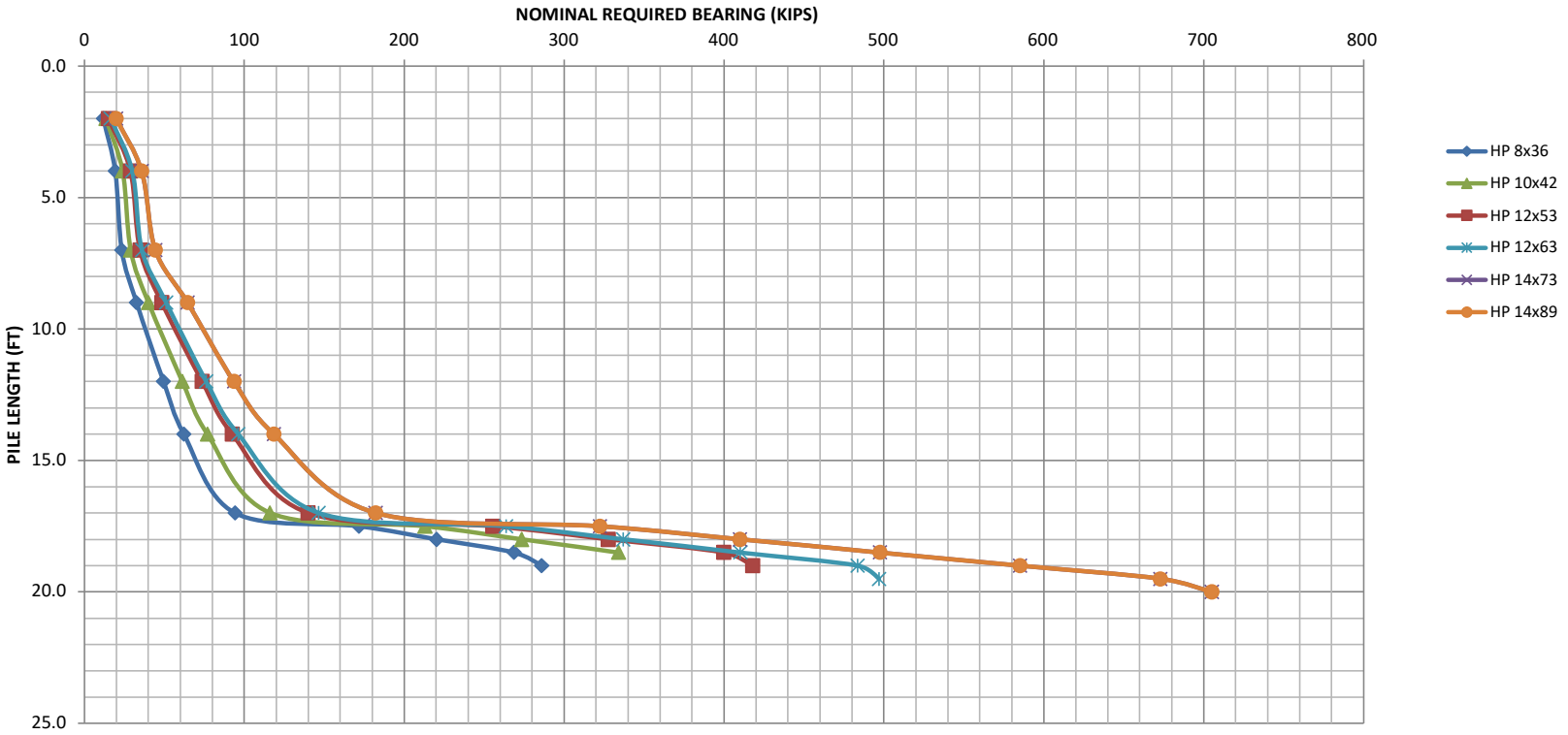
PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH

BORING BSB-12 Pier 3 EB



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH

BORING BSB-12 Pier 3 EB



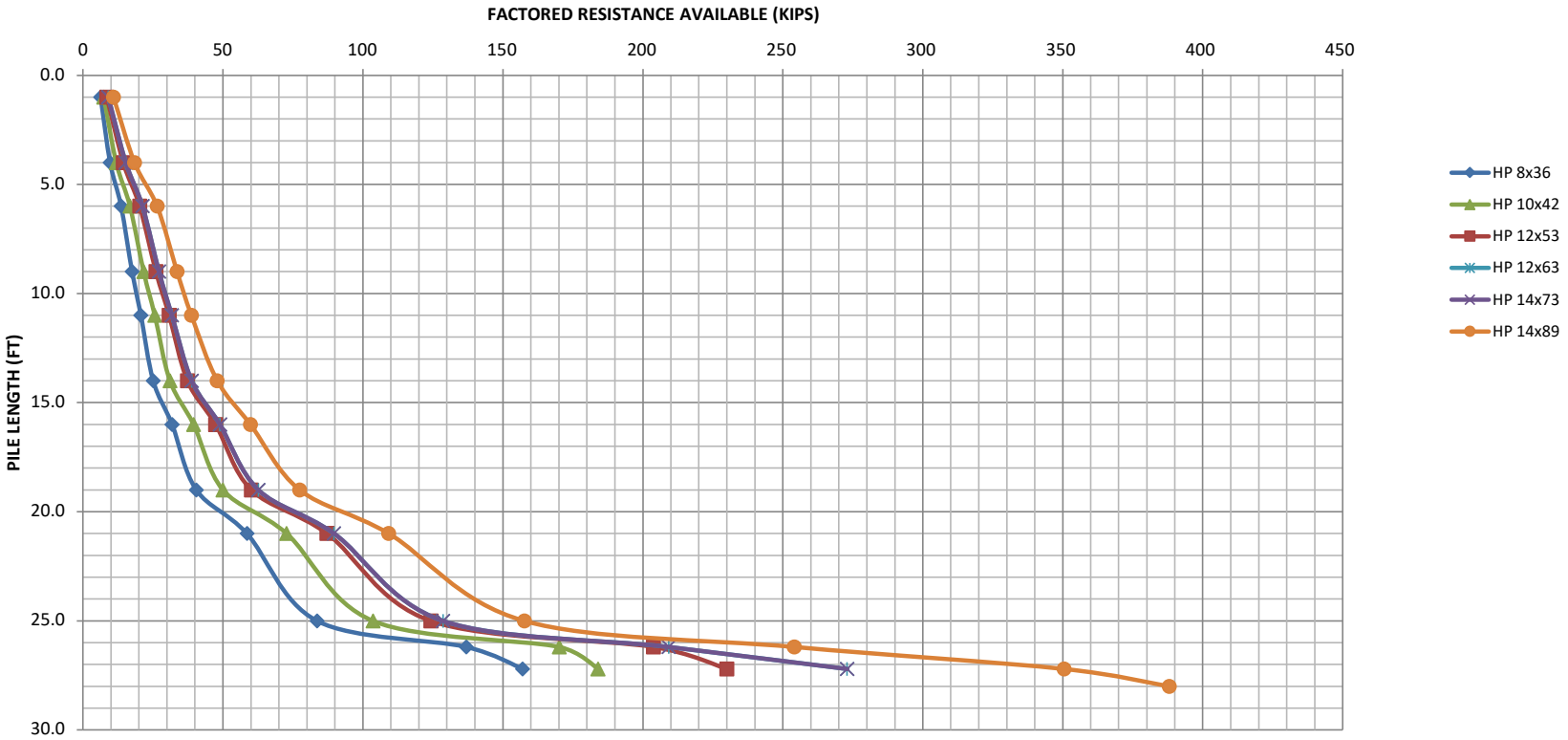
Estimated Pile Lengths and Capacities for the Pier 2 of the Proposed I-80 over Gardner St. and BNSF RR

Boring BSB-05 - Pier 2 WB (Ground Surface Elevation against Pile during driving = 544.30, Pile Cutoff Elevation = 540.50												
Estimated Pile Length (ft.)	HP 8x36		HP 10x42		HP 12x53		HP 12x63		HP 14x73		HP 14x89	
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Required Bearing NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)
1.0	6	11	7	14	9	16	9	16	10	19	11	20
4.0	10	18	12	22	14	26	15	28	17	31	18	33
6.0	14	25	17	31	20	37	21	39	25	46	26	48
9.0	18	32	22	39	26	47	27	49	32	58	34	61
11.0	21	38	26	47	31	56	32	58	38	68	39	70
14.0	25	46	31	56	37	68	39	71	46	83	48	87
16.0	32	58	39	72	47	86	49	89	58	105	60	109
19.0	40	74	50	91	60	109	63	114	74	135	77	141
21.0	59	106	73	132	87	158	90	163	106	193	109	198
25.0	84	152	104	188	124	226	129	234	152	277	158	287
26.2	137	249	170	309	204	371	209	381	248	450	254	462
27.2	157	286	184	335	230	418	273	497	318	578	350	637
28.0											388	705

Note: All piles reach Max Available NRB based on Pile Driving Stresses through bedrock.

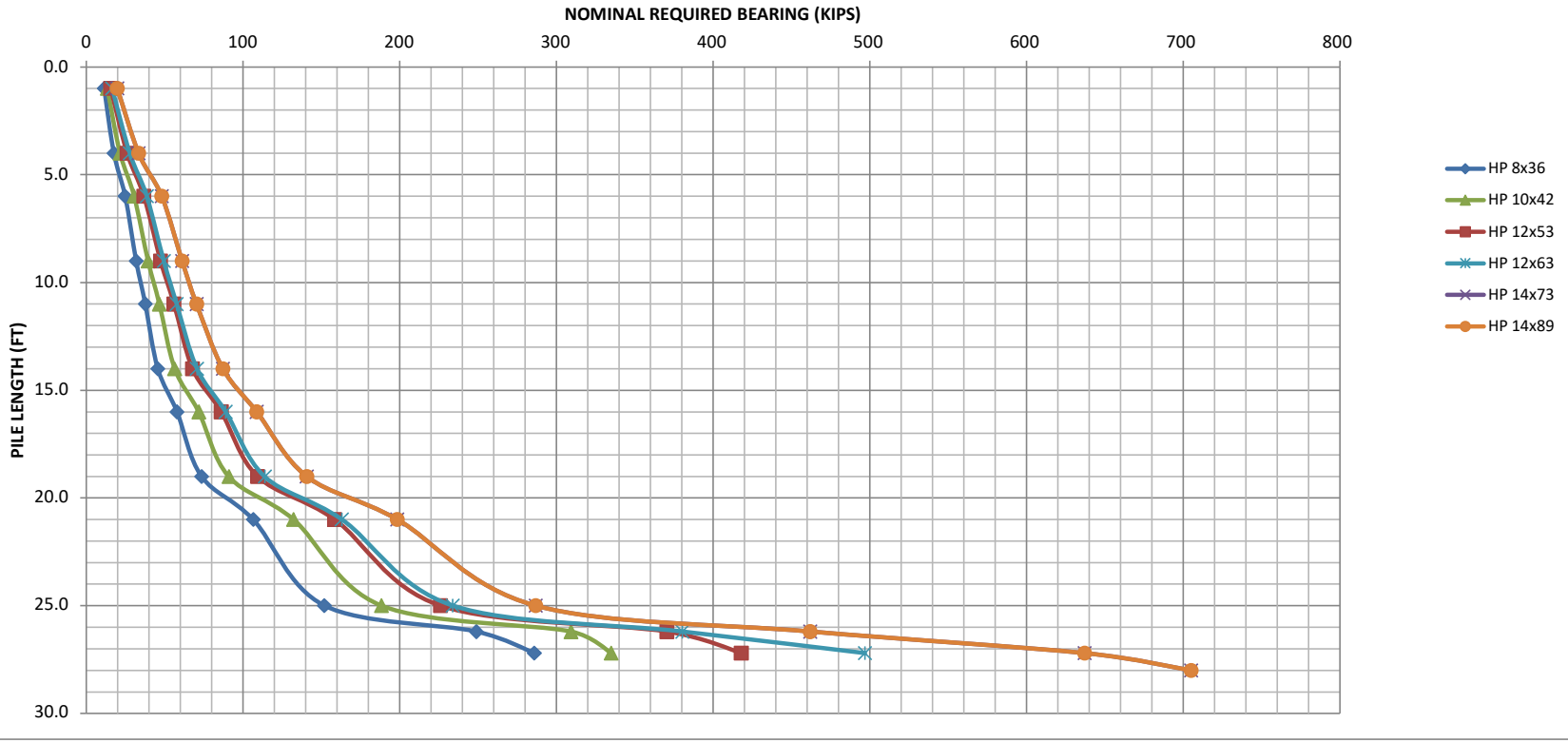
PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH

BORING BSB-05 Pier 2 WB



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH

BORING BSB-05 Pier 2 WB



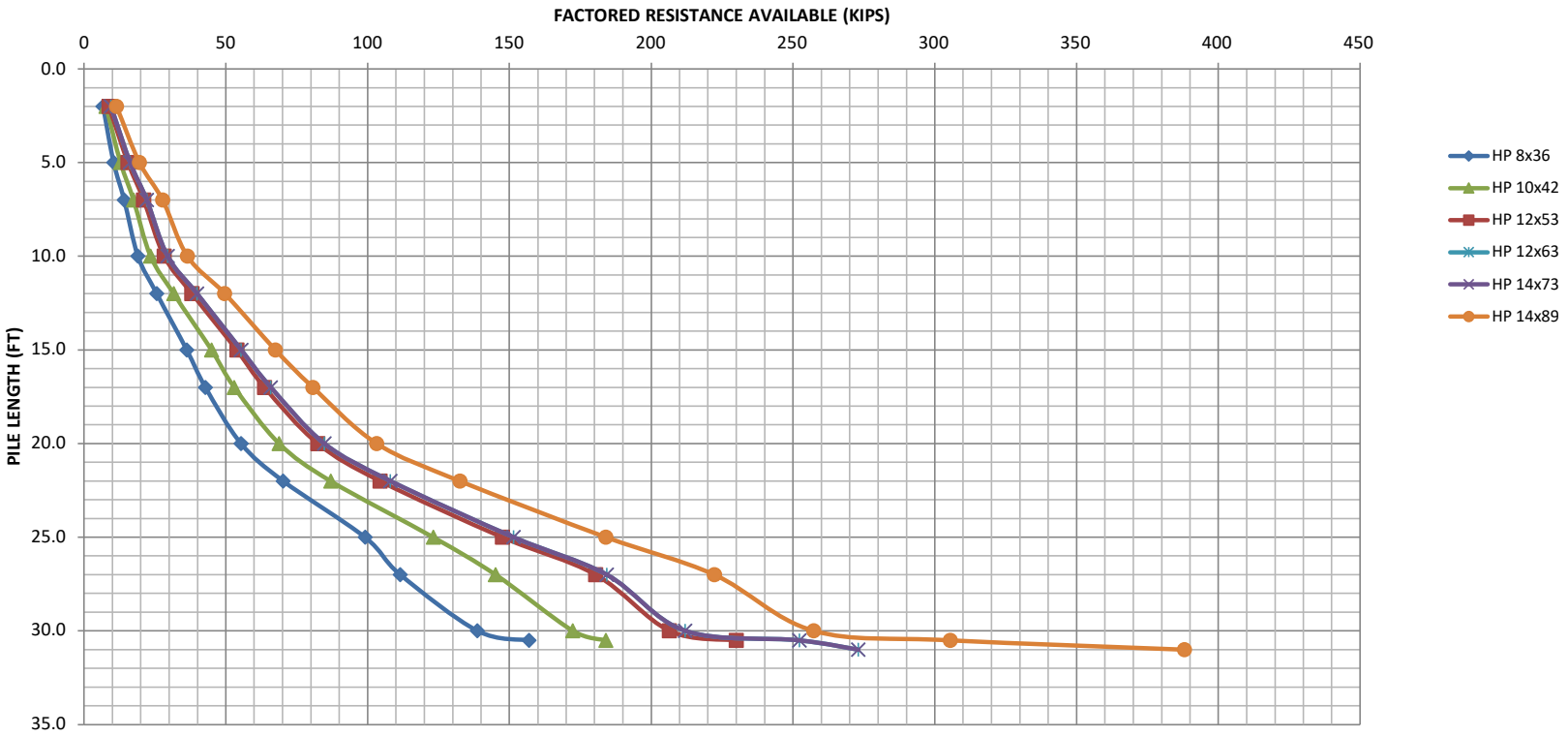
Estimated Pile Lengths and Capacities for the Pier 2 of the Proposed I-80 over Gardner St. and BNSF RR

Boring BSB-06, Pier 2 EB (Ground Surface Elevation against Pile during driving = 543.50, Pile Cutoff Elevation = 540.50)

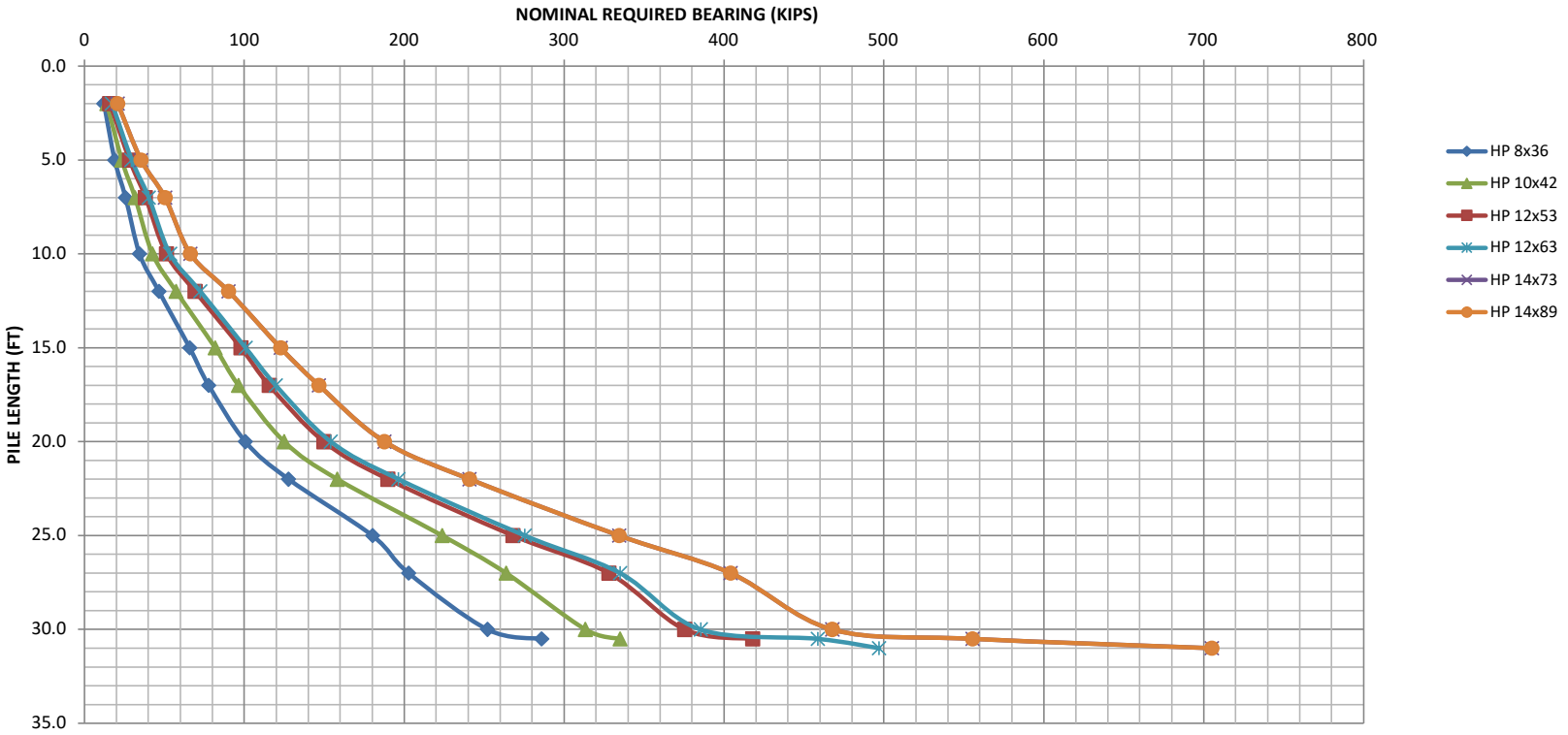
Estimated Pile Length (ft.)	HP 8x36		HP 10x42		HP 12x53		HP 12x63		HP 14x73		HP 14x89	
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)
2.0	7	12	8	14	9	16	9	17	10	19	11	21
5.0	10	19	13	23	15	28	16	30	19	34	20	35
7.0	14	26	17	32	21	38	22	40	26	48	28	50
10.0	19	35	23	43	28	51	29	54	35	63	36	66
12.0	26	47	32	57	38	69	40	72	47	86	50	90
15.0	36	66	45	82	54	98	55	101	66	119	67	123
17.0	43	78	53	96	64	116	66	120	78	141	81	147
20.0	55	101	69	125	82	150	85	154	100	182	103	188
22.0	70	128	87	158	104	190	108	196	128	232	132	241
25.0	99	180	123	224	147	268	151	275	179	326	184	334
27.0	112	203	145	264	180	328	184	335	218	397	222	404
30.0	139	252	172	313	206	375	212	385	251	456	257	468
30.5	157	286	184	335	230	418	252	459	299	543	305	555
31.0							273	497	318	578	388	705

Note: All piles reach Max Available NRB based on Pile Driving Stresses through bedrock. RED denotes pile length in bedrock.

PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH
BORING BSB-06 Pier 2 EB



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
BORING BSB-06 Pier 2 EB



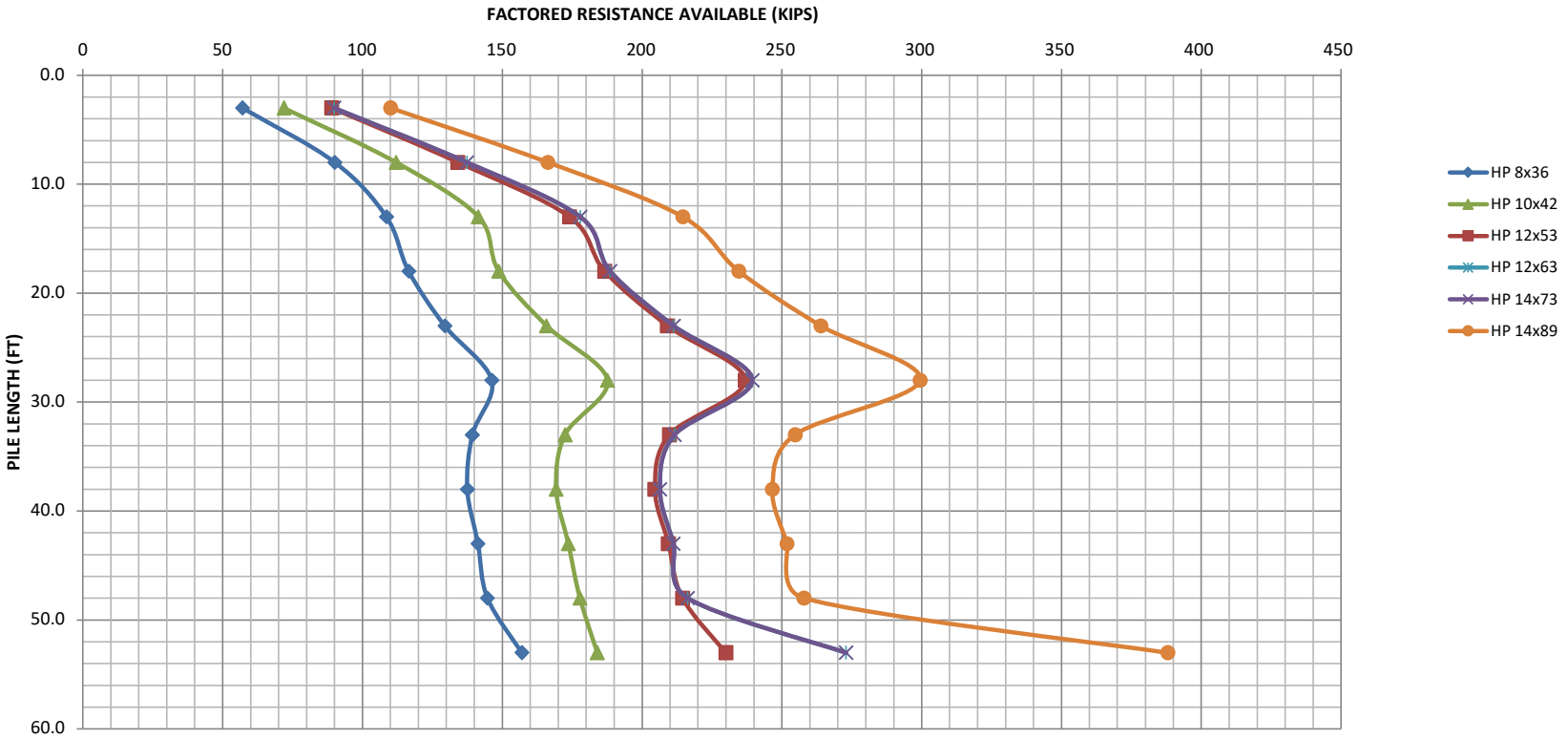
Estimated Pile Lengths and Capacities for the Pier 1 of the Proposed I-80 over Gardner St. and BNSF RR

Boring BSB-01 - Pier 1 WB (Ground Surface Elevation against Pile during driving = 577.10, Pile Cutoff Elevation = 544.50												
Estimated Pile Length (ft.)	HP 8x36		HP 10x42		HP 12x53		HP 12x63		HP 14x73		HP 14x89	
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Required Bearing NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)
3.0	57	104	72	131	89	162	90	163	109	198	110	200
8.0	90	164	112	204	134	244	137	250	163	296	166	302
13.0	109	197	141	257	174	317	178	323	211	383	215	390
18.0	117	212	149	270	187	339	189	343	231	421	235	427
23.0	129	235	166	302	209	380	211	384	260	473	264	480
28.0	146	266	188	341	237	431	239	435	295	537	299	545
33.0	139	253	172	314	210	381	212	385	252	458	255	463
38.0	138	250	169	308	205	372	206	375	244	443	247	448
43.0	141	257	174	316	209	381	211	384	249	453	252	458
48.0	145	263	178	323	214	390	216	393	255	464	258	469
53.0	157	286	184	335	230	418	273	497	318	578	388	705

Note: All piles reach Max Available NRB based on Pile Driving Stresses through bedrock.

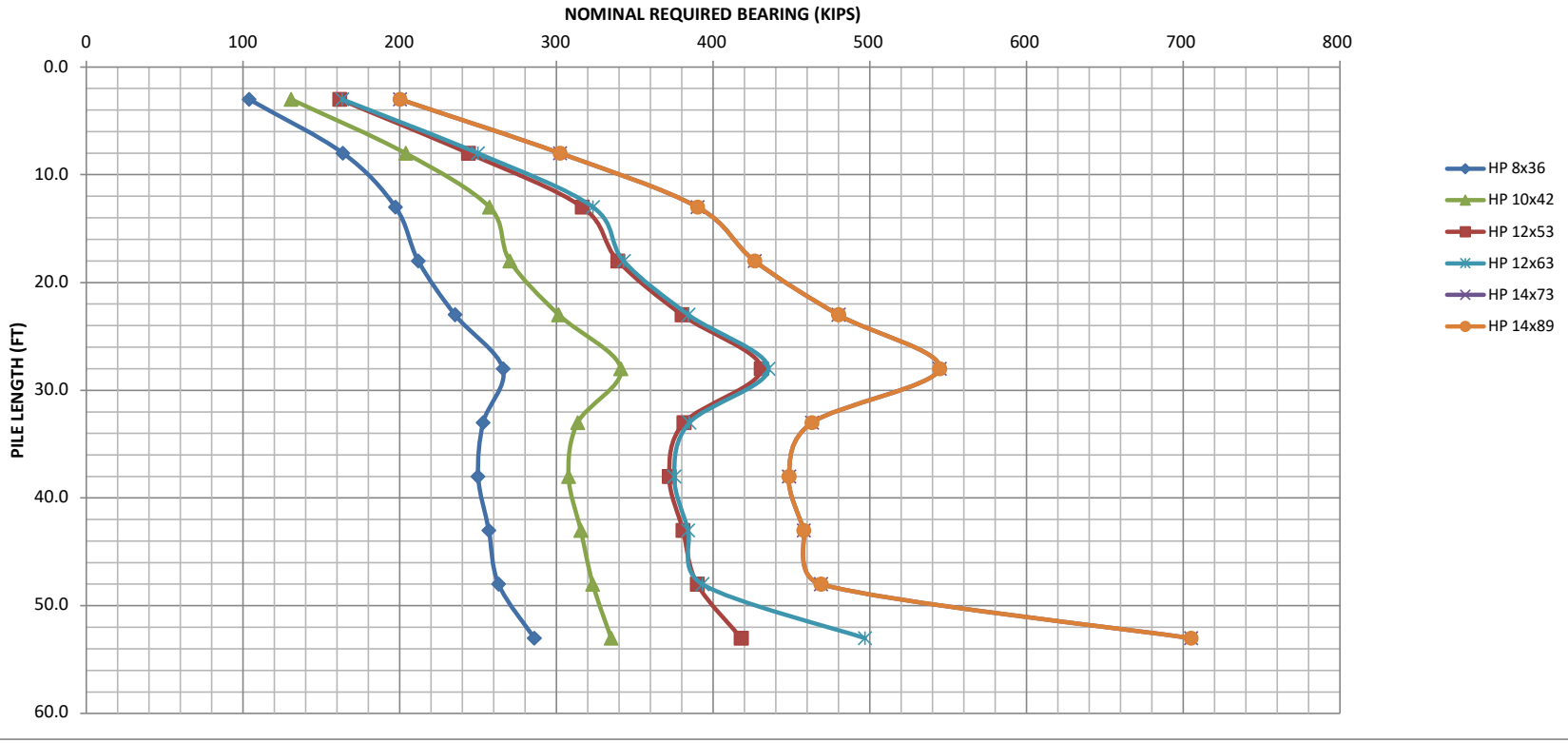
PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH

BORING BSB-01 Pier 1 WB



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH

BORING BSB-01 Pier 1 WB



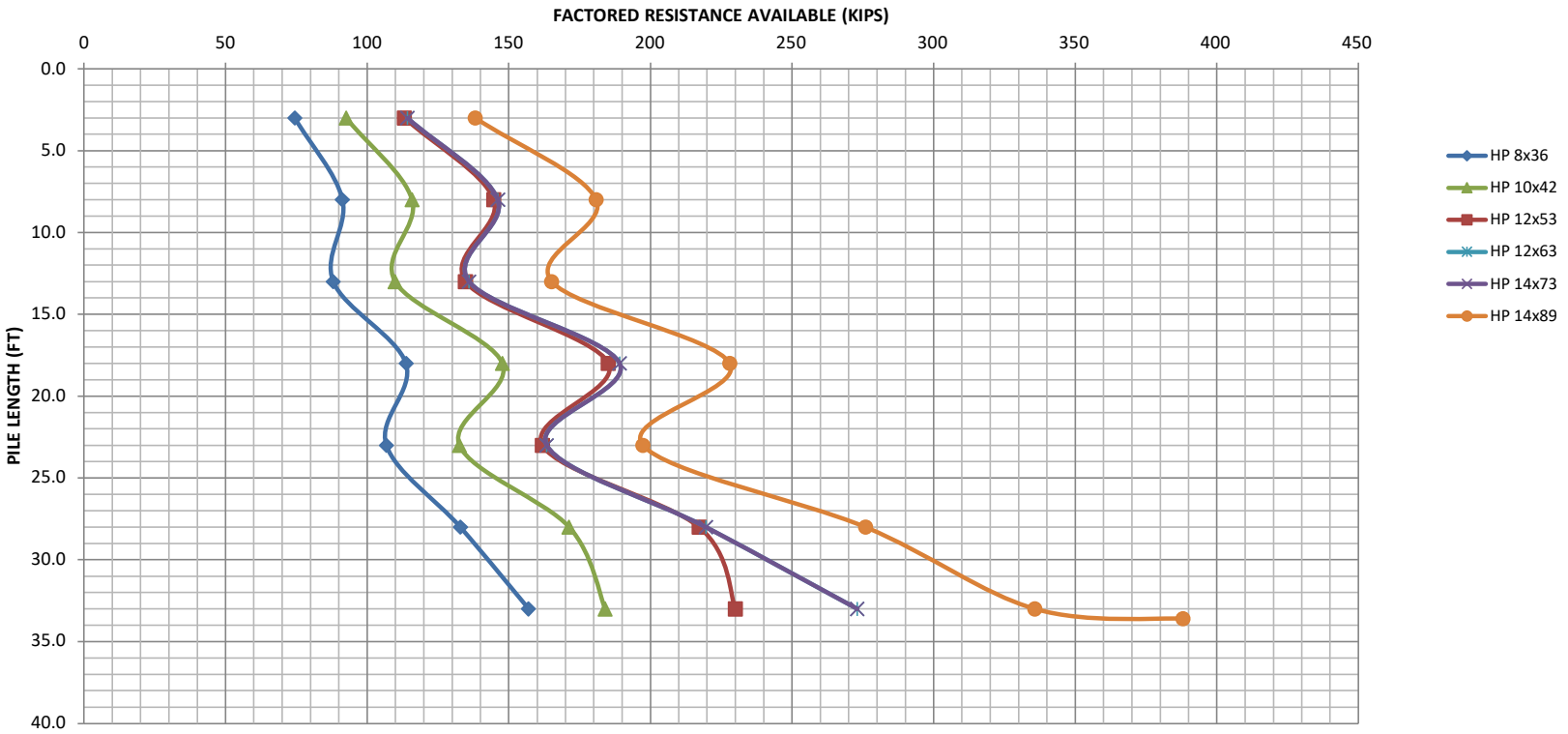
Estimated Pile Lengths and Capacities for the Pier 1 of the Proposed I-80 over Gardner St. and BNSF RR

Boring BSB-02 - Pier 1 EB (Ground Surface Elevation against Pile during driving = 576.9, Pile Cutoff Elevation = 544.50												
Estimated Pile Length (ft.)	HP 8x36		HP 10x42		HP 12x53		HP 12x63		HP 14x73		HP 14x89	
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)
3.0	74	135	93	168	113	206	114	208	137	248	138	251
8.0	91	166	116	211	145	263	146	266	178	324	181	329
13.0	88	160	110	200	135	245	136	247	163	297	165	300
18.0	114	207	148	269	185	337	189	344	224	407	228	415
23.0	107	194	133	241	162	294	163	297	195	355	197	359
28.0	133	242	171	311	217	395	220	399	272	495	276	502
33.0	157	286	184	335	230	418	273	497	318	578	336	610
33.6											388	705

Note: All piles reach Max Available NRB based on Pile Driving Stresses through bedrock. RED denotes pile length in bedrock.

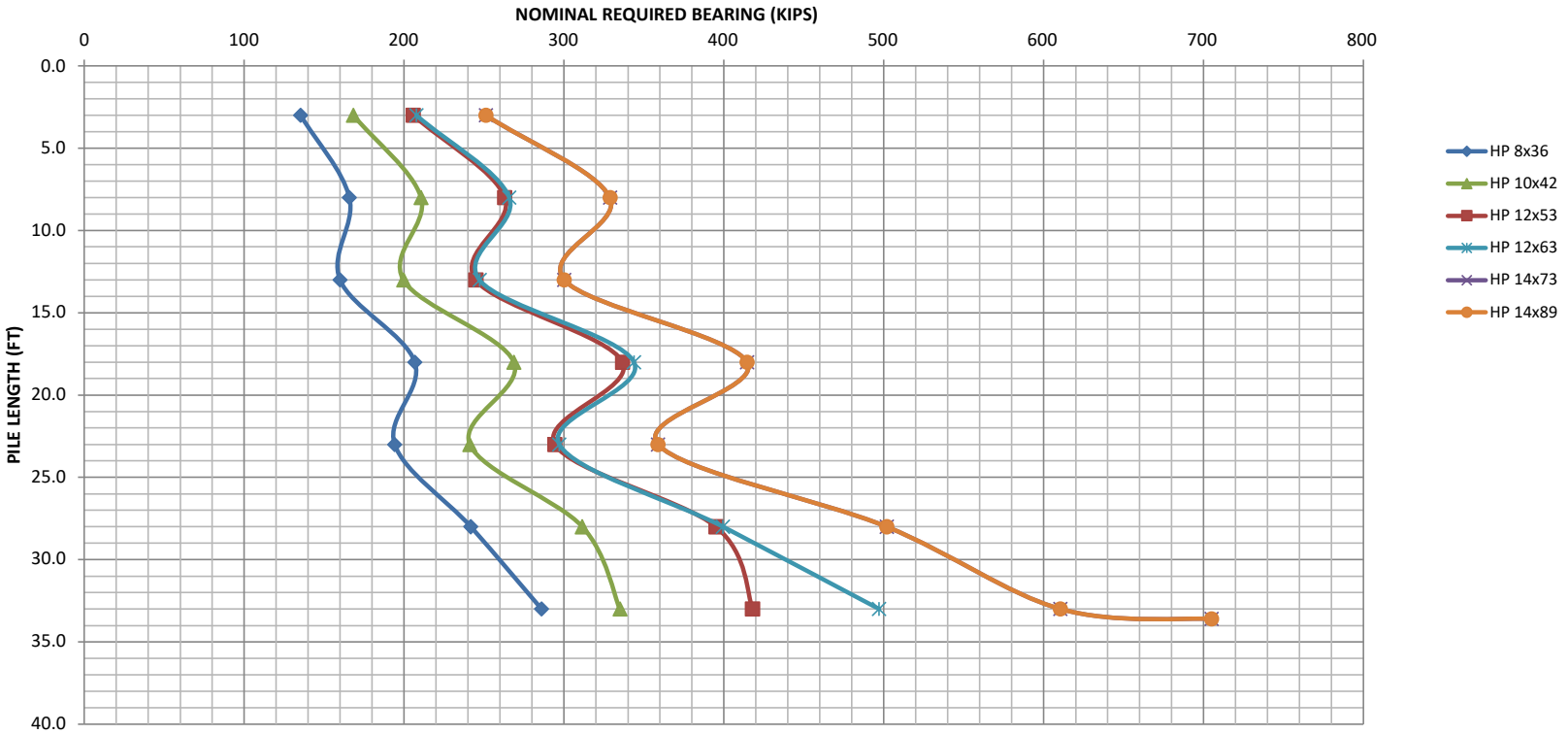
PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH

BORING BSB-02 Pier 1 EB



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH

BORING BSB-02 Pier 1 EB



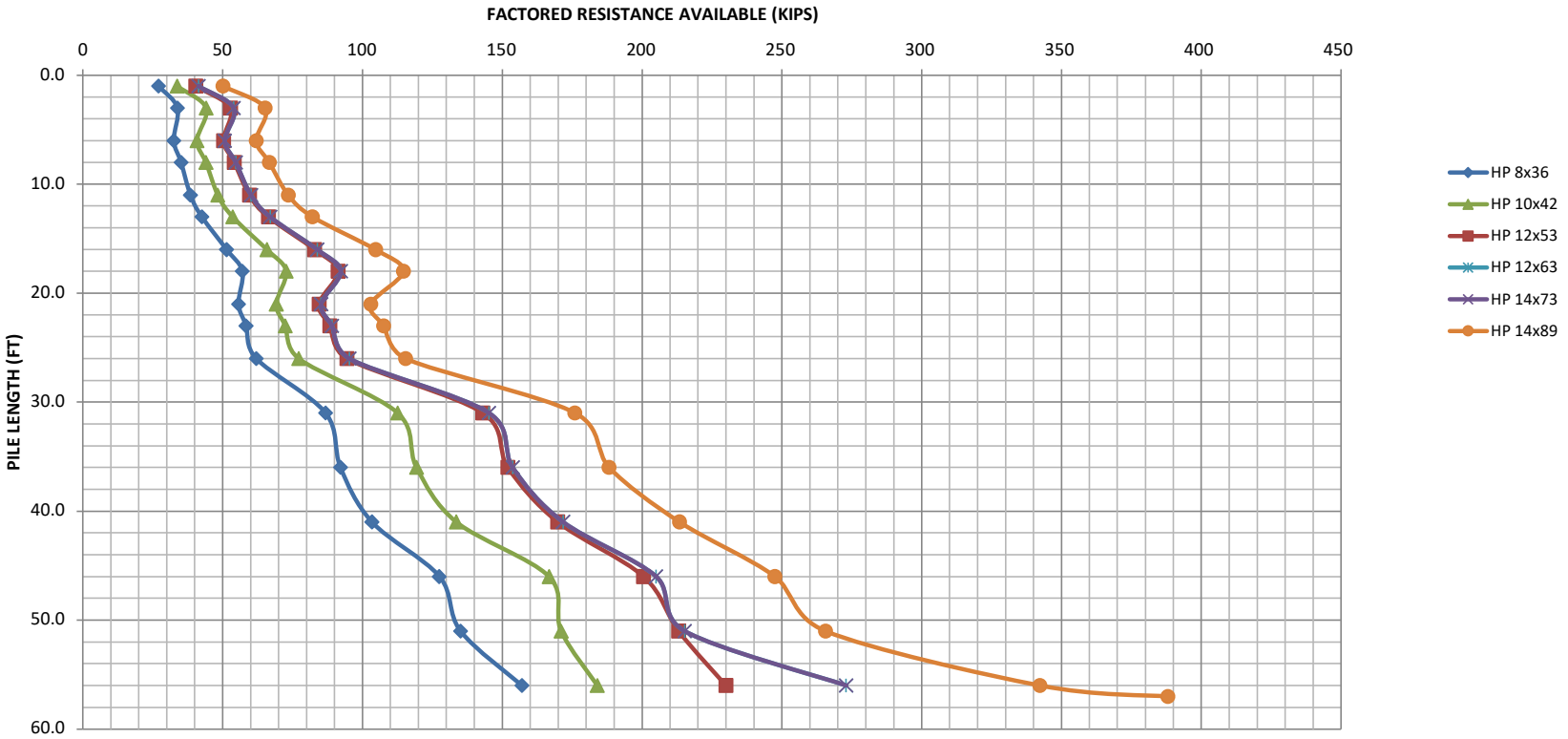
Estimated Pile Lengths and Capacities for the West Abutments of the Proposed I-80 over Gardner St. and BNSF RR

Boring BSB-54 - West Abutment WB (Ground Surface Elevation against Pile during driving = 574.83, Pile Cutoff Elevation = 569.90												
Estimated Pile Length (ft.)	HP 8x36		HP 10x42		HP 12x53		HP 12x63		HP 14x73		HP 14x89	
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Required Bearing NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)
1.0	27	49	34	61	40	9	41	75	49	89	50	91
3.0	34	62	44	80	53	22	54	98	64	116	65	118
6.0	33	59	41	74	50	42	51	92	61	111	62	113
8.0	35	64	44	80	54	51	55	99	66	120	67	121
11.0	38	70	48	88	60	60	60	109	73	132	73	134
13.0	43	77	54	97	66	74	67	122	81	147	82	149
16.0	51	93	66	120	83	89	84	152	103	188	105	190
18.0	57	104	73	132	91	105	92	168	113	206	115	208
21.0	56	101	69	126	84	127	85	155	102	185	103	187
23.0	58	106	72	132	88	161	89	162	106	193	108	196
26.0	62	113	77	140	94	187	95	173	114	207	115	210
31.0	87	158	113	205	143	198	145	264	173	315	176	320
36.0	92	168	119	217	152	209	154	280	185	336	188	342
41.0	103	188	134	243	170	220	172	312	210	382	213	388
46.0	127	232	167	303	201	244	205	373	243	441	248	450
51.0	135	246	171	311	213	316	215	391	262	477	266	483
56.0	157	286	184	335	230	418	273	497	318	578	342	622
57.0											388	705

Note: All piles reach Max Available NRB based on Pile Driving Stresses through bedrock.

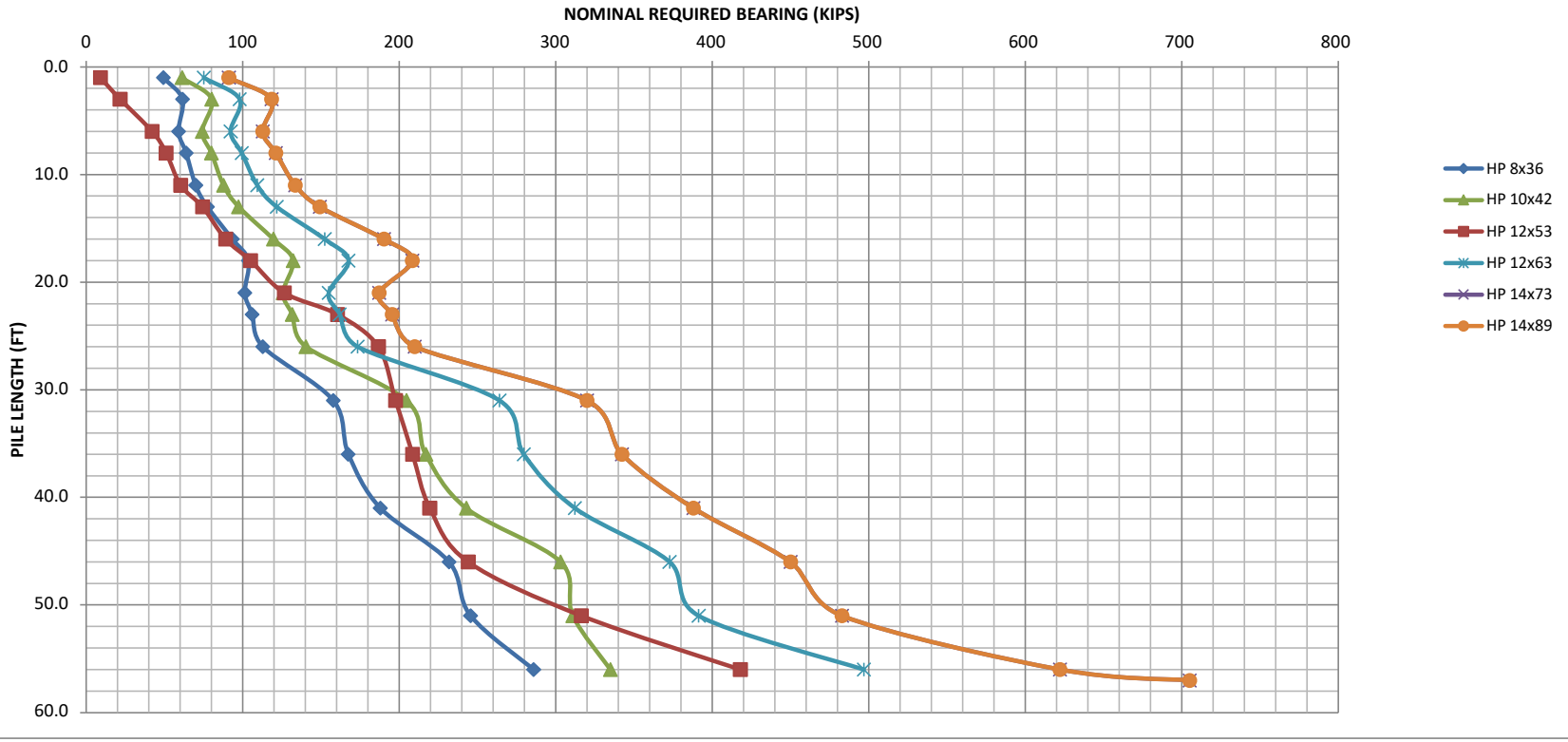
PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH

BORING BSB-54 West Abutment WB



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH

BORING BSB-54 West Abutment WB



Estimated Pile Lengths and Capacities for the West Abutments of the Proposed I-80 over Gardner St. and BNSF RR

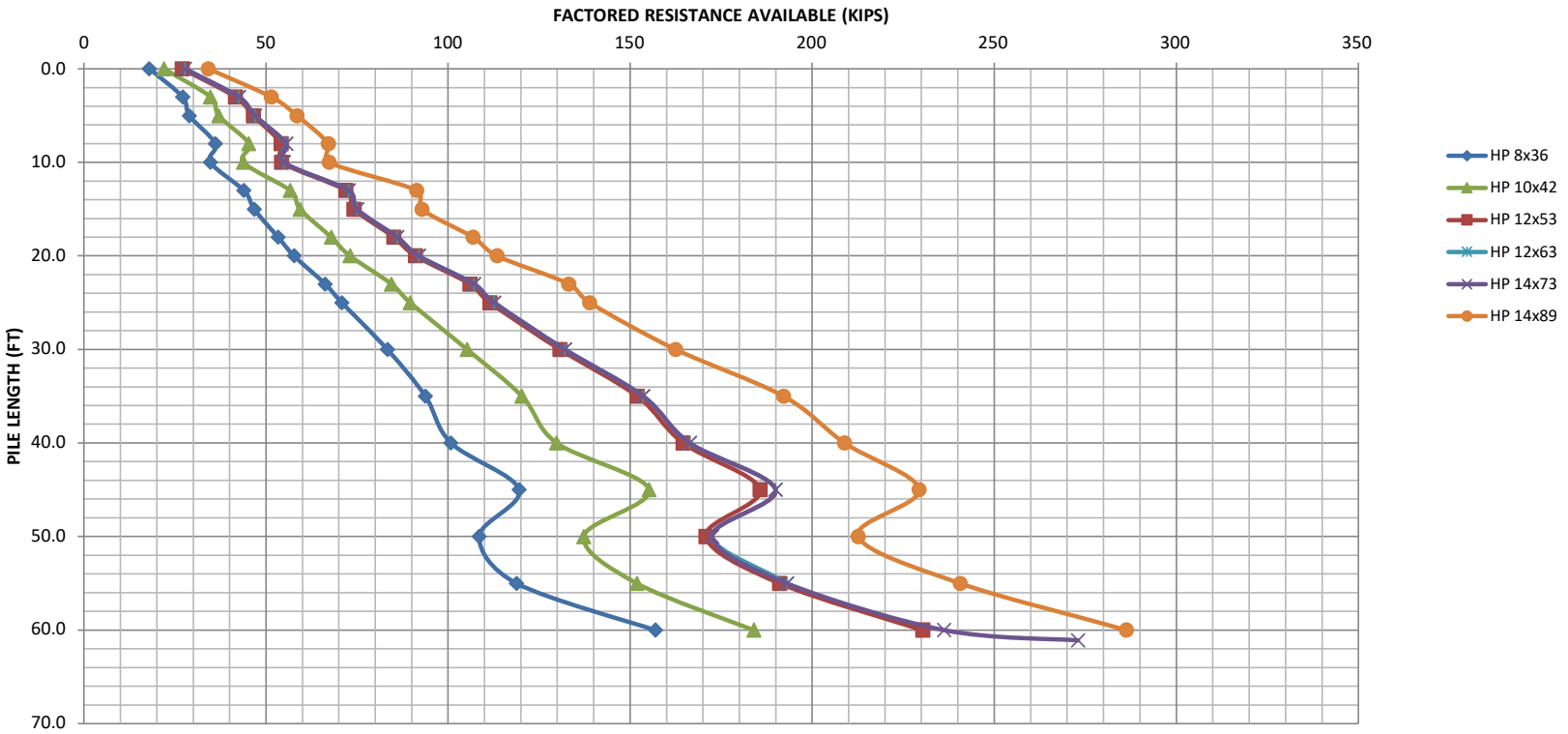
Boring BSB-55, West Abutment EB (Ground Surface Elevation against Pile during driving = 574.80, Pile Cutoff Elevation = 569.90)

Estimated Pile Length (ft.)	HP 8x36		HP 10x42		HP 12x53		HP 12x63		HP 14x73		HP 14x89	
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)
0.0	18	33	22	40	27	48	28	50	33	60	34	62
3.0	27	49	35	63	42	76	43	77	50	92	51	93
5.0	29	53	37	67	47	85	47	85	58	105	59	106
8.0	36	66	45	82	54	99	55	101	66	119	67	122
10.0	35	63	44	80	54	99	55	100	66	121	67	122
13.0	44	80	57	103	72	131	73	132	90	163	91	166
15.0	47	85	59	108	74	135	75	136	92	166	93	169
18.0	53	97	68	123	85	155	86	156	105	192	107	194
20.0	58	105	73	133	91	166	92	167	112	204	113	206
23.0	66	120	84	154	106	193	107	195	131	239	133	242
25.0	71	129	90	163	112	203	113	205	137	249	139	253
30.0	83	152	105	191	131	238	132	240	160	292	163	295
35.0	94	170	120	219	152	276	154	279	189	344	192	349
40.0	101	183	130	236	165	299	166	302	206	374	209	380
45.0	119	217	155	282	186	338	190	345	225	409	229	417
50.0	109	197	137	250	171	311	173	314	210	382	213	387
55.0	119	216	152	276	191	347	193	351	237	432	241	438
60.0	157	286	184	335	230	418	236	429	280	508	286	521
61.1							273	497	318	578	383	696
62.1											388	705

Note: All piles reach Max Available NRB based on Pile Driving Stresses through bedrock. RED denotes pile length in bedrock.

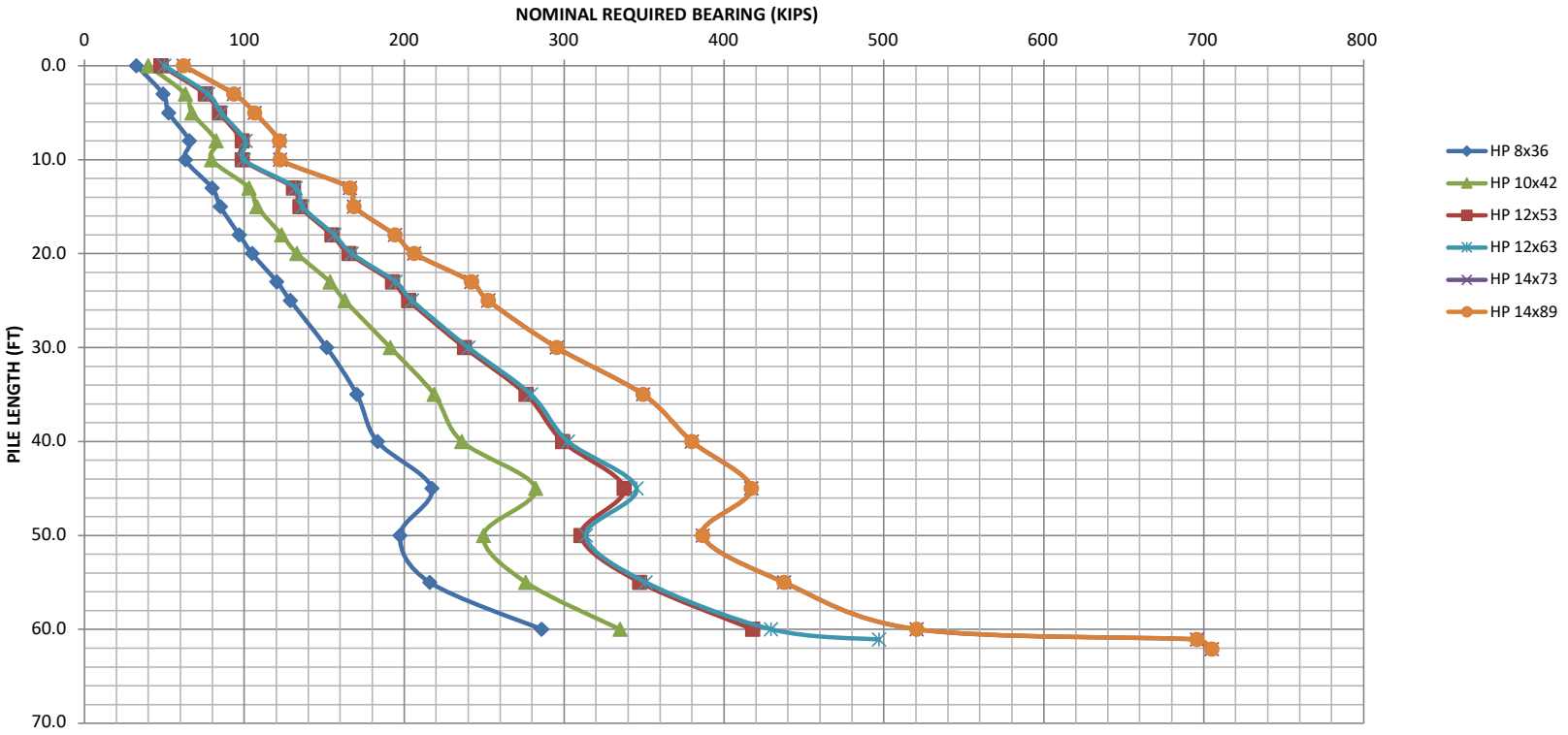
PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH

BORING BSB-55 West Abutment EB



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH

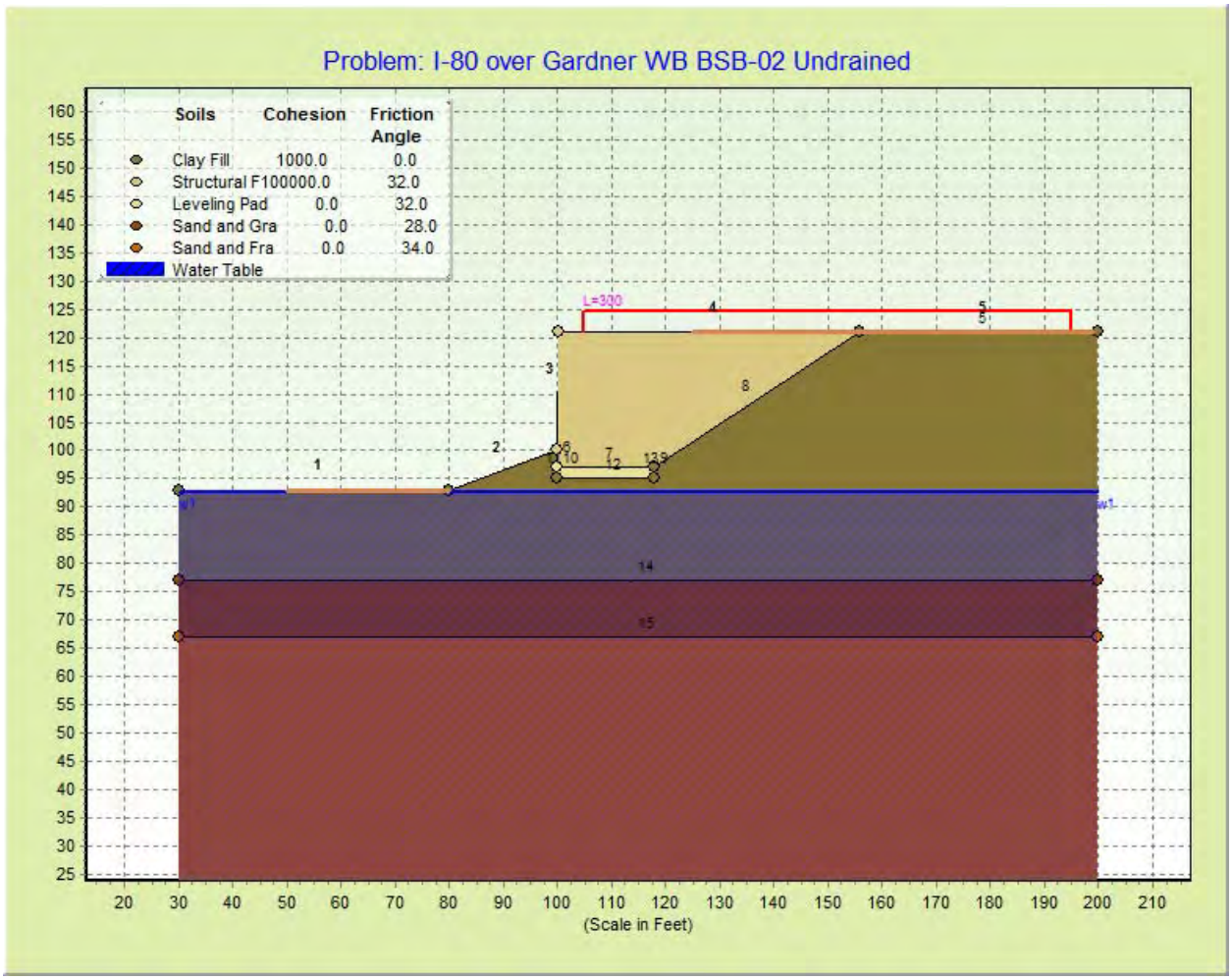
BORING BSB-55 West Abutment EB



APPENDIX F

SLOPE STABILITY RESULTS

========== DATA SUMMARY ==========



Profile Data

Segment Number	Left Extreme X	Left Extreme Y	Right Extreme X	Right Extreme Y	Soil Under Segment
1	30	93	80	93	1
2	80	93	100	100	1
3	100	100	100.1	121	2
4	100.1	121	156	121	2
5	156	121	200	121	1
6	100	100	100	97	2
7	100	97	118	97	3
8	118	97	156	121	1
9	118	97	118	95	1
10	100	97	100	95	3

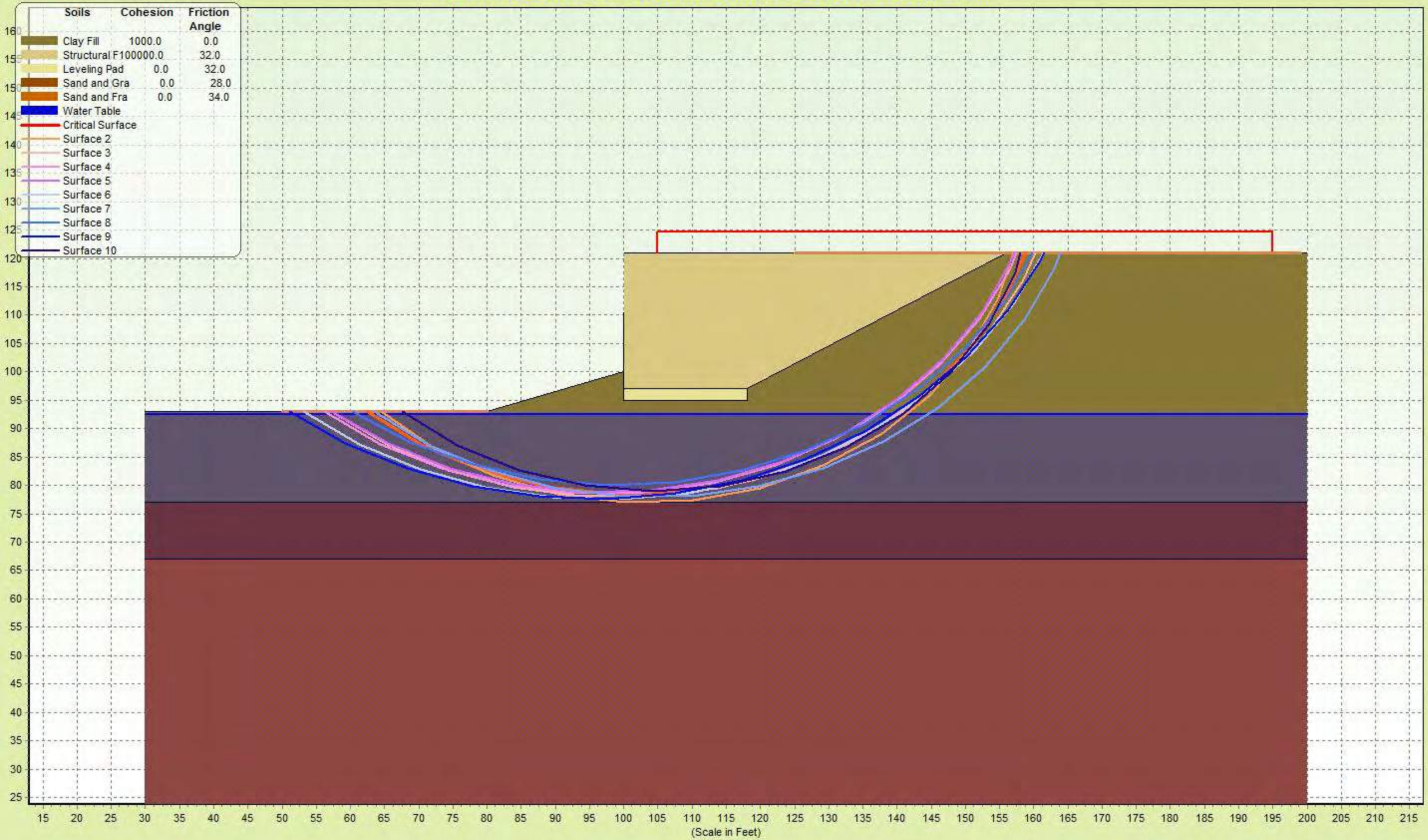
Segment Number	Left Extreme X	Left Extreme Y	Right Extreme X	Right Extreme Y	Soil Under Segment
11	100	95	100	97	3
12	100	95	118	95	1
13	118	95	118	97	1
14	30	77	200	77	4
15	30	67	200	67	5

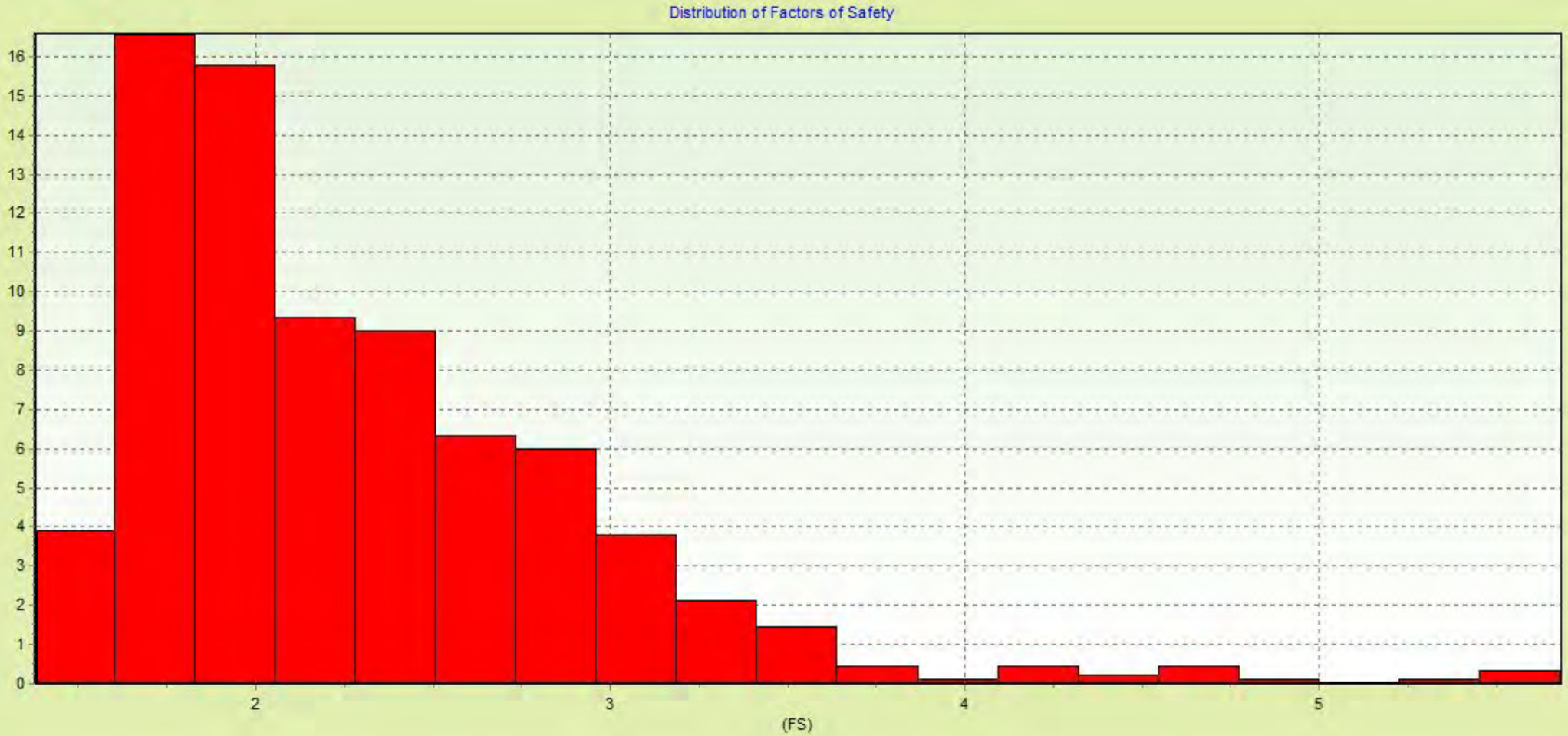
Soil Properties

Soil Number	Wet Unit Weight	Saturated Unit Weight	Cohesive Intercept	Friction Angle	Ru	Pressure Head	Water Table	Soil Name
1	120	125	1000	0	0	0	1	Clay Fill
2	120	125	100000	32	0	0	1	Structural Fill
3	120	125	0	32	0	0	1	Leveling Pad
4	120	125	0	28	0	0	1	Sand and
5	130	132	0	34	0	0	1	Sand and Frac

Problem: I-80 over Gardner WB BSB-02 Undrained - FS Min- Bishop = 1.53

Soils	Cohesion	Friction Angle
Clay Fill	1000.0	0.0
Structural F	100000.0	32.0
Leveling Pad	0.0	32.0
Sand and Gra	0.0	28.0
Sand and Fra	0.0	34.0
Water Table		
Critical Surface		
Surface 2		
Surface 3		
Surface 4		
Surface 5		
Surface 6		
Surface 7		
Surface 8		
Surface 9		
Surface 10		

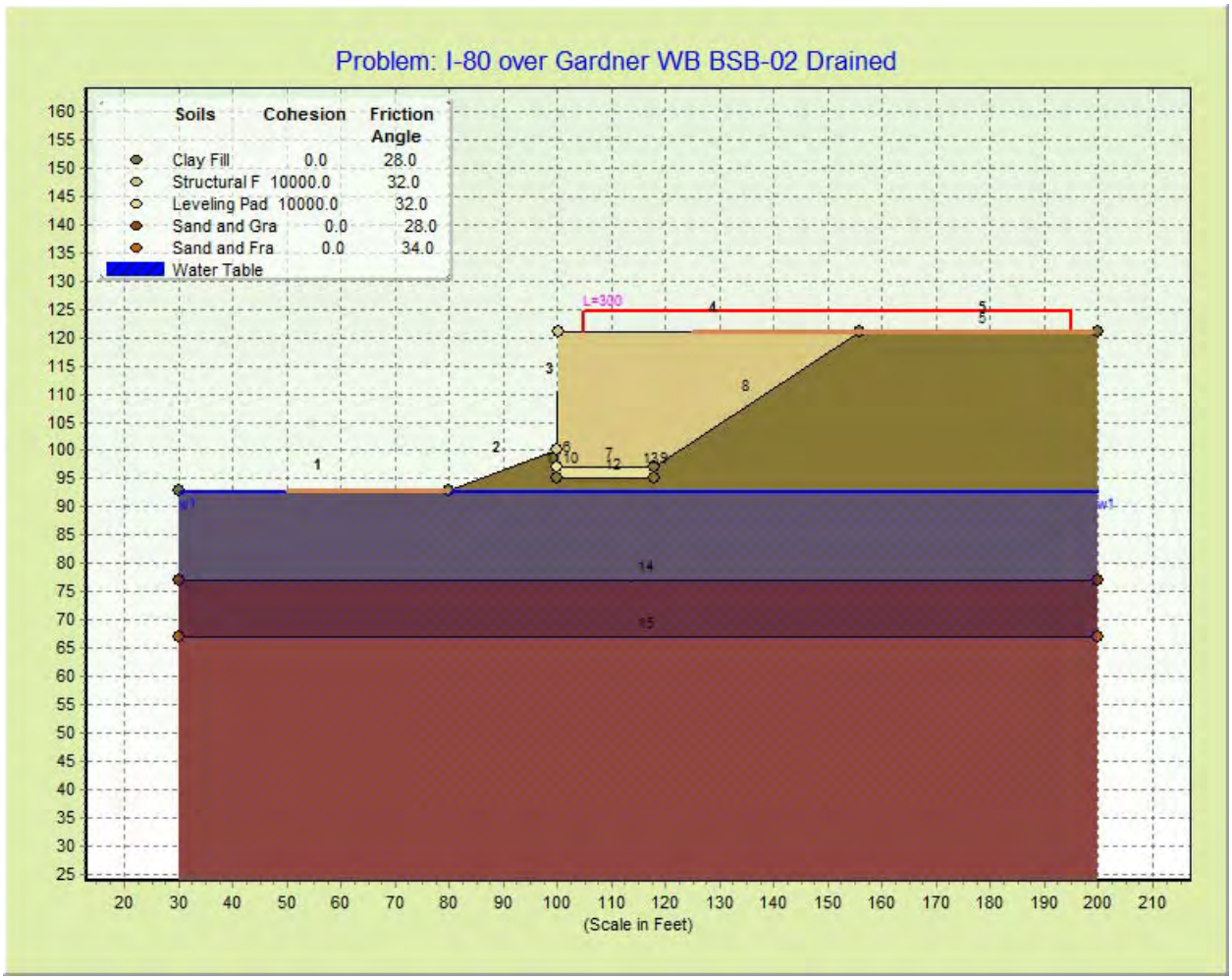




Factor of safety distribution

	Surface	Factor of Safety
▶	Surface # 1	1.53
	Surface # 2	1.534
	Surface # 3	1.535
	Surface # 4	1.536
	Surface # 5	1.536
	Surface # 6	1.538
	Surface # 7	1.544
	Surface # 8	1.546
	Surface # 9	1.551
	Surface # 10	1.554

========== DATA SUMMARY ==========



Profile Data

Segment Number	Left Extreme X	Left Extreme Y	Right Extreme X	Right Extreme Y	Soil Under Segment
1	30	93	80	93	1
2	80	93	100	100	1
3	100	100	100.1	121	2
4	100.1	121	156	121	2
5	156	121	200	121	1
6	100	100	100	97	2
7	100	97	118	97	3
8	118	97	156	121	1
9	118	97	118	95	1
10	100	97	100	95	3

Segment Number	Left Extreme X	Left Extreme Y	Right Extreme X	Right Extreme Y	Soil Under Segment
11	100	95	100	97	3
12	100	95	118	95	1
13	118	95	118	97	1
14	30	77	200	77	4
15	30	67	200	67	5

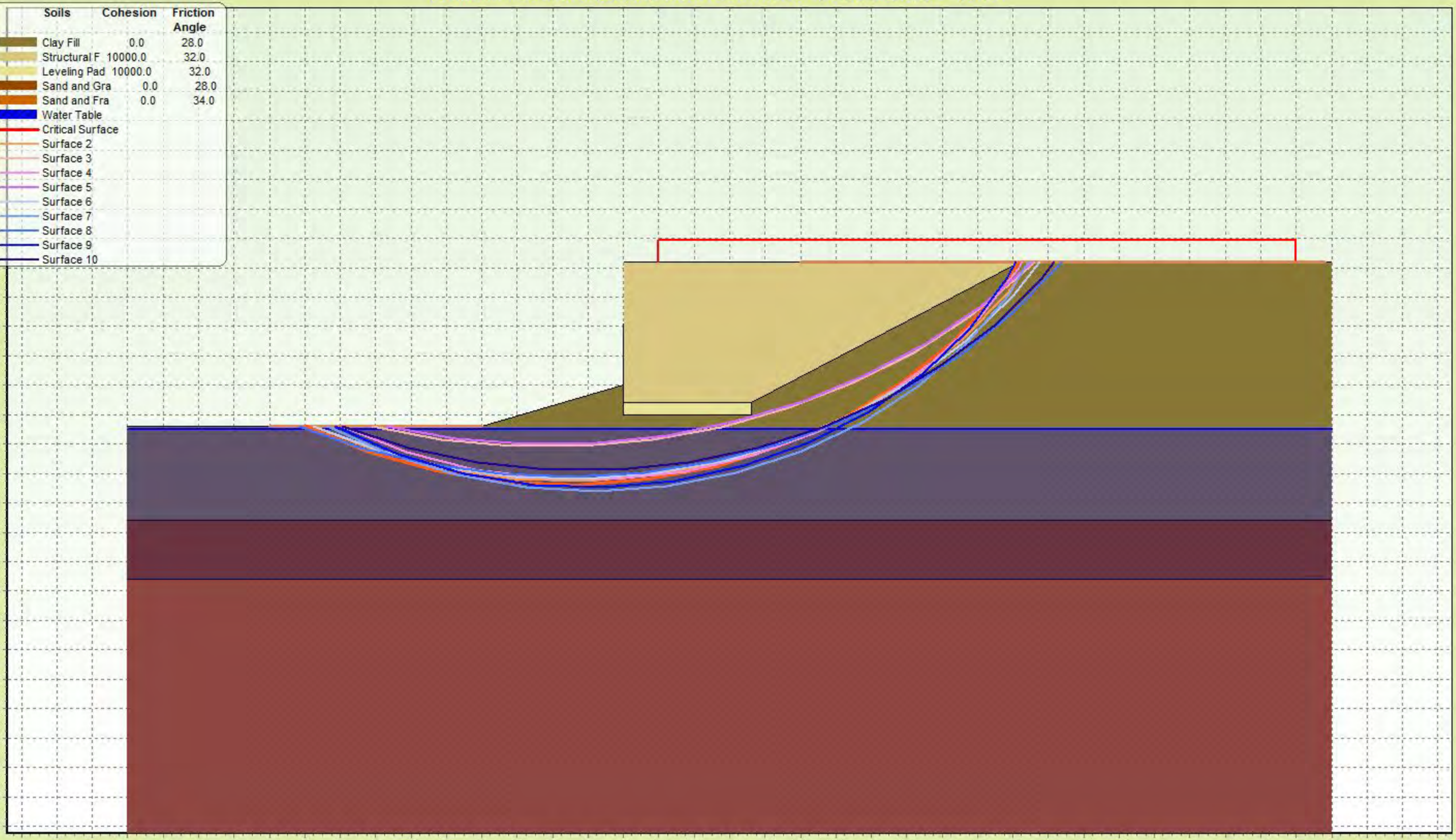
Soil Properties

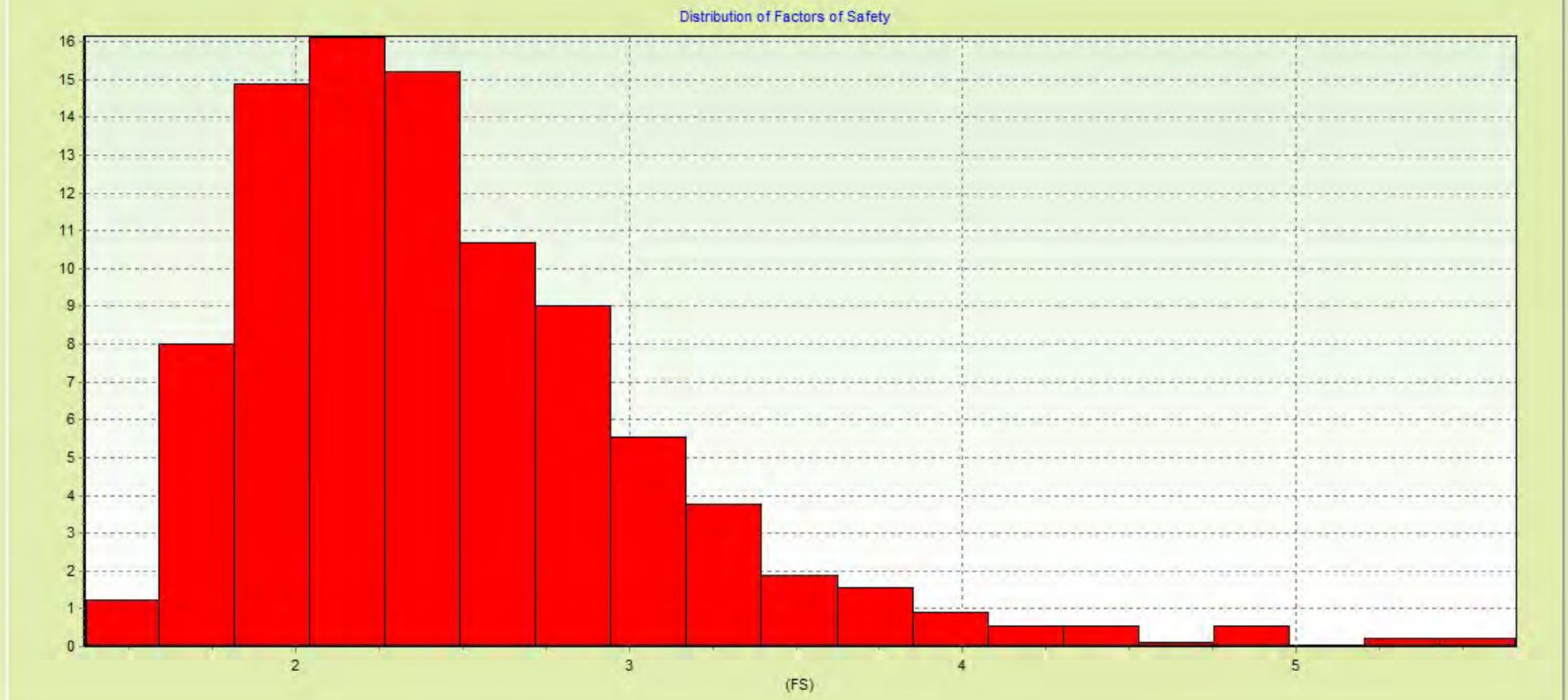
Soil Number	Wet Unit Weight	Saturated Unit Weight	Cohesive Intercept	Friction Angle	Ru	Pressure Head	Water Table	Soil Name
1	120	125	0	28	0	0	1	Clay Fill
2	120	125	10000	32	0	0	1	Structural Fill
3	125	130	10000	32	0	0	1	Leveling Pad
4	120	125	0	28	0	0	1	Sand and
5	130	132	0	34	0	0	1	Sand and Frac

Problem: I-80 over Gardner WB BSB-02 Drained - FS Min- Bishop = 1.518

Soils	Cohesion	Friction Angle
Clay Fill	0.0	28.0
Structural F	10000.0	32.0
Leveling Pad	10000.0	32.0
Sand and Gra	0.0	28.0
Sand and Fra	0.0	34.0

Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10

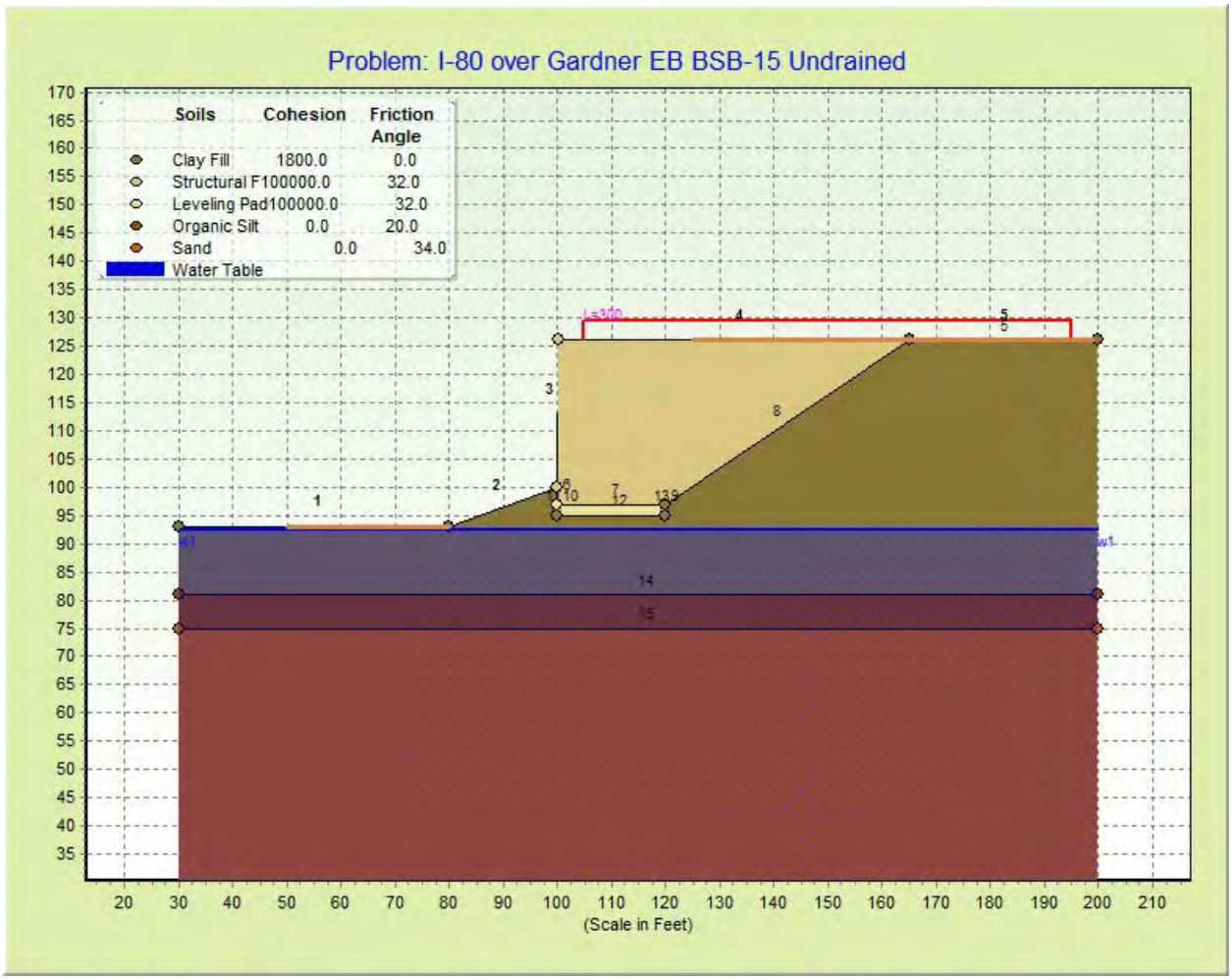




Factor of safety distribution

	Surface	Factor of Safety
▶	Surface # 1	1.518
	Surface # 2	1.521
	Surface # 3	1.524
	Surface # 4	1.525
	Surface # 5	1.525
	Surface # 6	1.538
	Surface # 7	1.565
	Surface # 8	1.574
	Surface # 9	1.579
	Surface # 10	1.584

========== DATA SUMMARY ==========



Profile Data

Segment Number	Left Extreme X	Left Extreme Y	Right Extreme X	Right Extreme Y	Soil Under Segment
1	30	93	80	93	1
2	80	93	100	100	1
3	100	100	100.1	126	2
4	100.1	126	165	126	2
5	165	126	200	126	1
6	100	100	100	97	2
7	100	97	120	97	3
8	120	97	165	126	1
9	120	97	120	95	1
10	100	97	100	95	3

Segment Number	Left Extreme X	Left Extreme Y	Right Extreme X	Right Extreme Y	Soil Under Segment
11	100	95	100	97	3
12	100	95	120	95	1
13	120	95	120	97	1
14	30	81	200	81	4
15	30	75	200	75	5

Soil Properties

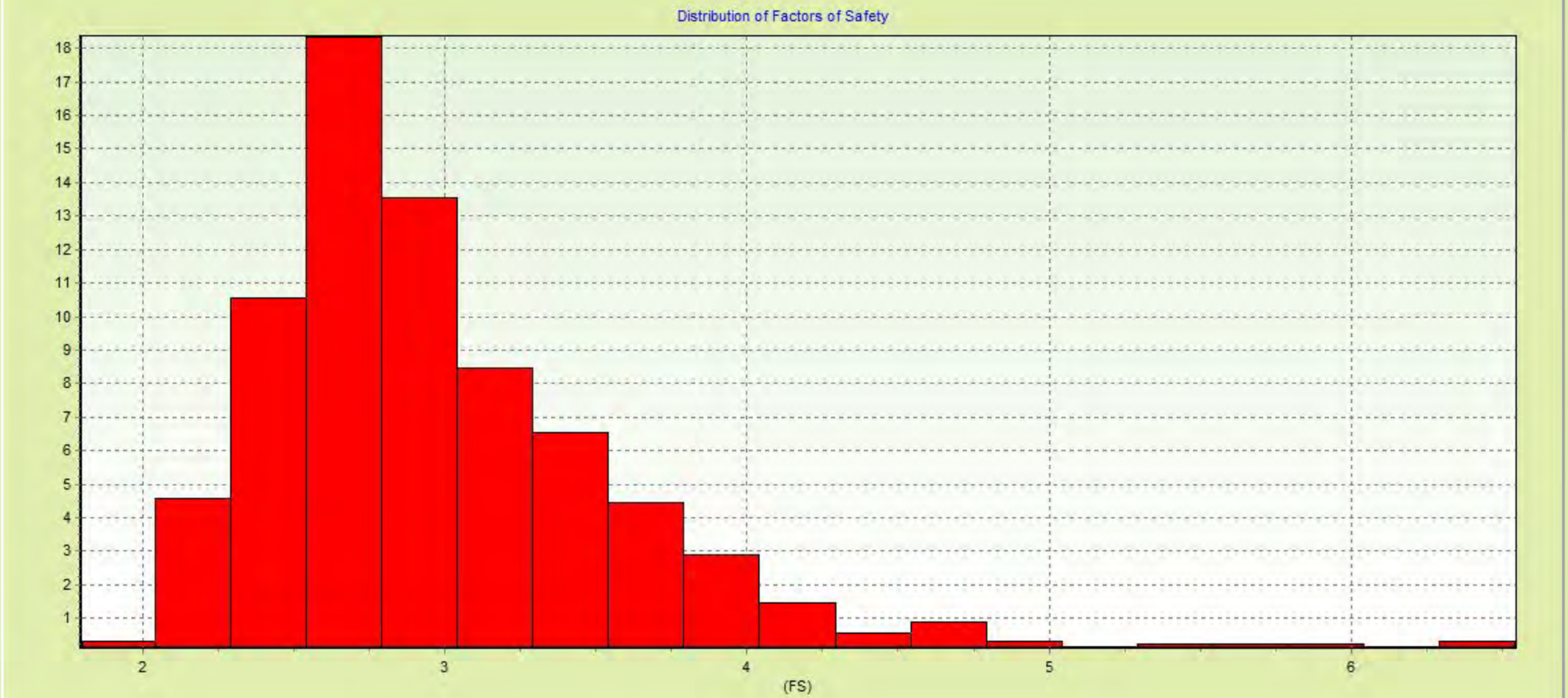
Soil Number	Wet Unit Weight	Saturated Unit Weight	Cohesive Intercept	Friction Angle	Ru	Pressure Head	Water Table	Soil Name
1	120	125	1800	0	0	0	1	Clay Fill
2	120	125	100000	32	0	0	1	Structural Fill
3	120	125	100000	32	0	0	1	Leveling Pad
4	100	110	0	20	0	0	1	Organic Silty
5	130	132	0	34	0	0	1	Sand

Problem: I-80 over Gardner EB BSB-15 Undrained - FS Min- Bishop = 1.995

Soils	Cohesion	Friction Angle
Clay Fill	1800.0	0.0
Structural F	100000.0	32.0
Leveling Pad	100000.0	32.0
Organic Silt	0.0	20.0
Sand	0.0	34.0

Water Table
Critical Surface
Surface 2
Surface 3
Surface 4
Surface 5
Surface 6
Surface 7
Surface 8
Surface 9
Surface 10

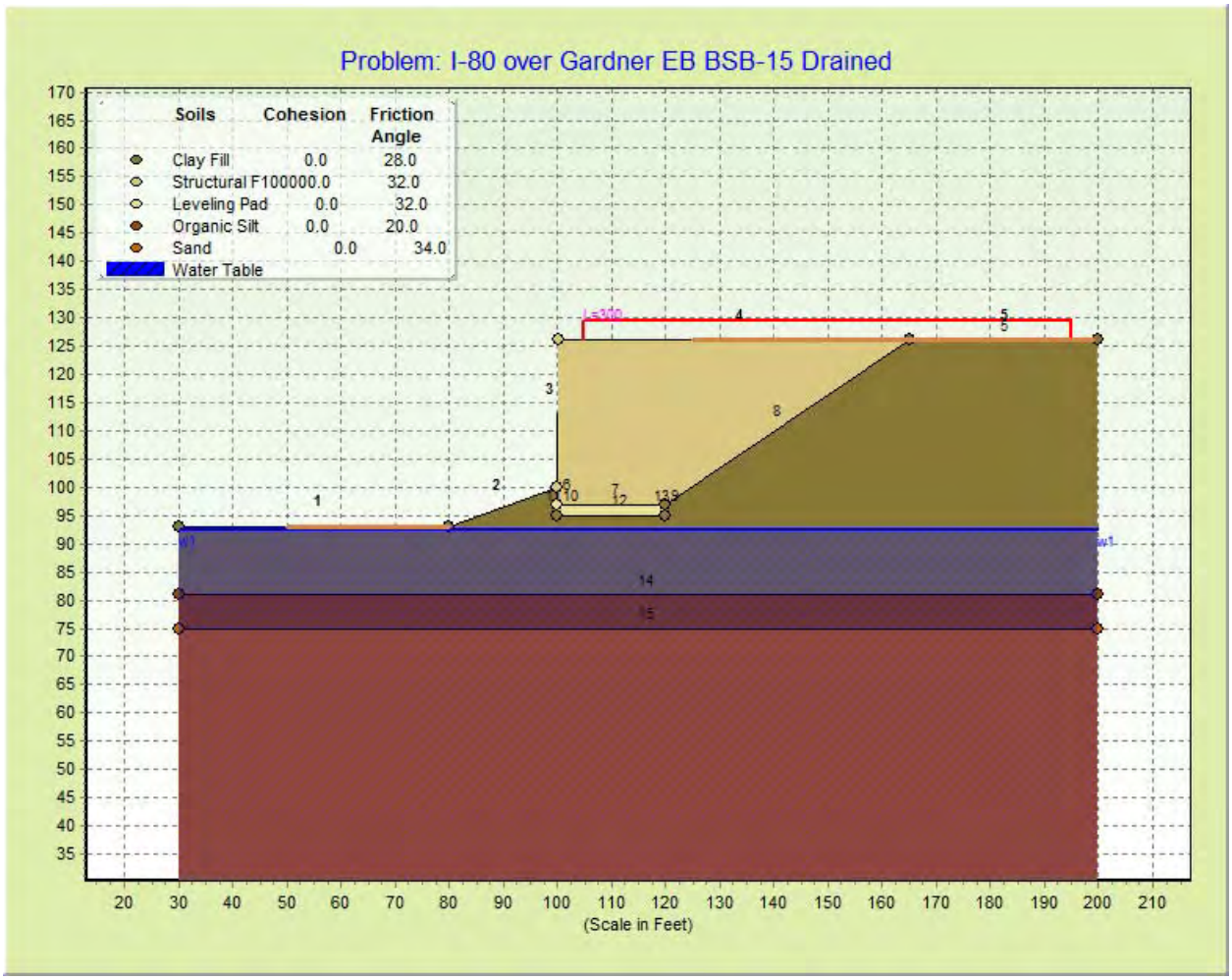
(Scale in Feet)



Factor of safety distribution

	Surface	Factor of Safety
▶	Surface # 1	1.995
	Surface # 2	2.014
	Surface # 3	2.014
	Surface # 4	2.062
	Surface # 5	2.063
	Surface # 6	2.067
	Surface # 7	2.085
	Surface # 8	2.109
	Surface # 9	2.109
	Surface # 10	2.112

========== DATA SUMMARY ==========



Profile Data

Segment Number	Left Extreme X	Left Extreme Y	Right Extreme X	Right Extreme Y	Soil Under Segment
1	30	93	80	93	1
2	80	93	100	100	1
3	100	100	100.1	126	2
4	100.1	126	165	126	2
5	165	126	200	126	1
6	100	100	100	97	2
7	100	97	120	97	3
8	120	97	165	126	1
9	120	97	120	95	1
10	100	97	100	95	3

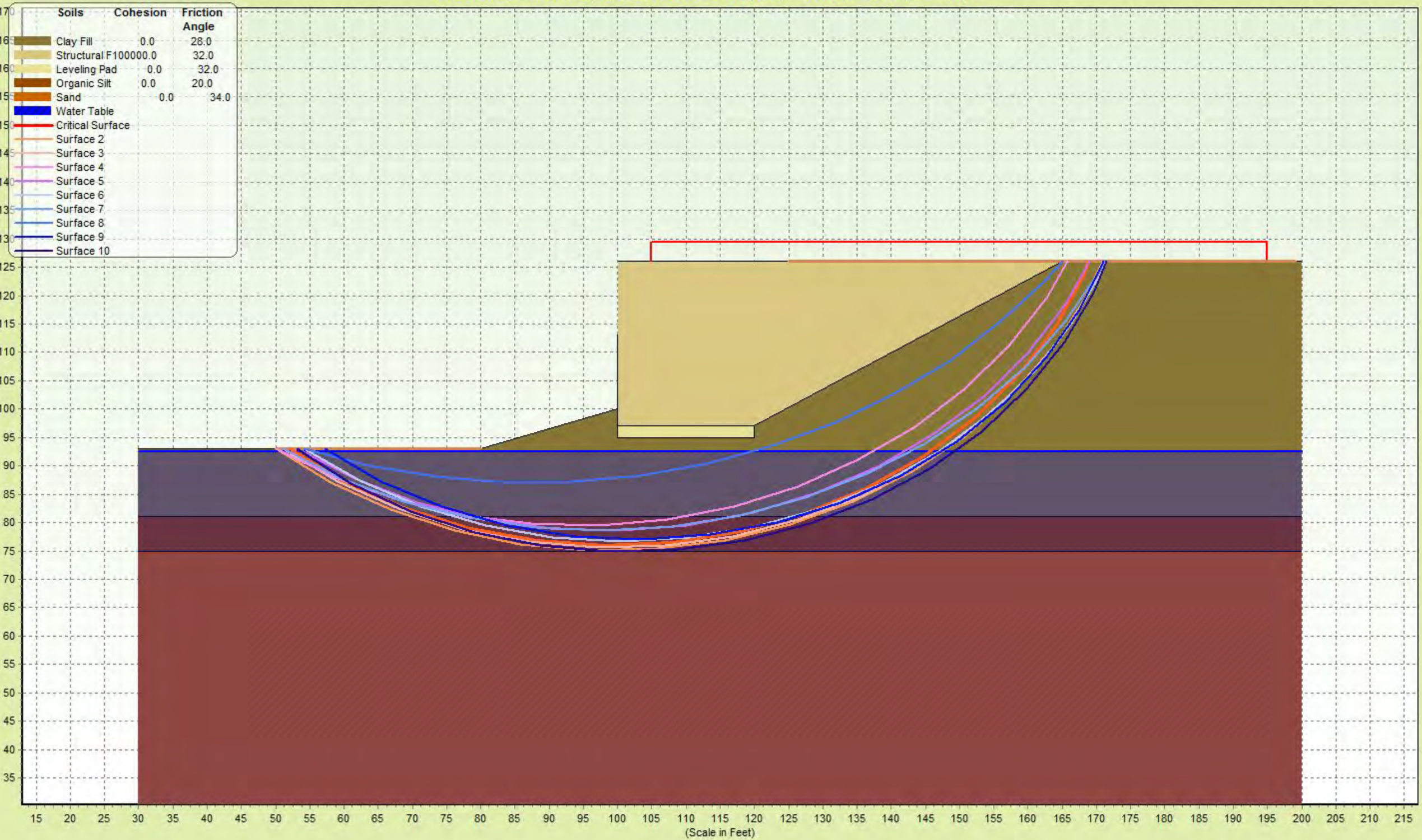
Segment Number	Left Extreme X	Left Extreme Y	Right Extreme X	Right Extreme Y	Soil Under Segment
11	100	95	100	97	3
12	100	95	120	95	1
13	120	95	120	97	1
14	30	81	200	81	4
15	30	75	200	75	5

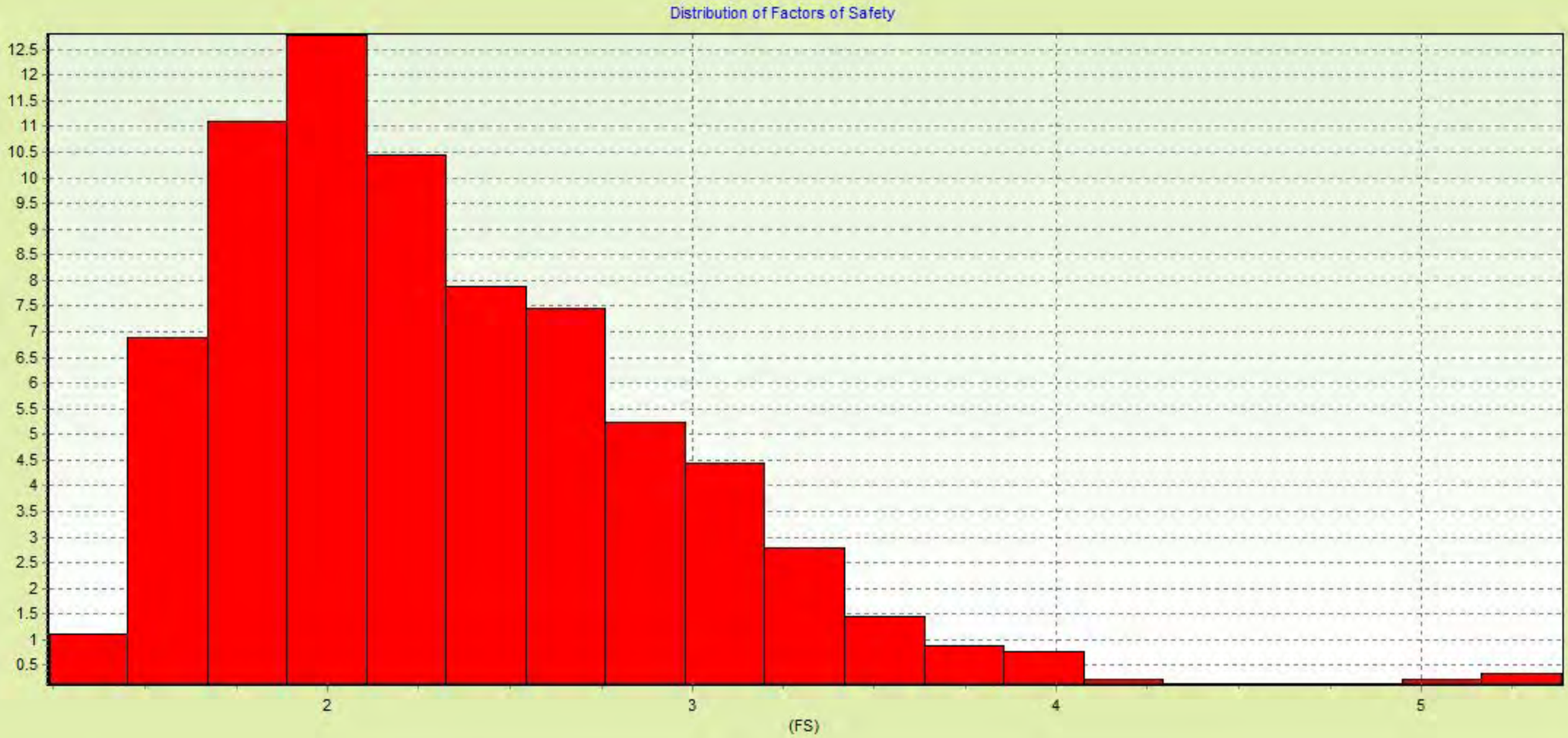
Soil Properties

Soil Number	Wet Unit Weight	Saturated Unit Weight	Cohesive Intercept	Friction Angle	Ru	Pressure Head	Water Table	Soil Name
1	120	125	0	28	0	0	1	Clay Fill
2	120	125	100000	32	0	0	1	Structural Fill
3	120	125	0	32	0	0	1	Leveling Pad
4	100	110	0	20	0	0	1	Organic Silty
5	130	132	0	34	0	0	1	Sand

Problem: I-80 over Gardner EB BSB-15 Drained - FS Min- Bishop = 1.371

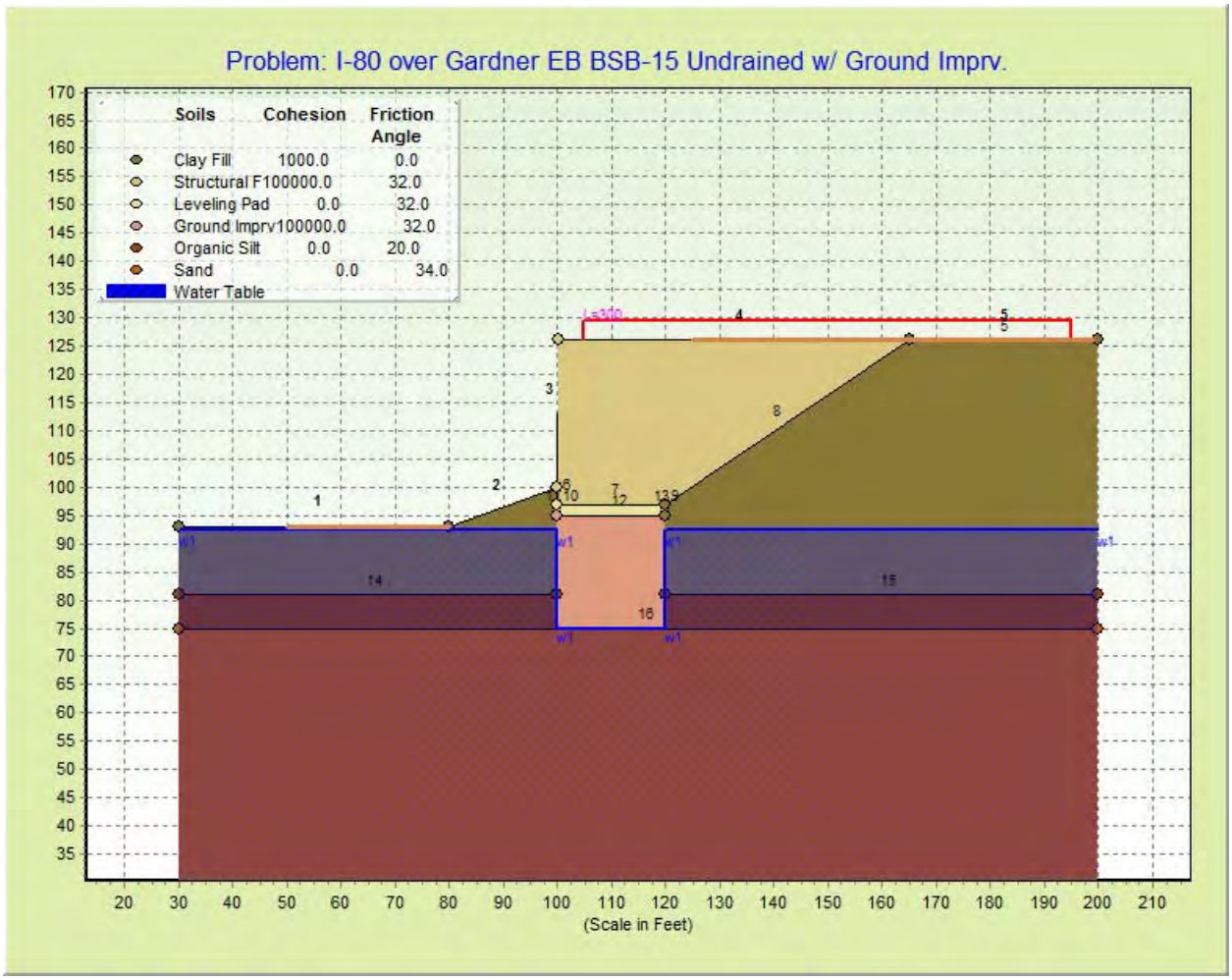
Soils	Cohesion	Friction Angle
Clay Fill	0.0	28.0
Structural F100000.0		32.0
Leveling Pad	0.0	32.0
Organic Silt	0.0	20.0
Sand	0.0	34.0
Water Table		
Critical Surface		
Surface 2		
Surface 3		
Surface 4		
Surface 5		
Surface 6		
Surface 7		
Surface 8		
Surface 9		
Surface 10		





Factor of safety distribution	
Surface	Factor of Safety
Surface # 1	1.371
Surface # 2	1.375
Surface # 3	1.383
Surface # 4	1.398
Surface # 5	1.414
Surface # 6	1.416
Surface # 7	1.43
Surface # 8	1.441
Surface # 9	1.449
Surface # 10	1.45

========== DATA SUMMARY ==========



Profile Data

Segment Number	Left Extreme X	Left Extreme Y	Right Extreme X	Right Extreme Y	Soil Under Segment
1	30	93	80	93	1
2	80	93	100	100	1
3	100	100	100.1	126	2
4	100.1	126	165	126	2
5	165	126	200	126	1
6	100	100	100	97	2
7	100	97	120	97	3
8	120	97	165	126	1
9	120	97	120	95	1
10	100	97	100	95	3

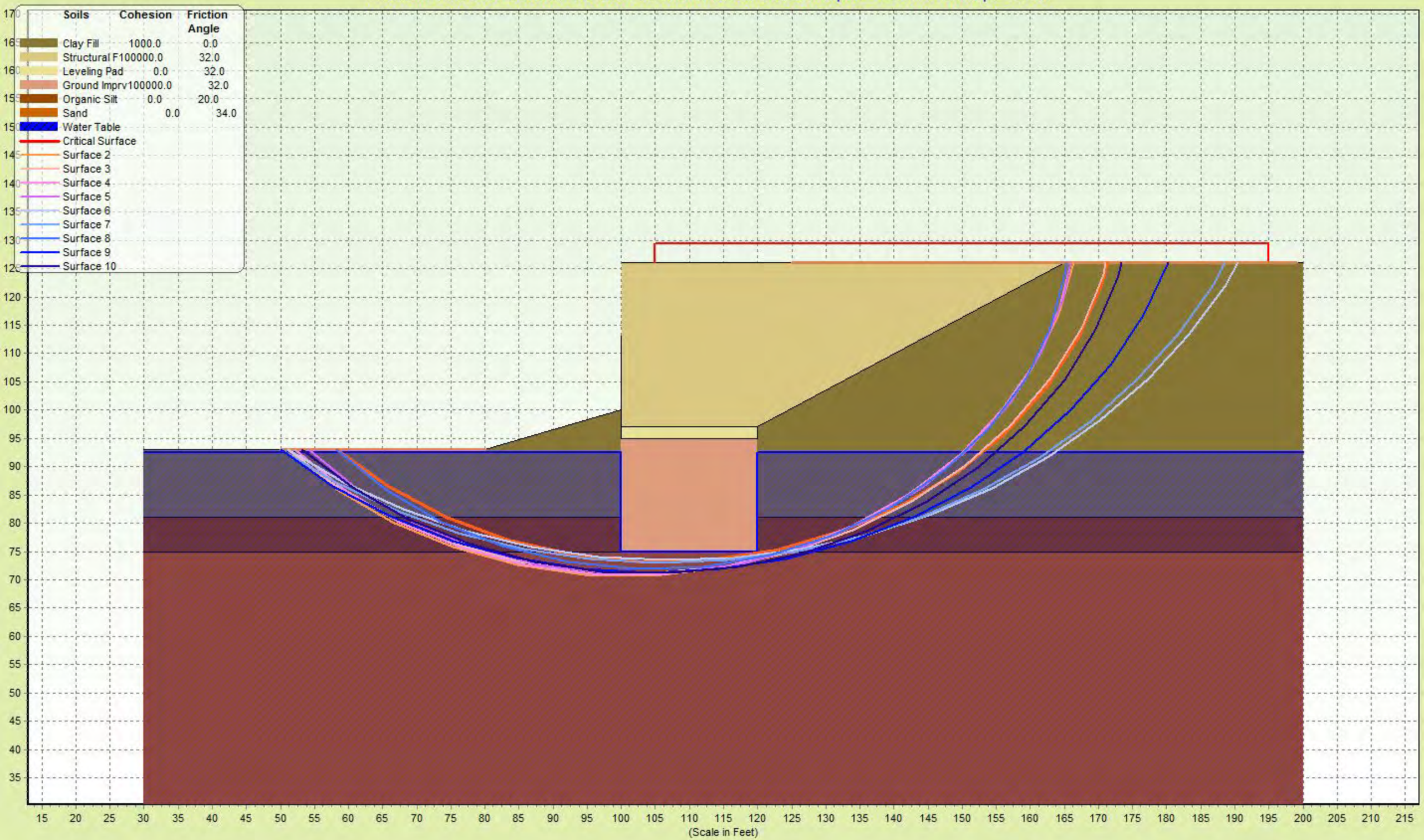
Segment Number	Left Extreme X	Left Extreme Y	Right Extreme X	Right Extreme Y	Soil Under Segment
11	100	95	100	97	3
12	100	95	120	95	6
13	120	95	120	97	1
14	30	81	100	81	4
15	120	81	200	81	4
16	30	75	200	75	5

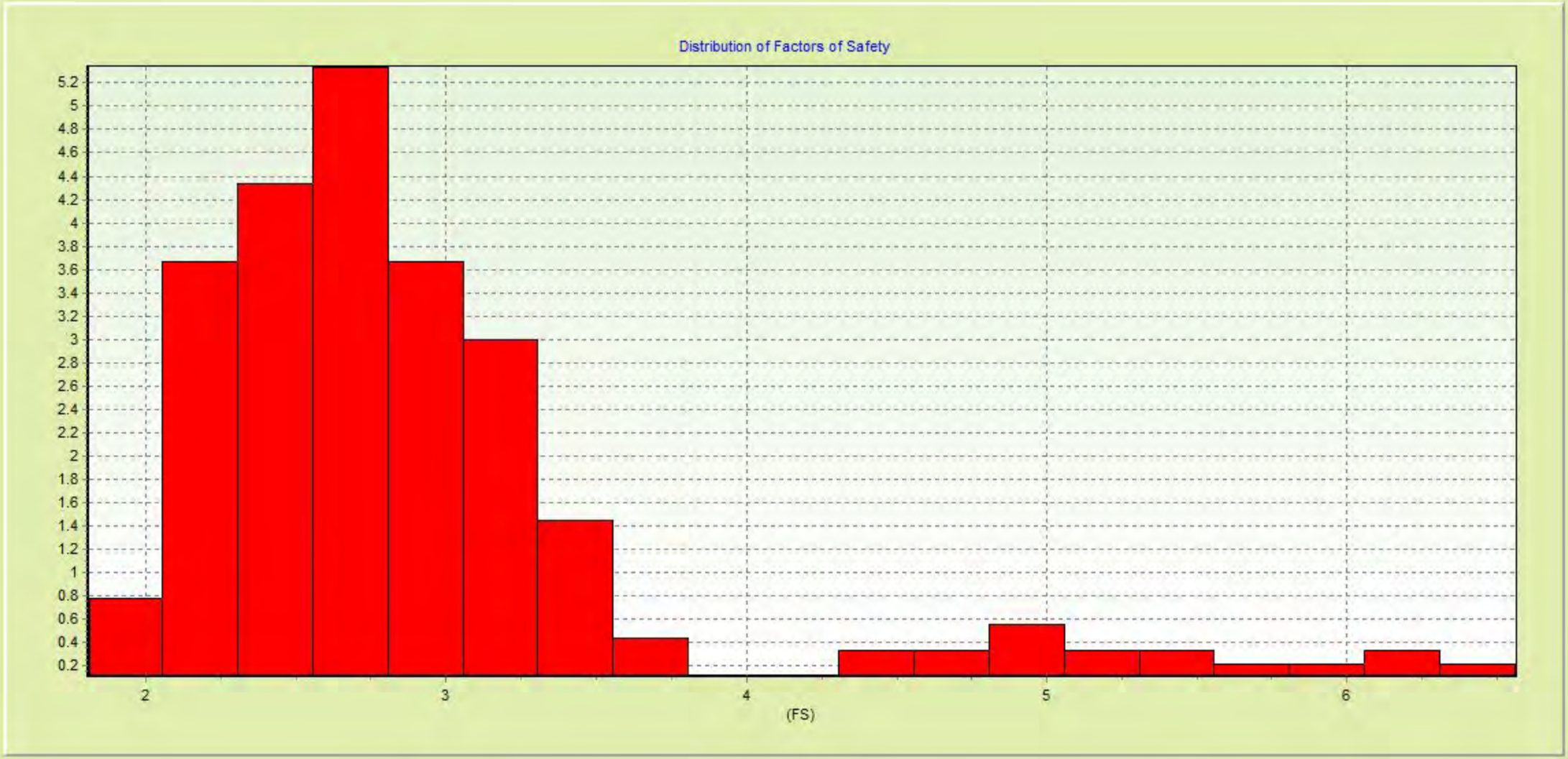
Soil Properties

Soil Number	Wet Unit Weight	Saturated Unit Weight	Cohesive Intercept	Friction Angle	Ru	Pressure Head	Water Table	Soil Name
1	120	125	1000	0	0	0	1	Clay Fill
2	120	125	100000	32	0	0	1	Structural Fill
3	120	125	0	32	0	0	1	Leveling Pad
4	100	110	0	20	0	0	1	Organic Silty
5	130	132	0	34	0	0	1	Sand
6	125	130	100000	32	0	0	1	Ground Imprv.

Problem: I-80 over Gardner EB BSB-15 Undrained w/ Ground Imprv. - FS Min- Bishop = 2.007

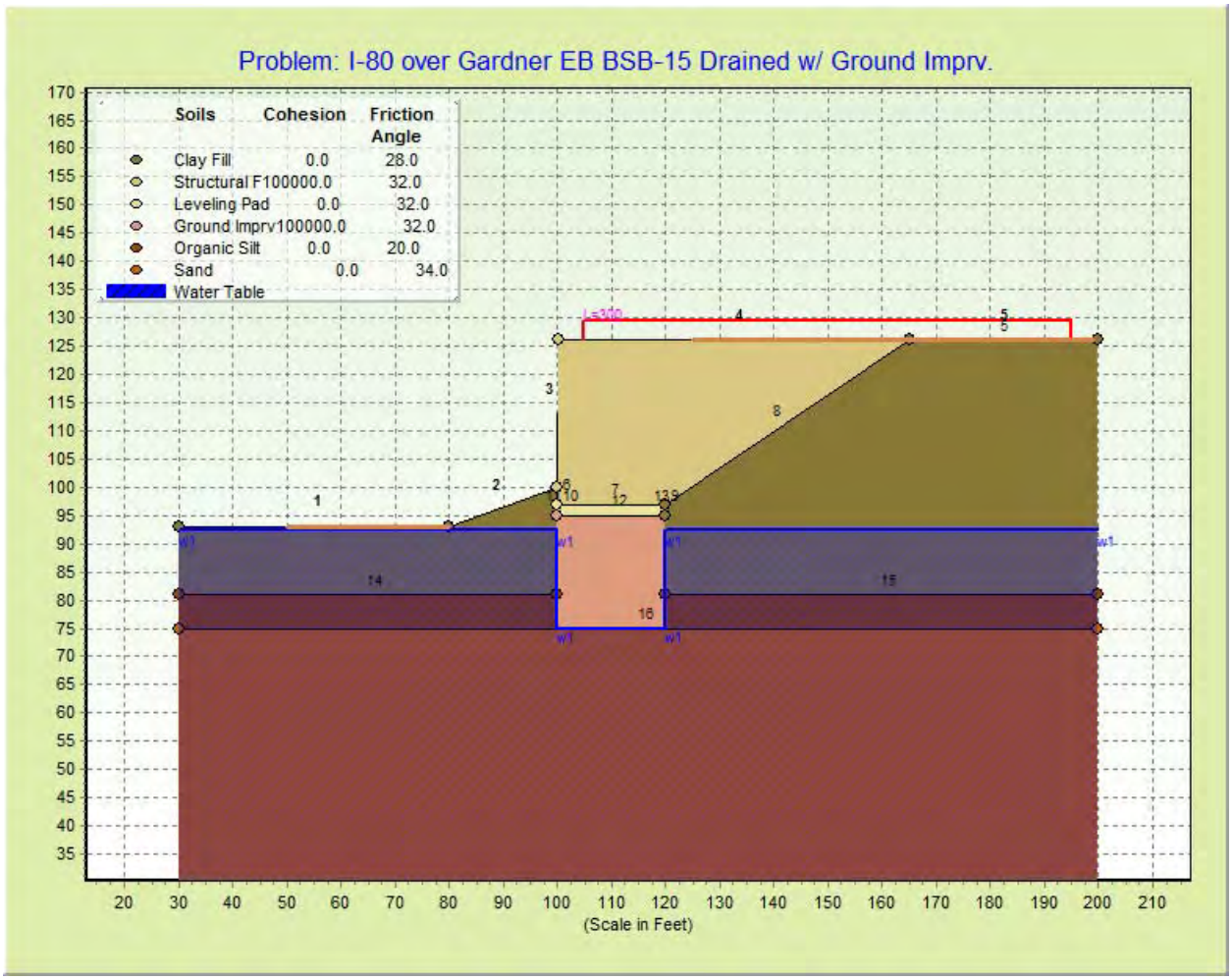
Soils	Cohesion	Friction Angle
Clay Fill	1000.0	0.0
Structural F	100000.0	32.0
Leveling Pad	0.0	32.0
Ground Imprv	100000.0	32.0
Organic Silt	0.0	20.0
Sand	0.0	34.0
Water Table		
Critical Surface		
Surface 2		
Surface 3		
Surface 4		
Surface 5		
Surface 6		
Surface 7		
Surface 8		
Surface 9		
Surface 10		





Factor of safety distribution	
Surface	Factor of Safety
Surface # 1	2.007
Surface # 2	2.01
Surface # 3	2.013
Surface # 4	2.018
Surface # 5	2.043
Surface # 6	2.044
Surface # 7	2.05
Surface # 8	2.075
Surface # 9	2.081
Surface # 10	2.085

========== DATA SUMMARY ==========



Profile Data

Segment Number	Left Extreme X	Left Extreme Y	Right Extreme X	Right Extreme Y	Soil Under Segment
1	30	93	80	93	1
2	80	93	100	100	1
3	100	100	100.1	126	2
4	100.1	126	165	126	2
5	165	126	200	126	1
6	100	100	100	97	2
7	100	97	120	97	3
8	120	97	165	126	1
9	120	97	120	95	1
10	100	97	100	95	3

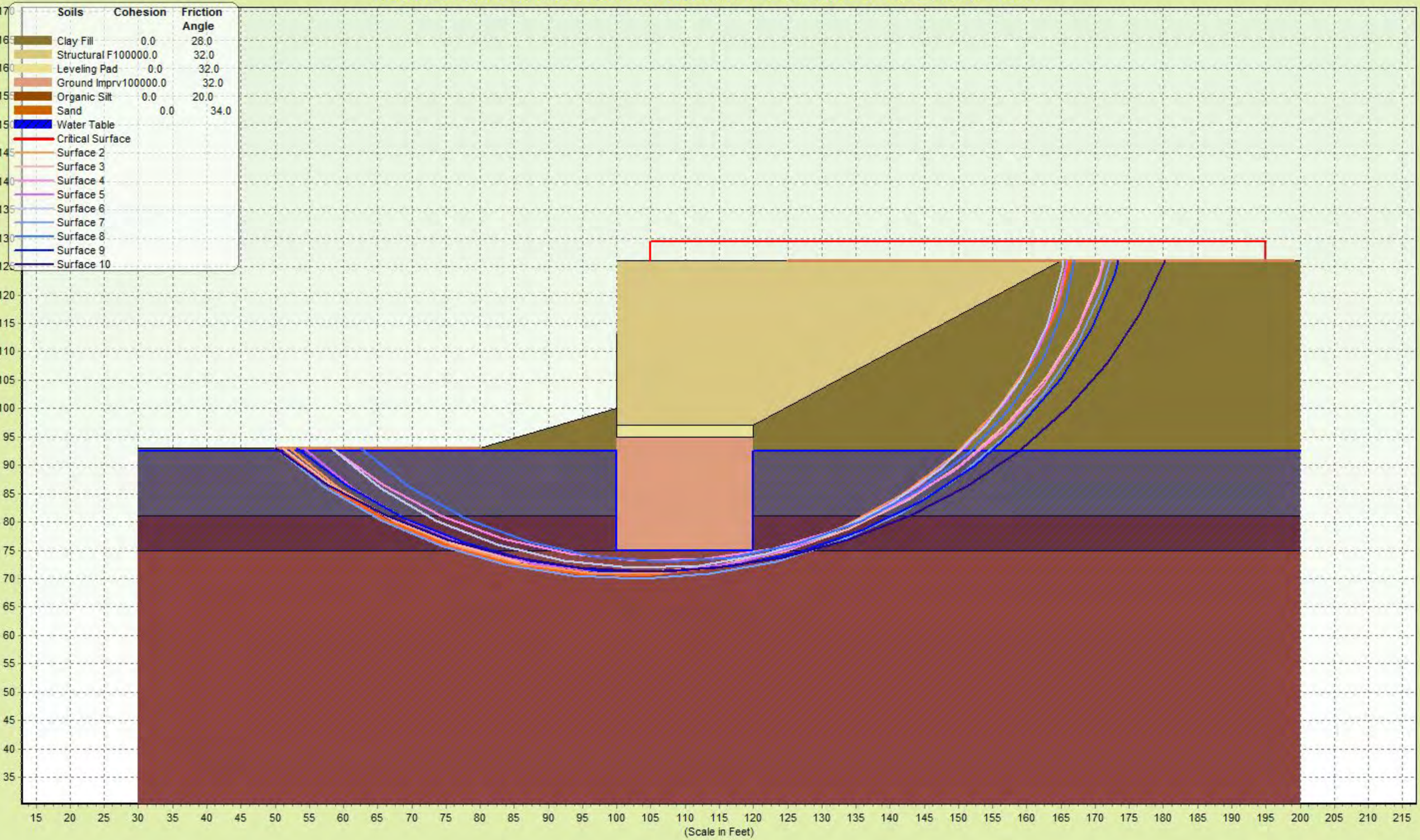
Segment Number	Left Extreme X	Left Extreme Y	Right Extreme X	Right Extreme Y	Soil Under Segment
11	100	95	100	97	3
12	100	95	120	95	6
13	120	95	120	97	1
14	30	81	100	81	4
15	120	81	200	81	4
16	30	75	200	75	5

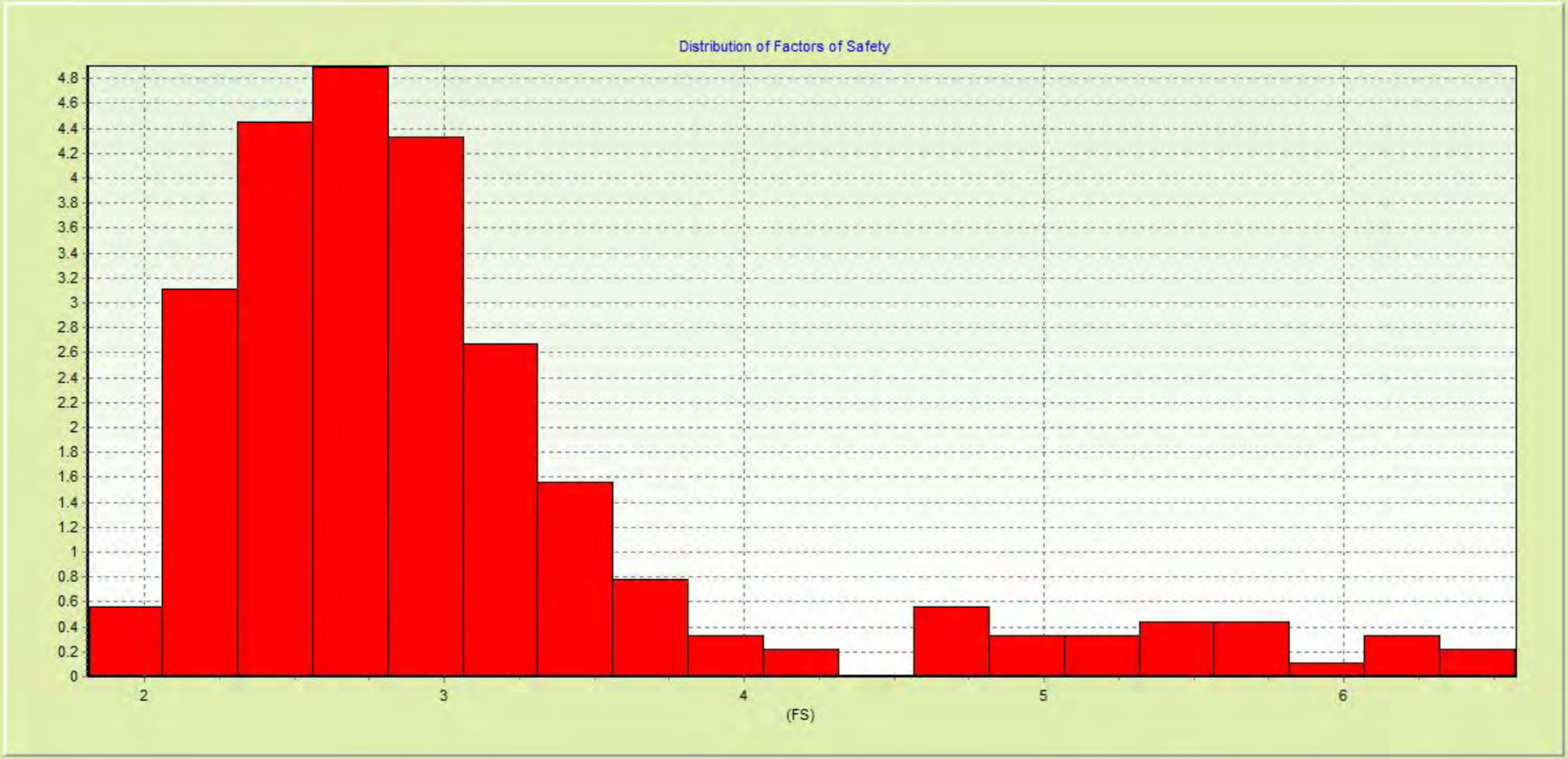
Soil Properties

Soil Number	Wet Unit Weight	Saturated Unit Weight	Cohesive Intercept	Friction Angle	Ru	Pressure Head	Water Table	Soil Name
1	120	125	0	28	0	0	1	Clay Fill
2	120	125	100000	32	0	0	1	Structural Fill
3	120	125	0	32	0	0	1	Leveling Pad
4	100	110	0	20	0	0	1	Organic Silty
5	130	132	0	34	0	0	1	Sand
6	125	130	100000	32	0	0	1	Ground Imprv.

Problem: I-80 over Gardner EB BSB-15 Drained w/ Ground Imprv. - FS Min- Bishop = 2.011

Soils	Cohesion	Friction Angle
Clay Fill	0.0	28.0
Structural F100000.0		32.0
Leveling Pad	0.0	32.0
Ground Imprv100000.0		32.0
Organic Silt	0.0	20.0
Sand	0.0	34.0
Water Table		
Critical Surface		
Surface 2		
Surface 3		
Surface 4		
Surface 5		
Surface 6		
Surface 7		
Surface 8		
Surface 9		
Surface 10		

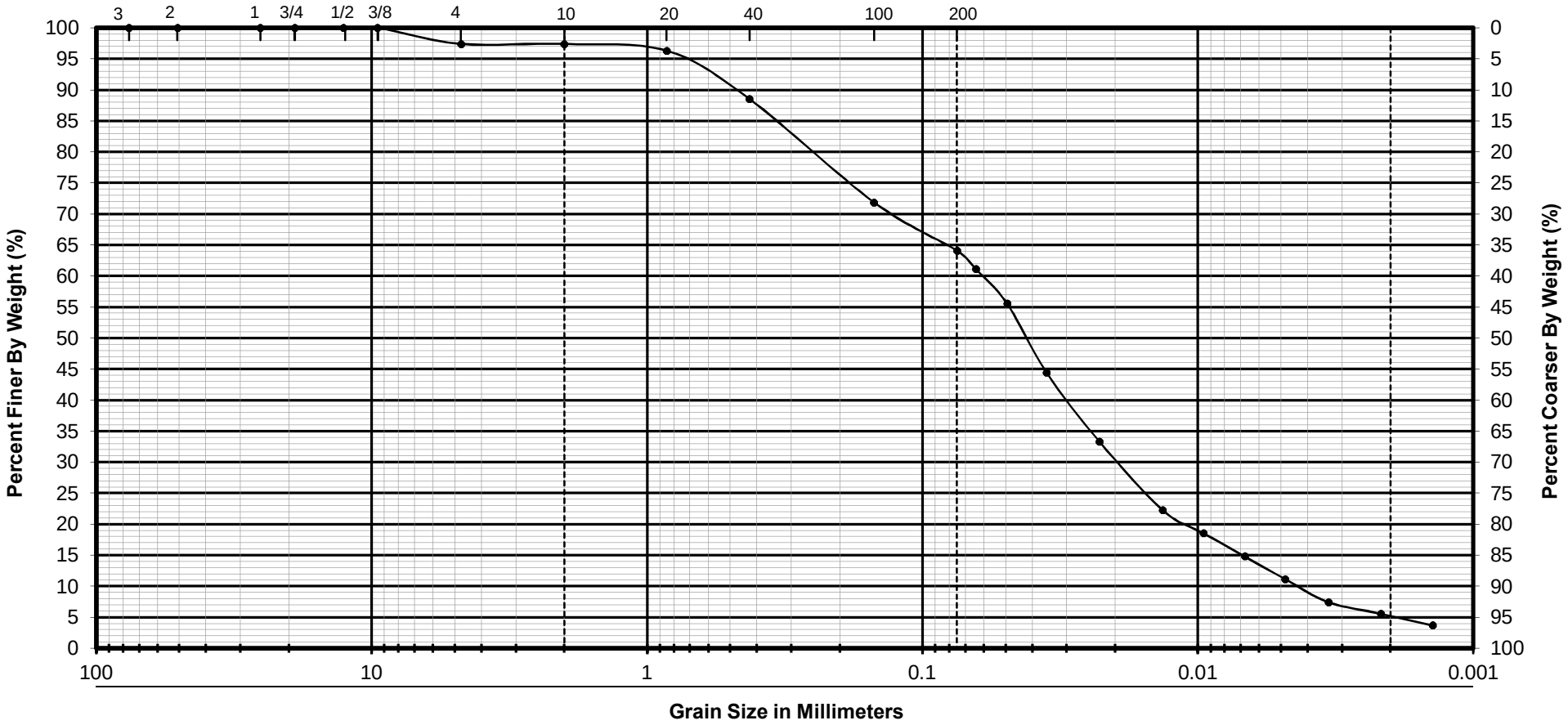




Factor of safety distribution	
Surface	Factor of Safety
Surface # 1	2.011
Surface # 2	2.018
Surface # 3	2.033
Surface # 4	2.036
Surface # 5	2.039
Surface # 6	2.075
Surface # 7	2.098
Surface # 8	2.108
Surface # 9	2.109
Surface # 10	2.121

APPENDIX G

LAB TEST RESULTS



GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	BSB-15	CLASSIFICATION		PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	17			
Depth	48.5'-50.0'	ORGANIC SILTY LOAM		I-80 Phase II
Liquid Limit	62	A-7		Will County, Illinois
Plastic Limit	51	black		
Plasticity Index	11	Group Index	9	
Test By	MT	% Gravel	2.6	
Date	6/9/14	% Sand	33.3	
Reviewed By	RR	% Silt	58.5	
Job No	13125	% Clay	5.6	

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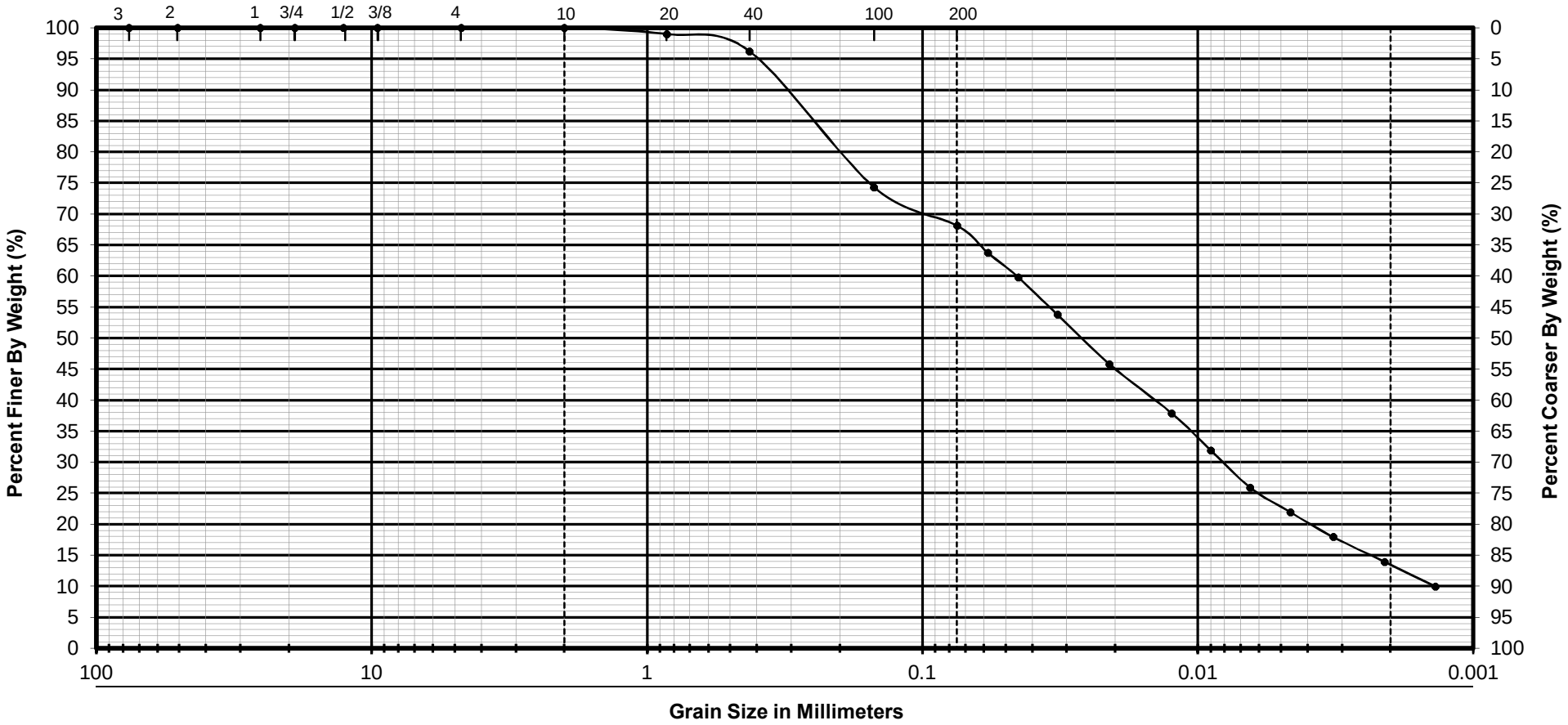
1235 E. Davis St., Arlington Heights, IL 60005
Phone 847-253-3845 • Fax 847-253-0482



GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	BSB-16	CLASSIFICATION		PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	17			
Depth	48.5'-50.0'	SILTY LOAM		I-80 Phase II
Liquid Limit	37	A-6		Will County, Illinois
Plastic Limit	23	dark brown		
Plasticity Index	14	Group Index	8	
Test By	MT	% Gravel	0.0	
Date	6/10/14	% Sand	31.9	
Reviewed By	RR	% Silt	54.2	
Job No	13125	% Clay	13.9	

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Arlington Heights, Illinois 60005
Phone: (847) 253-3845 Fax: (847) 253-0482

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

I-80 Reconstruction (Near Term Phase 2) — Date 4/29/22
Location Various — Job No. 13125
County Will — Tested By: RWC
Sample Type Drilled Bedrock Core Sample

Sample No.	Depth (ft)	Length (in)	Diameter (in)	Weight (g)	Load (lbs)	Area (in^2)	Unit Weight ($lbs\ ft^3$)	Compressive Strength (tsf)	Compressive Strength (psi)
BSB-01A Run 1	68.1	4.079	2.049	592.2	43490	3.30	167.7	950	13189
BSB-01A Run 3	89.0	4.074	2.047	575.8	38610	3.29	163.6	845	11738
BSB-02 Run 1	66.7	4.167	2.050	601.0	20140	3.30	166.4	439	6102
BSB-03 Run 1	74.6	4.099	2.056	594.2	38840	3.32	166.3	843	11705
BSB-04 Run 1	67.7	4.091	2.054	586.9	28600	3.31	164.9	622	8635
BSB-04 Run 2	83.7	4.088	2.057	587.2	27530	3.32	164.6	596	8284
BSB-04 Run 3	85.8	3.994	2.061	564.6	17710	3.33	161.4	382	5311
BSB-05 Run 1	32.5	4.099	2.052	570.0	47700	3.31	160.1	1038	14424
BSB-06 Run 1	36.7	4.079	2.056	564.8	43260	3.32	158.8	938	13030
BSB-07 Run 1	19.8	4.121	2.050	592.2	49870	3.30	165.8	1088	15109
BSB-08 Run 1	27.8	4.129	2.070	588.5	56520	3.37	161.3	1209	16795
BSB-09 Run 1	25.4	4.077	2.047	499.7	12810	3.29	141.8	280	3892
BSB-10 Run 2	24.5	4.097	2.052	549.6	15470	3.31	154.5	337	4678
BSB-11 Run 1	25.0	4.094	2.074	539.0	20360	3.38	148.4	434	6027
BSB-12 Run 1	23.5	4.166	2.059	600.5	25930	3.33	164.8	561	7788
BSB-13 Run 1	25.6	4.099	2.066	561.2	30860	3.35	155.5	663	9205
BSB-14 Run 1	29.7	4.111	2.051	588.7	66650	3.30	165.0	1452	20173
BSB-15 Run 1	64.5	4.085	2.051	571.5	61120	3.30	161.2	1332	18500
BSB-16 Run 1	62.1	4.107	2.055	607.8	40360	3.32	169.9	876	12168
BSB-54 Run 1	64.6	4.067	2.052	580.1	24900	3.31	164.2	542	7529
BSB-54 Run 2	74.5	4.082	2.058	581.6	22270	3.33	163.1	482	6695
BSB-55 Run 1	66.8	4.084	2.046	579.4	32880	3.29	164.3	720	10001
BSB-55 Run 2	76.6	4.049	2.047	572.0	26120	3.29	163.4	571	7937

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Organic Matter in Soils by Wet Combustion
AASHTO T 194

Project Name I-80 Phase II **Date** 6/11/15

Location Will County, Illinois **Job No** 13125

Sample Location	**BSB-53**							
Sample No	4							
Depth	42.5'-50.0'							
Total Organic Matter %	6.7							

Comments: -

Performed by: JE

APPENDIX H

TS&L

Bench Mark: Square on S.E. wingwall of I-80 W.B. bridge S.N. 099-0061, Sta. 709+99.63, 12.99' Lt., Elev. 579.27

Existing Structure: S.N. 099-0060 (EB) and S.N. 099-0061 (WB) were built in 1964 under F.A.I. Route 80 Project I-IG-80-4(35)134, Section 99-4VB. Existing dual structures consist of a seven span structure composed of two three-span units and a single span unit. The reinforced concrete deck is carried by W36 rolled steel beams (composite at the center span), supported by pile bent abutments and multi-column concrete piers on steel piles. The approach slabs are supported on timber piles. The EB structure measures 483'-5" back to back of abutments and the WB structure measures 477'-1" back to back of abutments. The out to out deck width is 48'-0" at each structure. The structure will be removed and replaced.

Stage construction will be utilized to maintain traffic during construction.

No salvage

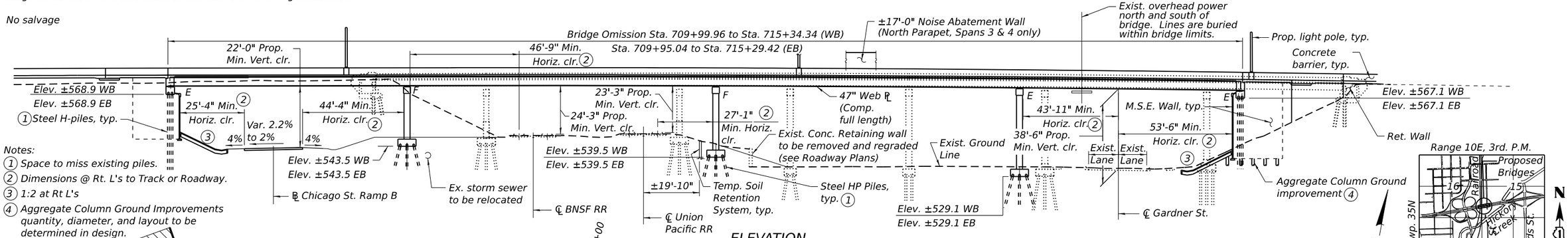
SUGGESTED CONSTRUCTION SEQUENCE

1. Install TSRS down to bottom of existing west abutment cap.
2. Complete Stage I removal of existing substructure.
3. Install remainder of TSRS, while removing existing piles, and excavating as needed to construct Stage I substructure, MSE wall and temp. MSE wall.
4. Relocate existing utilities that are in conflict with proposed work.
5. Construct Stage I substructure, MSE wall and temp. MSE wall.
6. Construct Stage II substructure and MSE wall.

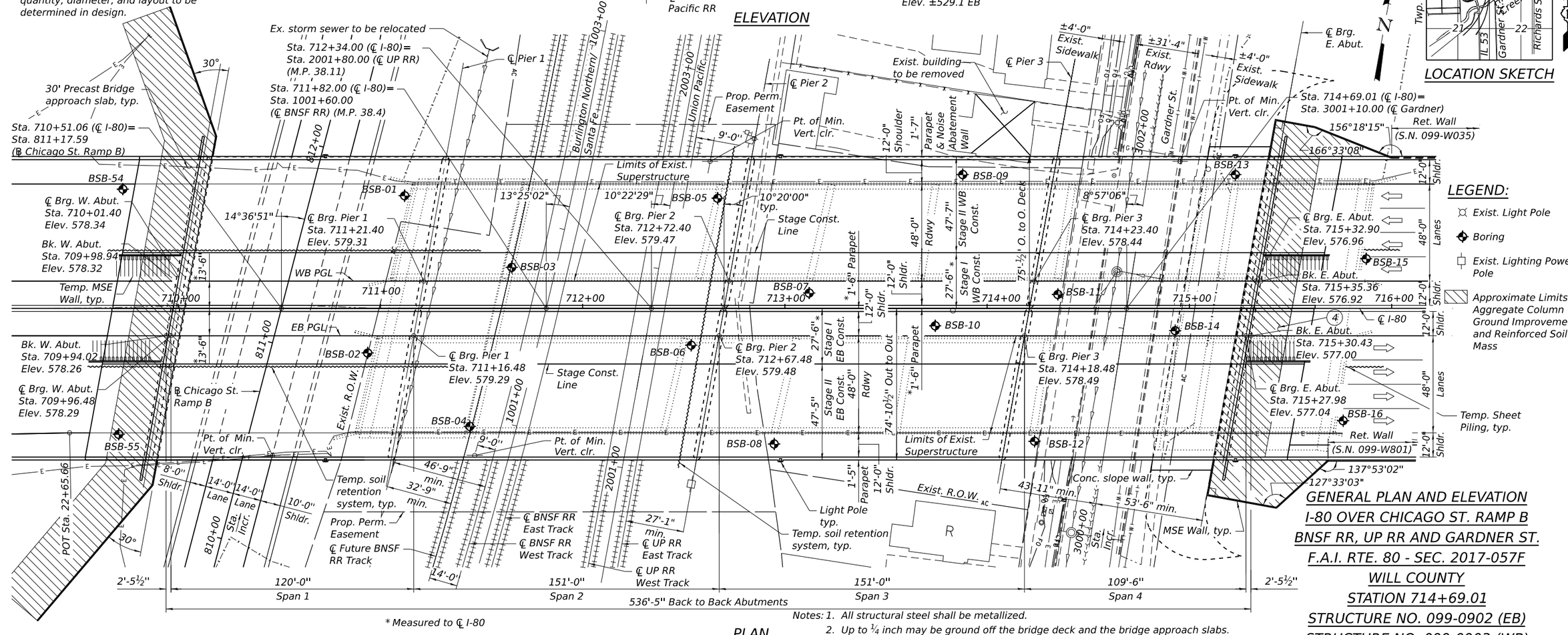
HIGHWAY CLASSIFICATION

F.A.I. Rte. 80	Gardner St.	Chicago St. Ramp B
Functional Class: Interstate	Functional Class: Collector (Urban)	Functional Class: Interstate Ramp
ADT: 85,160 (2017); 130,500 (2040)	ADT: 1,750 (2012); 1,609 (2032)	ADT: 5,110 (2017); 10,200 (2040)
ADTT: 21,554 (2017); 33,030 (2040)	ADTT: 88 (2012); 80 (2032)	ADTT: 398 (2019); 794 (2040)
DHV: 13,050 (2040)	DHV: 195 (2032)	DHV: 1,020 (2040)
Design Speed: 65 m.p.h.	Design Speed: 30 m.p.h.	Design Speed: 30 m.p.h.
Posted Speed: 65 m.p.h.	Posted Speed: 30 m.p.h.	Posted Speed: 30 m.p.h.
Two Way Traffic	Two Way Traffic	One Way Traffic
Directional Distribution: 50:50	Directional Distribution: 50:50	

Notes:
1. Space to miss existing piles.
2. Dimensions @ Rt. L's to Track or Roadway.
3. 1:2 at Rt L's
4. Aggregate Column Ground Improvements quantity, diameter, and layout to be determined in design.



ELEVATION



* Measured to ℄ I-80

PLAN

Notes:
1. All structural steel shall be metallized.
2. Up to ¼ inch may be ground off the bridge deck and the bridge approach slabs.
3. The proposed pier footings should be sized to miss existing pier footings, when feasible.

LOCATION SKETCH

LEGEND:

- Exist. Light Pole
- Boring
- Exist. Lighting Power Pole
- Approximate Limits of Aggregate Column Ground Improvements and Reinforced Soil Mass
- Temp. Sheet Piling, typ.

GENERAL PLAN AND ELEVATION
I-80 OVER CHICAGO ST. RAMP B
BNSF RR, UP RR AND GARDNER ST.
F.A.I. RTE. 80 - SEC. 2017-057F
WILL COUNTY
STATION 714+69.01
STRUCTURE NO. 099-0902 (EB)
STRUCTURE NO. 099-0903 (WB)

exp.

USER NAME =	DESIGNED - BAR	REVISED -	
	CHECKED - VCP	REVISED -	
PLOT SCALE =	DRAWN - BAR	REVISED -	
PLOT DATE =	CHECKED - VCP	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET 1 OF 4 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
80	2017-057F	WILL	4	1
		CONTRACT NO. 62F94		
		ILLINOIS	FED. AID PROJECT	

MODEL: SHEET 1
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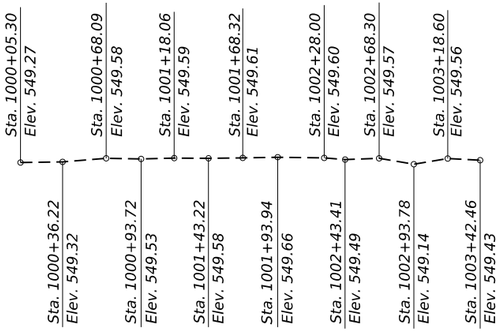
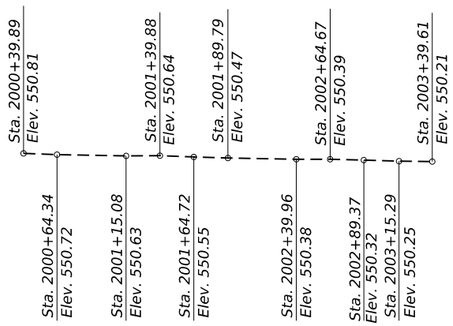
8/31/2022



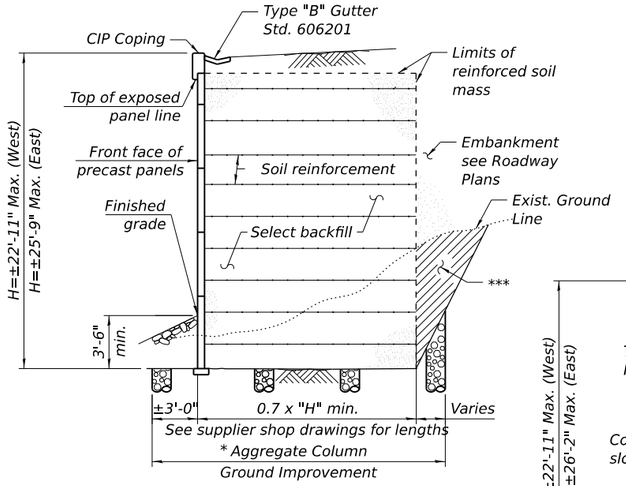
PROFILE GRADE EXIST. BNSF R.R.

(Top of Rail @ East Track)



PROFILE GRADE EXIST. UNION PACIFIC R.R.

(Top of Rail @ East Track)



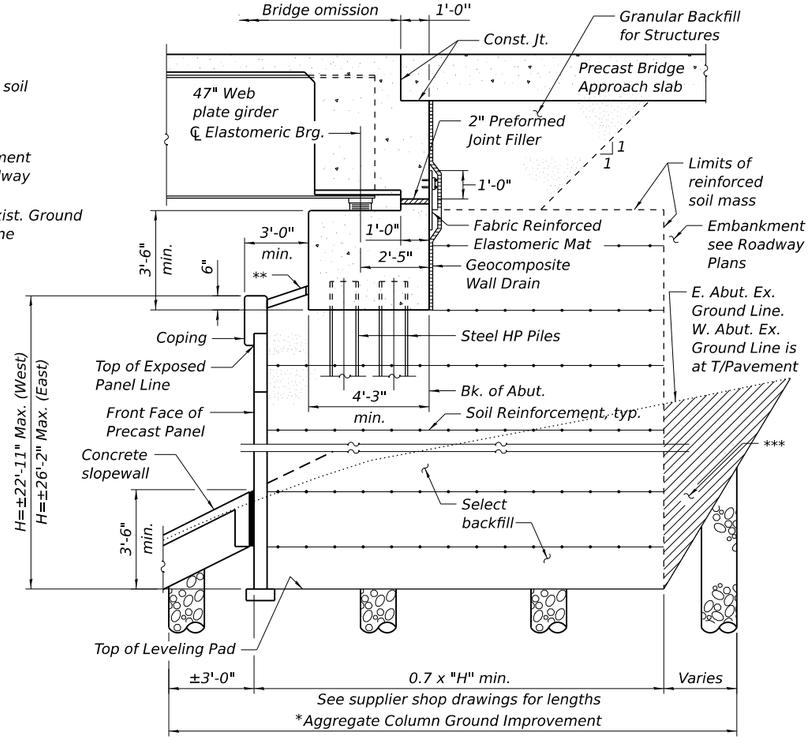
SECTION THRU M.S.E. WALL

(Horiz. dim. @ Rt. ∠'s)

* *Number & spacing to be finalized in design and spaced to miss proposed H-piles. (East Abutment only)*

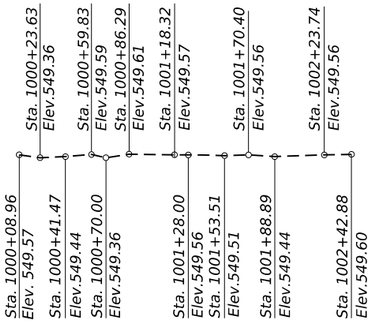
** *Slope to drain*

*** *Overexcavation beyond structure excavation. This area not measured for payment. Backfill overexcavation with same material used for select fill used in MSE wall.*



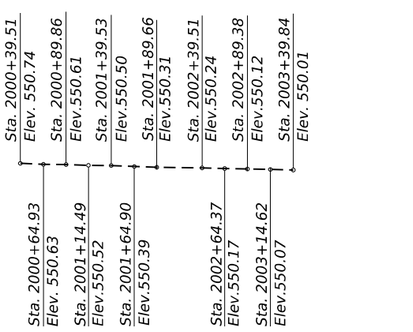
SECTION THRU ABUTMENT

(Horiz. dim. @ Rt. ∠'s)



PROFILE GRADE EXIST. BNSF R.R.

(Top of Rail @ West Track)



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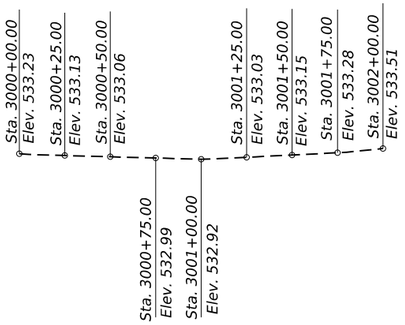
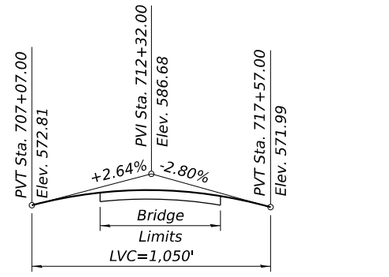
(Top of Rail @ West Track)



PROFILE GRADE EXIST. GARDNER ST.

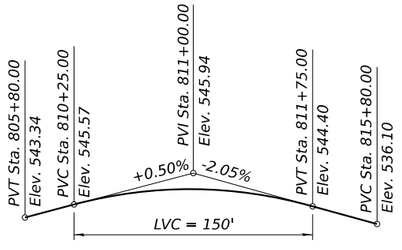
(Along ℄ Roadway)



PROFILE GRADE PROP. I-80

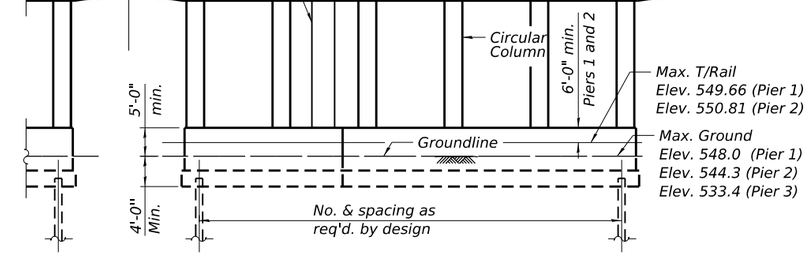
(Along PGL of EB & WB Roadway)

(The profile grade shows the final elevations after grinding)

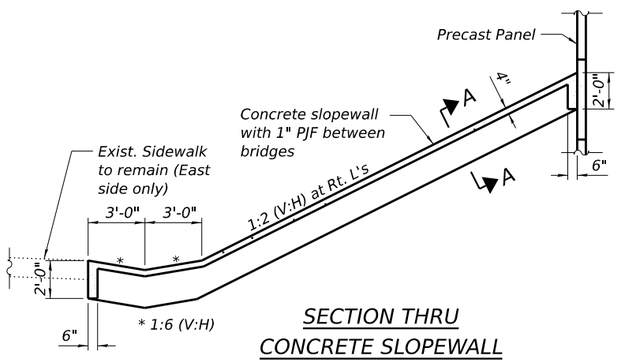


PROFILE GRADE PROP. CHICAGO ST. RAMP B

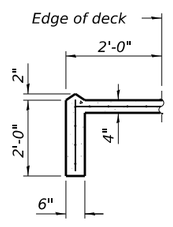
(Along PGL Roadway)



PIER SKETCH



SECTION THRU CONCRETE SLOPEWALL



SECTION A-A

LOADING HL-93

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

DESIGN SPECIFICATIONS

2020 AASHTO LRFD Bridge Design Specifications, 9th Edition

DESIGN STRESSES

FIELD UNITS

f'c = 3,500 psi
f'c = 4,000 psi (superstructure)
fy = 60,000 psi (Reinforcement)
fy = 50,000 psi (M270 Grade 50)

SEISMIC DATA

Seismic Performance Zone (SPZ) = 1
Design Spectral Acceleration at 1.0 sec. (SD1) = 0.068g
Design Spectral Acceleration at 0.2 sec. (SDS) = 0.125g
Soil Site Class = C

DETAILS

I-80 OVER CHICAGO ST. RAMP B
BNSF RR, UP RR AND GARDNER ST.
F.A.I. RTE. 80 - SEC. 2017-057F
WILL COUNTY
STATION 714+69.01
STRUCTURE NO. 099-0902 (EB)
STRUCTURE NO. 099-0903 (WB)

MODEL: SHEET 2
FILE NAME: C:\TRANSYSTEMS\PW_LOCAL\TRANSYSTEMS-PW-01\DMS0984\7099090\2-099090\3-82F94-TSL.DGN

8/31/2022

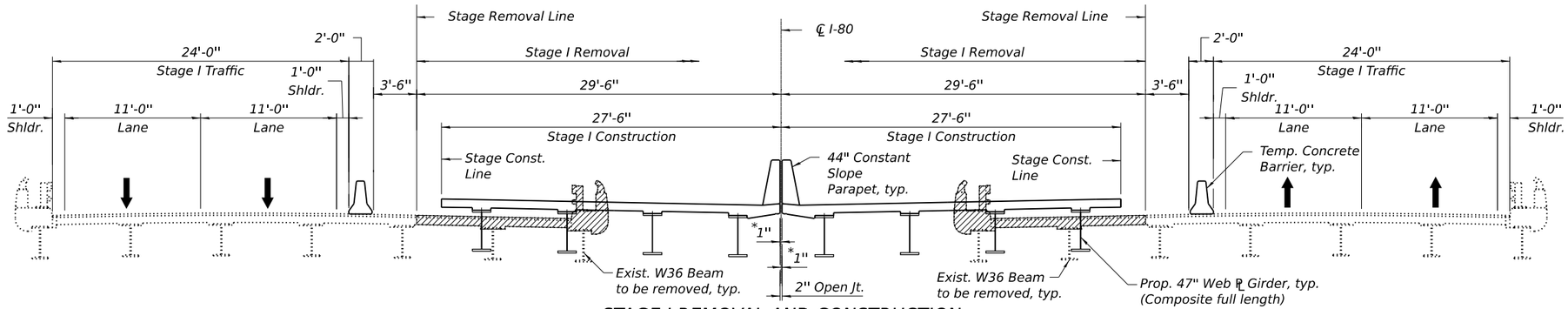
exp.

USER NAME =	DESIGNED - BAR	REVISED -	
	CHECKED - VCP	REVISED -	
PLOT SCALE =	DRAWN - BAR	REVISED -	
PLOT DATE =	CHECKED - VCP	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

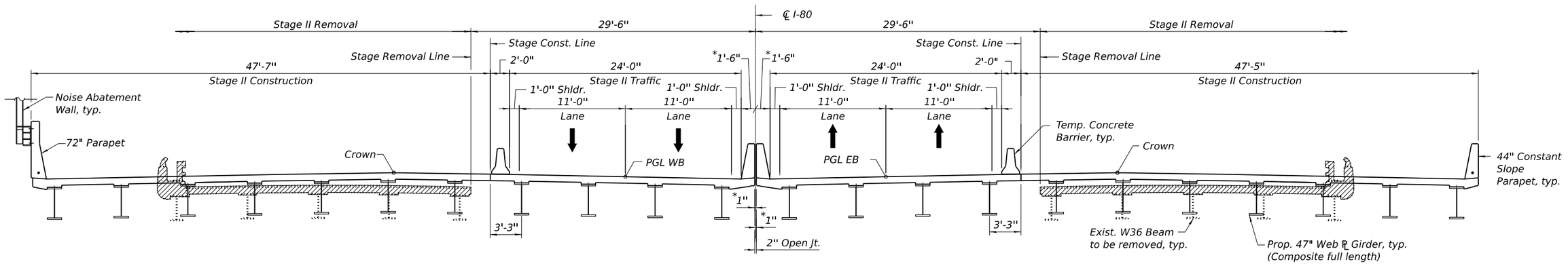
SHEET 2 OF 4 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
80	2017-057F	WILL	4	2
		CONTRACT NO. 62F94		
		ILLINOIS	FED. AID PROJECT	



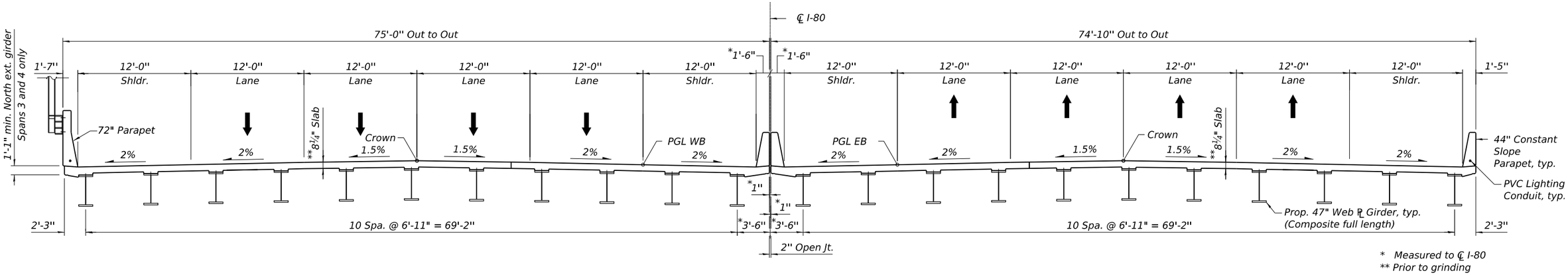
STAGE I REMOVAL AND CONSTRUCTION

(Looking East)



STAGE II REMOVAL AND CONSTRUCTION

(Looking East)



* Measured to ℄ I-80
** Prior to grinding

FINAL CONDITION

(Looking East)

BRIDGE CROSS SECTION
I-80 OVER CHICAGO ST. RAMP B
BNSF RR, UP RR AND GARDNER ST.
F.A.I. RTE. 80 - SEC. 2017-057F
WILL COUNTY
STATION 714+69.01
STRUCTURE NO. 099-0902 (EB)
STRUCTURE NO. 099-0903 (WB)

USER NAME =	DESIGNED - BAR	REVISED -	
	CHECKED - VCP	REVISED -	
PLOT SCALE =	DRAWN - BAR	REVISED -	
PLOT DATE =	CHECKED - VCP	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET 3 OF 4 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
80	2017-057F	WILL	4	3
		CONTRACT NO. 62F94		
		ILLINOIS	FED. AID PROJECT	

MODEL: SHEET 3
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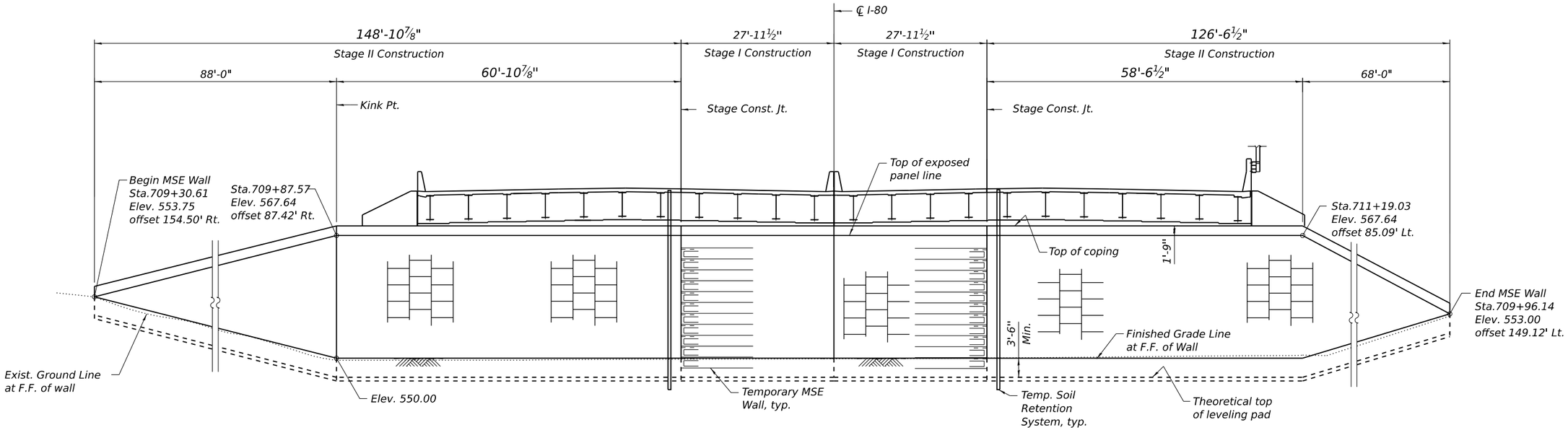
8/31/2022



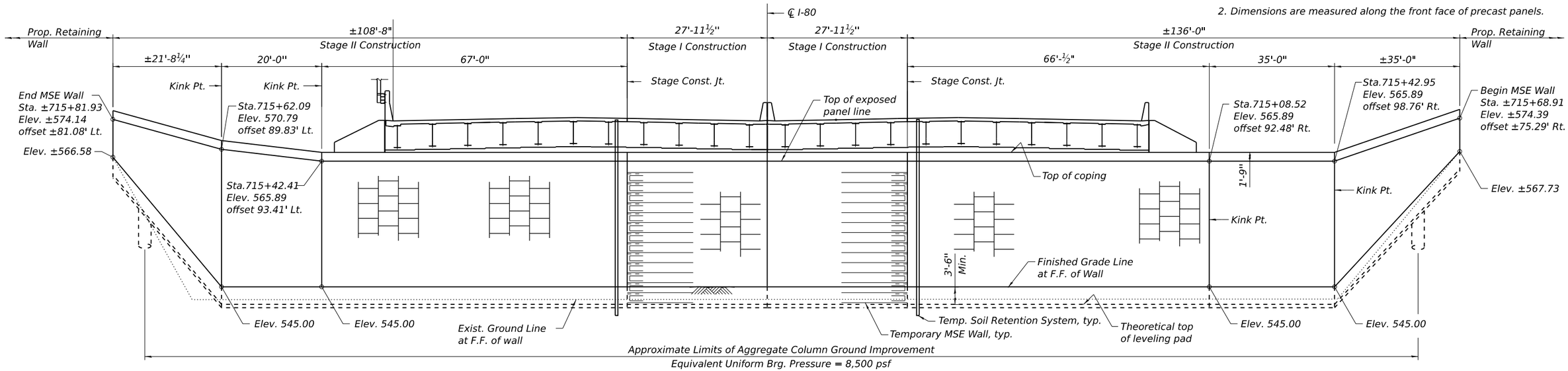
WEST ABUTMENT WALL

(Looking @ F.F. of Wall)

Notes:

1. Stations and offsets are measured from ℄ FAI-80 to the front face of precast panels.

2. Dimensions are measured along the front face of precast panels.



EAST ABUTMENT WALL

(Looking @ F.F. of Wall)

RETAINING WALLS
I-80 OVER CHICAGO ST. RAMP B
BNSF RR, UP RR AND GARDNER ST.
F.A.I. RTE. 80 - SEC. 2017-057F
WILL COUNTY
STATION 714+69.01
STRUCTURE NO. 099-0902 (EB)
STRUCTURE NO. 099-0903 (WB)

USER NAME =	DESIGNED - BAR	REVISED -	
	CHECKED - VCP	REVISED -	
PLOT SCALE =	DRAWN - BAR	REVISED -	
PLOT DATE =	CHECKED - VCP	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET 4 OF 4 SHEETS

F.A.I. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
80	2017-057F	WILL	4	4
		CONTRACT NO. 62F94		
		ILLINOIS	FED. AID PROJECT	

MODEL: SHEET 5
FILE NAME: C:\TRANSYSTEMS\PW_LOCAL\TRANSYSTEMS-PW-01\DMS\09847\099090902-0990903-62F94-TSL.DGN

8/31/2022