STRUCTURE GEOTECHNICAL REPORT

IL-171 over Interstate 55

IL-171 (First Avenue) from 47th Street to 55th Street

IDOT Job: D-91-191-10 (PTB 154, ITEM 014)

SN 016-1510 (South Bound, Contract: 60W77)

SN 016-1511 (North Bound, Contract: 60W78)

Cook County, Illinois

STRUCTURAL ENGINEER:

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JOB NO. 10025

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Revised 01/27/14

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

October 2, 2013
Revised December 9, 2013
Revised January 27, 2014

Alfred Benesch & Company
205 North Michigan Avenue
Suite 2400
Chicago, Illinois 60601

Attn: Mr. Kurt Naus, P.E., S.E.

Job No. 10025

Re: Structure Geotechnical Report – IL-171 over Interstate 55
IL-171 (First Avenue) from 47th Street to 55th Street
SN 016-1510 (Contract: 60W77) & 016-1511 (Contract: 60W78)
Cook County, Illinois
IDOT Job Number: D-91-191-10 (PTB 154, Item #014)

Dear Mr. Naus:

The following report presents the geotechnical analysis and recommendations for the replacement and reconstruction of the bridge structures carrying IL-171 over Interstate 55 (I-55). A total of six (6) structural soil borings (SB-15, SB-16, SB-35, SB-36, SB-48 and SB-49) were completed. Copies of these boring logs, along with plan and profiles are included in this report.

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

Very truly yours,

GEO SERVICES, Inc.

Alex Barlan, P.E.
Project Engineer

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TABLE OF CONTENTS

SECTION 01: INTRODUCTION

This report presents the results of the geotechnical investigation for the demolition and reconstruction of the IL-171 Bridges over Interstate 55 (I-55) for the IL-171 (First Avenue) Widening Project from 47th Street to 55th Street, IDOT Job Number: D-91-191-10 (PTB 154, Item 014). The results of the six (6) structure borings (SB-15, SB-16, SB-35, SB-36, SB-48 and SB-49) 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 Alfred Benesch & Company (Benesch) and the Illinois Department of Transportation (IDOT). Boring locations were located in the field by Benesch and finalized in the field by Geo Services, Inc. personnel after review of accessibility and utility locations. Drilled locations are illustrated on the boring location diagram in Appendix C.

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

SECTION 02: PROJECT DESCRIPTION

The existing bridges (SN 016-0484 and SN 016-0485) were built in 1964. The existing structures consist of continuous five span steel beams with reinforced concrete decks supported on four piers and two stub abutments. The overall length of the existing bridges per existing plans is 283'-8" for the southbound and 293'-7" for the northbound measured from back of the abutments. The out-to-out width of each bridge varies from 49'-0 7/8" to 54'-8 1/2" for the southbound and 50'-1 1/8" to 52'-10 1/4" for the northbound. Both structures have a 9^{o} 34' 18" skew. Existing plan information indicates the use of steel H-piles for support of the abutments and piers.

The existing bridges are proposed to be demolished and new bridges constructed. The Northbound Structure will be designated as SN 016-1511 and the Southbound Structure as SN 016-1510. The contract number for Southbound Structure (SN 016-1510) is 60W77 and the contract number for Northbound Structure (SN 016-1511) is 60W78. The overall lengths of the proposed NB and SB bridges are 258'-9", measured from back of the abutments. The out-to-out width of each bridge is 57'-9" for the southbound and 52'-2" for the northbound. The estimated maximum factored bearing resistance reactions at the foundation structures provided by Benesch are as shown on Table 1.

Table 1 – Factored Bearing Resistance Load (SN 016-1510 and SN 016-1511)

Location	Factored Bearing Resistance Load Kips
North Abutment	1540
Pier 2	2790
Pier 1	2950
South Abutment	1600

Currently, stub abutments with embankment and slope walls are proposed for the north abutments, and stub abutments with a wrap-around MSE walls are proposed at the south abutments. The proposed bottom of footing elevations are shown on the following tables 2 and 3.

Table 2 – Southbound Bottom of Footing Elevations (SN 016-1510)

Location	Elevation
North Abutment	613.5
Pier 2	595.5
Pier 1	596.5
South Abutment	614.5*

*Stub abutment at 614.5; MSE wall leveling pad at elevation at 597.0 feet

Table 3 – Northbound Bottom of Footing Elevations (SN 016-1511)

Location	Elevation
North Abutment	613.9
Pier 2	596.0
Pier 1	597.0
South Abutment	614.6*

*Stub abutment at 614.6; MSE wall leveling pad at elevation at 597.5 feet

The north abutment will have sloped embankment with a 1V:2H typical slope for the bridge cone.

SECTION 03: SUBSURFACE INVESTIGATION PROCEDURES

The borings were performed during the month of March, 2013 with a truck-mounted drilling rig. Borings performed were advanced by means of hollow stem augers to a depth of 10 to 15 feet and continued with rotary drilling techniques to completion. Representative soil samples were obtained employing split spoon sampling procedures in accordance with AASHTO Method T-206. Samples obtained in the field were returned to our laboratory for further examination and testing. Bedrock cores were obtained in the bridge borings using a NX-size double tubed core barrel with a diamond impregnated bit.

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. 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

North Abutment

Abutment borings SB-16 and SB-36 were drilled at the I-55 roadway level on the ramp, right shoulder. Pavement in borings SB-16 and SB-36 consisted of approximately 11 to 15 inches of asphalt. Below the pavement, subbase material in SB-36 consisted of 27 inches of crushed stone overlying clay loam fill to an elevation of 594, and subgrade

material in SB-16 consisted of clay fill to 593. Underlying these materials, the boring logs indicated medium dense to very dense sand, gravel and fractured rock to an elevation of 560, where bedrock was encountered. A stratum of very dense clay loam (moisture content of 11%) was encountered in SB-36 from an elevation of 575 to 571. The clay fill soils had moisture contents within the elevation range of 14% to 25%, with an average of 18%. The medium dense to very dense sand, gravel and fractured rock strata had moisture contents within the range of 3% to 14% with an average of 8%. The rock cores retrieved for the borings indicated Silurian System, Niagaran Dolomite with the R.Q.D.s in the range of 73% to 91%.

Pier 2

Boring SB-49 was performed on the southbound I-55 right shoulder in the area of Pier 2. The boring encountered approximately 12 inches of asphalt overlying 2.5 feet of crushed stone. Below the pavement section, fill material mainly consisted of very stiff to hard clay loam to an approximate elevation of 595. Below an elevation of 595, the boring indicated medium dense to very dense sand, gravel and fractured rock to an elevation of 563, where bedrock was encountered. The stiff to hard clay fill had moisture contents within the range of 11% to 14%. The medium to very dense sand, gravel and fractured rock had moisture content in the range of 3% to 10% with an average of 8%. The rock core taken for SB-49 indicated Silurian System, Niagaran Dolomite with a R.Q.D. of 75%.

Pier 1

Pier 1 borings SB-15 and SB-35 were drilled at I-55 roadway level in the median shoulder. Pavement section in the borings consisted of 18 inches of asphalt overlying 18 inches of crushed stone fill. Below the surficial pavement and subbase material in the borings, fill material mainly consisting very stiff to hard clay loam fill and was encountered to an approximate elevation of 594. Underlying these materials, the boring logs indicated medium dense to very dense crushed stone fill, ending around an elevation range of 583 to 580. Below the stone fill, the boring logs encountered varying strata of very dense loam, sand, gravel and fractured rock down to an elevation of 566, where bedrock was encountered. The very stiff to hard clay fill had moisture contents within the range of 10% to 17% with an average of 11%. The medium dense to very dense loam, crushed stone, sand, gravel and fractured rock strata had moisture contents within the range of 4% to 13% with an average of 10%. The rock cores taken for the borings indicated Silurian System, Niagaran Dolomite with the R.Q.D.s in the range of 32% to 35%.

South Abutment

Abutment boring SB-48 was performed on the northbound right should of I-55. The pavement section in SB-48 consisted of 14 inches of asphalt over 4 inches of stone and gravel. Below the pavement, 9.5 feet of stiff to hard clay loam fill was encountered to an approximate elevation of 592. Below the fill material, medium dense to very dense sand, gravel and fractured rock were encountered to an elevation of 568. At an elevation of 568, bedrock was encountered and a rock core was retrieved at 567. The stiff to hard clay soils had moisture contents within the range of 12% to 18% with an average of 15%. The medium to very dense sand, gravel and fractured rock typically had moistures in the range of 6% to 21%, with an average of 10%. The rock core taken indicated Silurian System, Niagaran Dolomite with the R.Q.D.s of 57%.

SECTION 06: WATER TABLE CONDITIONS

Water was encountered in SB-16, SB-36, SB-48 and SB-49 around an elevation range of 588 to 590 feet, before switching to rotary drilling at a depth of 10 feet. Water was encountered in SB-15 at an elevation of 598; however, it is anticipated to be perched ground water trapped in the clay fill. We estimate the long term water table around the elevation of 588 to 590 feet. Fluctuations in the amount of water accumulated and in the hydrostatic water table can be anticipated depending on variations in precipitation, surface runoff, the Des Plaines River and the Sanitary & Ship Canal.

SECTION 07: ANALYSIS

Mining Activity

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

Site Seismic Parameters

According to the AASHTO LRFD Bridge Design Specification 2012, the project site has a horizontal Response Spectral Acceleration of 0.037 at a period of 1.0 second and 5% critical dampening (S_1) and 0.095 at a period of 0.2 seconds and 5% critical dampening (S_s). With a Site Class C, the Design Spectral Acceleration at 1.0 second is 0.063 (S_{D1}) and at 0.2 seconds is 0.114 (S_{Ds}). The site is designated as an area with a Seismic Performance Zone = 1. The project site is considered to be in a low seismic area and is considered a non-extreme event. Liquefiable layers and are not expected to impact the design of the new bridge.

Settlement

Approximately 4 feet of widening and maximum 10 feet of embankment fill is anticipated for the abutments. Settlement is calculated to be less than 0.4 inches at the embankment. No new or very little fill is considered at the piers, and settlement is considered negligible. There are no settlement concerns with the north abutment and piers.

At the south abutment, there is approximately 10 to 11 feet of new fill for the wrap around MSE wall and 20 feet of fill behind the abutment. Considering the very stiff soils (moistures around 15%) and the new fill, settlement is calculated less than 0.4 inches. There are no settlement concerns at the south abutment.

Slope Stability

The abutments and piers will be pile supported and will resist slope failure. No slope stability issues are associated with the bridge structure piers and abutments.

The wrap-around MSE wall at the south abutment will retain approximately 15 feet of embankment. A vertical wall with an exposed height of 15 feet and a base of 10.5 feet have been considered for slope stability calculations. We calculate a Factor of Safety of over 2.0. This is over the Factor of Safety requirements of 1.5 for a fill embankment per IDOT requirements. There are no slope stability concerns for the bridge structure.

SECTION 08: RECOMMENDATIONS

Based on the presence of existing clay and stone fill to fairly deep depths at both the abutment and pier locations and anticipated high loads for the proposed structures, it is not recommended to support the new bridge on conventional shallow spread footing foundations. In addition, existing plans indicate that the bridge structure is supported on a deep foundation system. Therefore, shallow footing foundation recommendations are not provided in the report.

Metal Shell and Steel H-Pile Foundation Recommendations

Based on the results of the borings and type of structure and loading, we recommend a deep foundation system consisting of friction piles be used for the support of the proposed abutment structures, wing walls, and piers.

Due to the presence of very dense sand and gravel soils, hard coring/drilling for drilled straight-shaft caissons is anticipated along with the need for temporary/permanent casing. Considering the bridge is located close to the river and after review of the boring and core logs, there is potential for water infiltration though the sandy soils and bedrock at isolated locations. Plans would need to inform the contractor for potential need to work under slurry during construction due to water. Drilled straight-shaft caissons to bedrock, while feasible, will incur additional costs and are considered expensive. Drilled-shaft caissons are not recommended for deep foundation design.

Steel H-piles are recommended and may be used for design of the deep foundation system. Pile data for H-piles are included in Appendix E. Due to some stratums of hard clay, very dense granular soils, fractured rock and possible boulders, we anticipate hard driving to occur, and driving shoes are recommended to drive the piles. An experienced engineer or representative should be present to oversee the pile driving operations. Due to the high blow count (N) value soils, metal shell piles are not recommended for design. If metal shell piles are selected for design, the shell piles would have to be designed to stop short of these very dense soils (around elevation 682 or higher) or possible damage may occur to the shell piles. Reducing the pile length of the metal shell pile would also limit the capacity of the pile, resulting in the need to increase the number of piles. In addition, to reduce the risk of damage to the shell piles due to possible over-driving, the piles' thickness would likely have to be increased. Considering that the use of shell piles would result in the increase in pile numbers and increase of pile thickness, the use of shell piles is considered to be costly and is not recommended. Pile data for metal shell piles have not been included in this report.

As per the IDOT Design Guide AGMU Memo 10.2, dated October 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 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.

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. 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.

If H-piles are to be designed with capacities that will terminate within the dense sand and gravel strata, potential problems reaching design capacities may be encountered during pile driving construction. We have been involved with previous IDOT projects that have encountered temporary liquefaction of the sandy and gravelly soils during the H-Pile driving process, and production piles were required to be driven deeper

(sometimes much deeper) than the design values. We recommend that the H-piles be designed to be based to bedrock.

For proposed Piers 1 and 2, portions of the existing piers' deep foundation system may have conflicts with the proposed deep foundation system. If overlapping conflicts arise, the new foundation system should be spaced to miss the existing foundation system. Alternatively, the existing piles may be extracted. The existing piles consist of H-piles and are not considered ground-displacing piles; therefore pile extraction may be feasible. The contractor should submit a plan for extracting the piles to the engineer before construction.

MSE Wall Foundation Recommendations

Mechanically Stabilized Earth (MSE) walls are proposed around the south abutment. The bottom of leveling pad for the MSE wall will be set at an elevation of 597 to 597.5 and the leveling pad is generally situated on very stiff clay soils. Based on the boring log, SB-48 and the location of the MSE wall, we recommend that the natural soils at the base of the leveling pad have factored bearing resistance capacities as defined in the following Table 4 – Factored Bearing Resistance Capacity Summary.

Table 4 – Factored Bearing Resistance Capacity Summary

Area (Boring)	Bottom of MSE Wall Elevation (feet)	Factored Resistance Bearing (psf)
South Abutment	597	8,000 psf

Notes:Factored bearing resistanceccapacity is computed with a Factor Resistance = 0.65. Soils conditions should be verified in the field by the Geotechnical Engineer or technician.

We recommend a minimum reinforcement length to be 0.7 X "H" with a minimum length greater than or equal to 8-ft, to meet the external stability analysis and to satisfy AASHTO LRFD design. For overturning, wall lengths were evaluated up to a height of 20, with all resultants of the reaction forces located within the middle one-half of the base width. For resistance to sliding, a friction factor of 0.4 (for very stiff clay soils) with a critical height of 12 feet was used for calculations. A factored resistance against failure to sliding of 7,600 kips was calculated. This is in excess of estimated sliding force of 6,600 kips. A minimum reinforcement length of 0.7X"H" with a minimum length greater than or equal to 8-ft is adequate for the external stability of the MSE wall.

Lateral Resistance Recommendations

In the following tables are tabulations of lateral soil parameters to be used for design of piles.

Table 5 – Soil Parameters for Lateral Resistance

Material (elevation, feet)	Unit Weight (pcf)	Drained Friction Angle (°)	Undrained Cohesion (psf)	Lateral Modulus of Subgrade Reaction (pci)	Strain
Clay Loam Fill (Top to 595)	120	28	1,000	230	0.009
Crushed Stone/ Gravel/Fractured Rock Fill (595 to 580)	125	30	-	100	-
Dense to Very Dense Loam and Fractured Rock (580 to Bedrock Elevation)	125	38	-	125	-

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

Table 6 – Bedrock Parameters for Lateral Resistance

Material (elevation, feet)	Unit Weight (pcf)	Young's Modulus (psi)	Uniaxial Compressive Strength (psi)	RQD (%)	Strain (k_m)
Sound Bedrock (Varies from 560-569)	150	2×10^6	See Lab Data on Rock Core Logs	32% to 91%	0.0001

At the abutments, it is recommended that a lateral active earth pressure of 40 psf per foot of depth be used above the water table assuming a free-draining granular backfill is utilized. For non-yielding walls with granular backfill, a lateral at-rest pressure of 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 abutment.

Approach Slab Recommendations

The new approach slab will be supported on either new or existing embankment fill. We recommend using an assumed CBR of 2.0 for the compacted fill for the embankment. Shallow footings should be designed for a maximum factored resistance (LRFD) bearing pressure of 3,000 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 is calculated on the order of less than 0.4 inches.

SECTION 09: GENERAL CONSTRUCTION CONSIDERATIONS

It is proposed that the IL-171 mainline will be open to the public during construction. MOT will be maintained by utilizing crossovers. For construction at the abutments and at the pier pile footings between the I-55 lanes, high Qu and high blow count (N) value soils have been encountered in the boring logs, and the IDOT Temporary Sheet Piling Design Charts may not be used. The contractor should design a Temporary Soil Retention System where temporary earth retention is needed. Lateral soil properties provided in Section 08: Recommendations may be used for temporary retaining wall design.

In order to accommodate the stage construction and separate contracts of the permanent MSE wall at the south abutment, a “temporary” MSE wall will be needed to retain the MSE wall embankment of the southbound lanes while the northbound MSE wall is being built. This “temporary” MSE wall will remain in place after construction of the complete south abutment MSE wall. The “temporary” MSE wall may be designed with the recommendations outlined in the ***MSE Wall Foundation Recommendations*** section, found in **Section 08: Recommendations**.

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

SECTION 10: GENERAL QUALIFICATIONS

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

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

APPENDIX A

GENERAL NOTES

GENERAL NOTES

CLASSIFICATION

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

Cohesionless Soils

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

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

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.

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

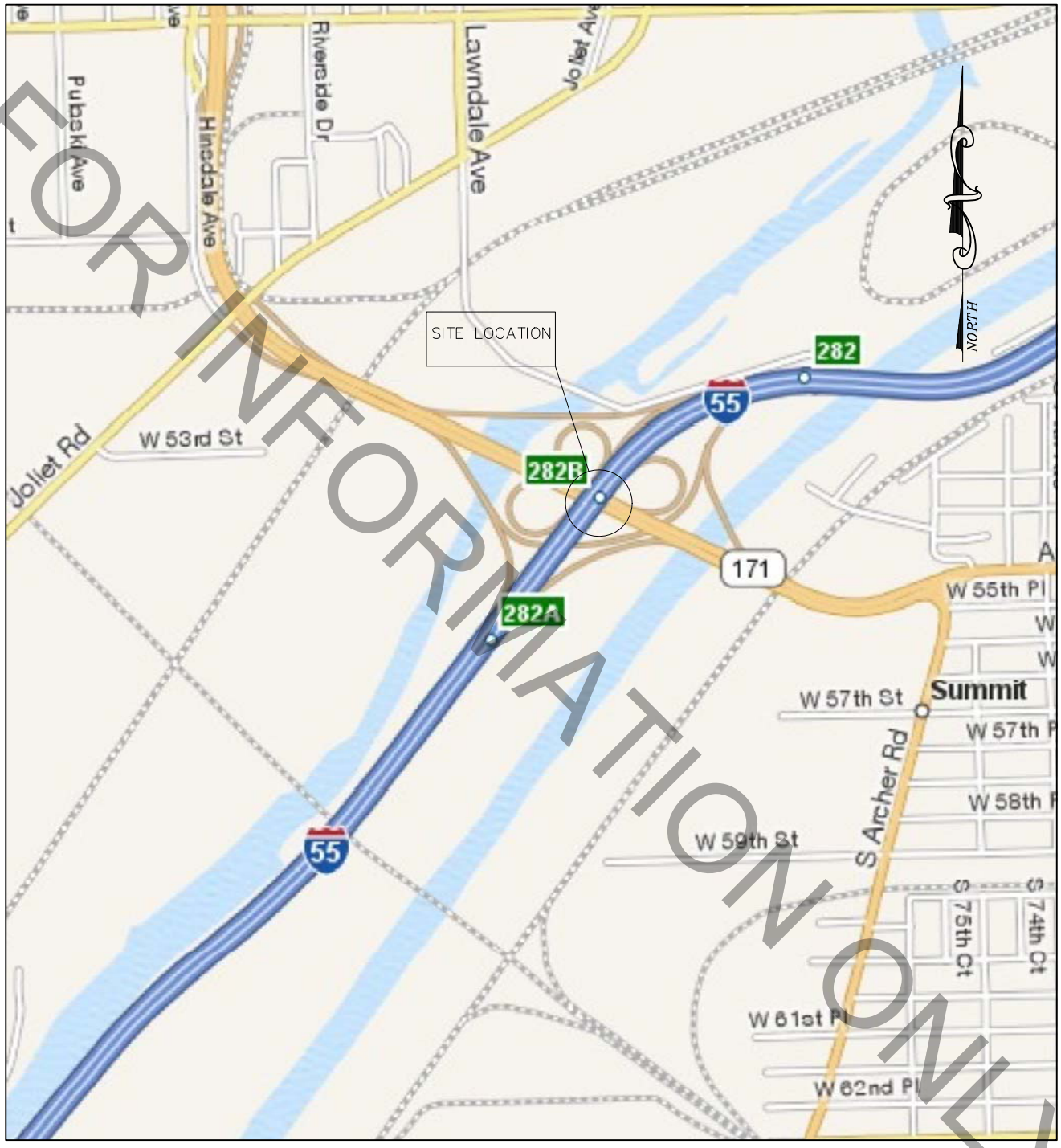
WATER LEVEL MEASUREMENT SYMBOLS

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



SITE LOCATION MAP			
IL–171 Over I–55 IL–171 (First Avenue) from 47th Street to 55th Street SN 016–1510 & 016–1511 Cook County, Illinois	**Geo Services, Inc.** Geotechnical, Environmental & Civil Engineering 805 Amherst Court, Suite 204 Naperville, Illinois 60565 (630) 355–2838	DRAWN BY	BT
		APPROVED BY	AJP
		DATE	July 17, 2013
		GSI JOB No.	10025
		SCALE	NTS

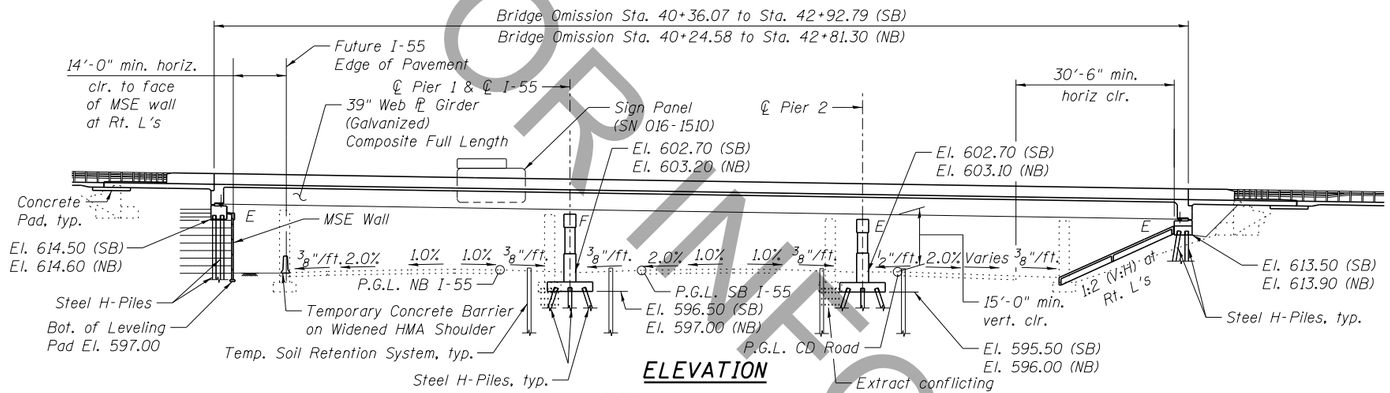
APPENDIX C

TS&L, SOIL BORING PLAN AND PROFILE

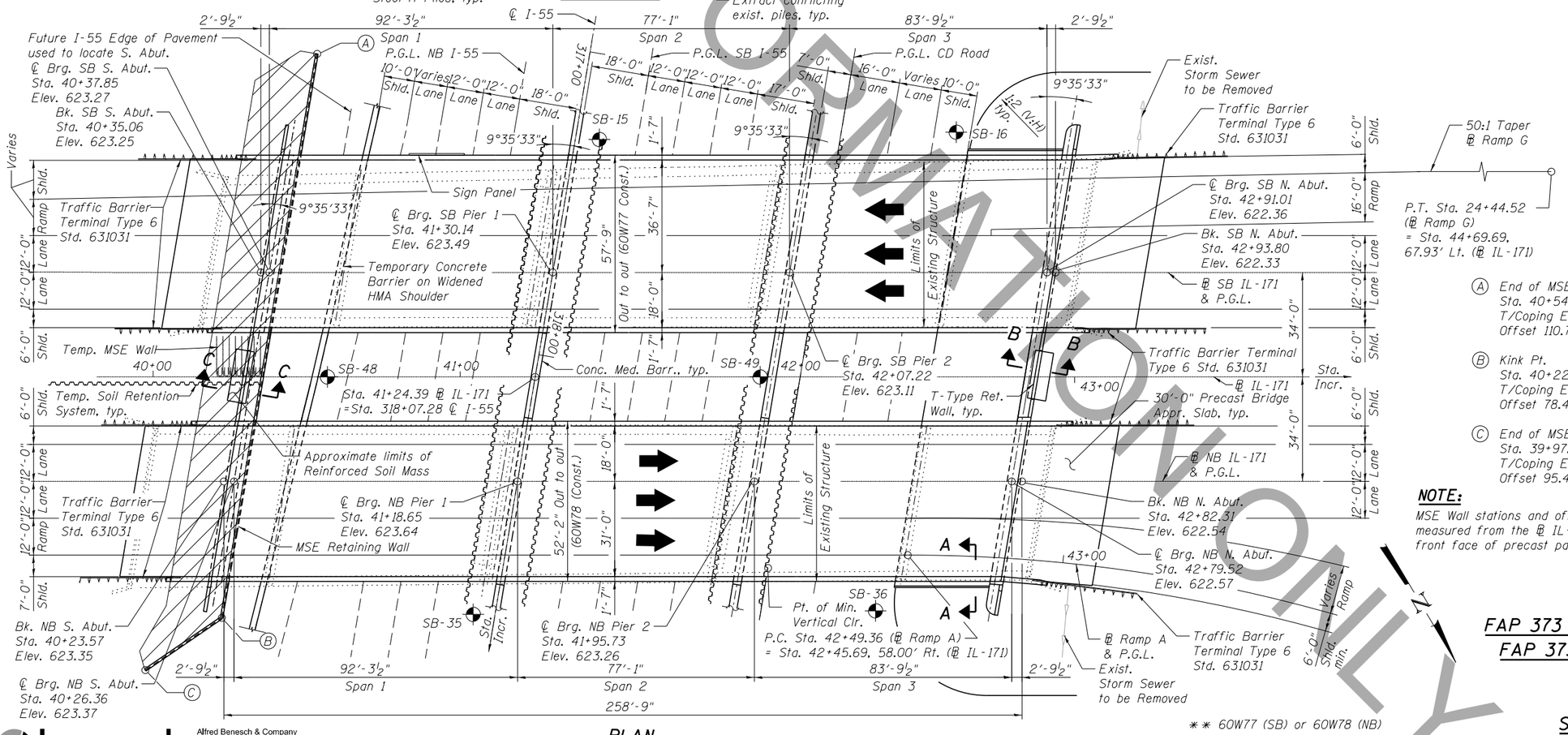
Benchmark: Chiseled square on wingwall at NE corner of NB IL-171 bridge wall over sanitary and ship canal. El. 625.62

Existing Structures: S.N. 016-0484 (SB) and S.N. 016-0485 (NB) were originally built in 1964 under section number 0707-608HB. The superstructures consist of five span continuous W33 rolled beams (8 beam lines). The reinforced concrete decks are 7½" thick, including a 2" microsilica concrete overlay. The substructures consist of four reinforced concrete column piers founded on steel piles and two reinforced concrete stub abutments founded on steel piles. The structures are 283'-8" (SB) and 293'-7" (NB) back to back of abutments, with out-to-out deck widths varying from 49'-0 7/8" to 54'-8½" (SB) and 52'-10¼" to 50'-10⅛" (NB) on 9° 34' 18" ahead left skew. Traffic is to be maintained utilizing crossovers.

No salvage.



ELEVATION



PLAN

** 60W77 (SB) or 60W78 (NB)

*** (0707-608&611)HB-B (SB) or 0707-608HB-B-1 (NB)

SEISMIC DATA

Seismic Performance Zone (SPZ) = 1
Design Spectral Acceleration at 1.0 sec. (S_{D1}) = 0.063 g
Design Spectral Acceleration at 0.2 sec. (S_{DS}) = 0.114 g
Soil Site Class = C

RAMP A CURVE DATA

P.I. Sta. = 43+31.95
Δ = 18° 23' 52" (RT)
D = 11° 14' 04"
R = 510.00'
T = 82.59'
L = 163.76'
E = 6.64'
e = 6.0%
P.C. Sta. = 42+49.36
P.C.C. Sta. = 44+13.12
Trans. 2% at Sta. 42+49.36 to 6% at Sta. 43+85.36

RAMP G CURVE DATA

P.I. Sta. = 23+57.67
Δ = 23° 28' 41" (RT)
D = 13° 19' 29"
R = 430.00'
T = 89.35'
L = 176.20'
E = 9.19'
e = 5.8%
P.C.C. Sta. = 22+68.32
P.T. Sta. = 24+44.52

HIGHWAY CLASSIFICATION

Structure No. 016-1510
IL 171 SB (FAP 373)
Functional Class: Other Principal Arterial
ADT: 21,726 (2008); 22,000 (2030)
DHV: 2,179 (2030)
ADTT: 9.9% (2008); 9.9% (2030)
Design Speed: 50 m.p.h. (Mainline)
Posted Speed: 50 m.p.h. (Mainline)
Design Speed: 35 m.p.h. (Ramp G)
Posted Speed: 25 m.p.h. (Ramp G)

Structure No. 016-1511
IL 171 NB (FAP 373)
Functional Class: Other Principal Arterial
ADT: 27,980 (2008); 29,000 (2030)
DHV: 2,445 (2030)
ADTT: 12.6% (2008); 12.9% (2030)
Design Speed: 50 m.p.h. (Mainline)
Posted Speed: 50 m.p.h. (Mainline)
Design Speed: 25 m.p.h. (Ramp A)
Posted Speed: 25 m.p.h. (Ramp A)

I-55 (FAI 55)
Functional Class: Interstate
ADT: 143,995 (2012); 213,664 (2040)
DHV: 7,720 (2040)
ADTT: 15.0% (2012); 15.0% (2040)
Design Speed: 70 m.p.h.
Posted Speed: 55 m.p.h.

LOADING HL-93

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

DESIGN SPECIFICATIONS

2012 AASHTO LRFD Bridge Design Specifications, 6th Edition with 2013 Interims

DESIGN STRESSES

FIELD UNITS

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

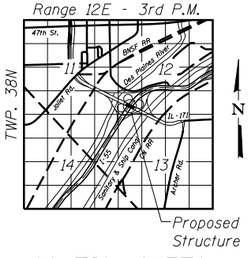
P.T. Sta. 24+44.52 (ℙ Ramp G) = Sta. 44+69.69, 67.93' Lt. (ℙ IL-171)

Ⓐ End of MSE Wall
Sta. 40+54.35
T/Coping Elev. 603.00
Offset 110.71' Lt.

Ⓑ Kink Pt.
Sta. 40+22.40
T/Coping Elev. 615.96
Offset 78.42' Rt.

Ⓒ End of MSE Wall
Sta. 39+97.49
T/Coping Elev. 610.00
Offset 95.43' Rt.

NOTE:
MSE Wall stations and offsets are measured from the ℙ IL-171 to the front face of precast panels.



LOCATION SKETCH

GENERAL PLAN
IL-171 OVER I-55
FAP 373 (SB) - SECTION (0707-608&611)HB-B
FAP 373 (NB) - SECTION 0707-608HB-B-1
COOK COUNTY
STATION 41+24.39
STRUCTURE NO. 016-1510 (SB)
STRUCTURE NO. 016-1511 (NB)

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Chicago, Illinois 60601
312-565-0450
Job No. 10093

FILE NAME = 016151015l1-60J16-TSL-001.dgn	USER NAME = knaus	DESIGNED - AAY	REVISED -
		CHECKED - JHG	REVISED -
	PLOT SCALE =	DRAWN - RMG	REVISED -
	PLOT DATE = 12/13/2013	CHECKED - KJN	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET NO. 1 OF 4 SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
373	***	COOK		
		CONTRACT NO. **		
	ILLINOIS FED. AID PROJECT			

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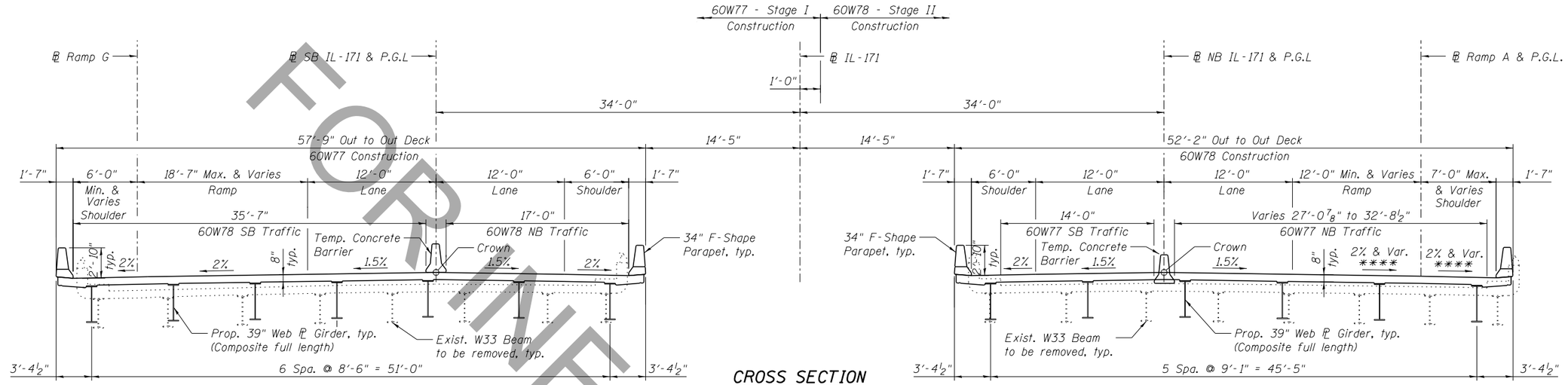
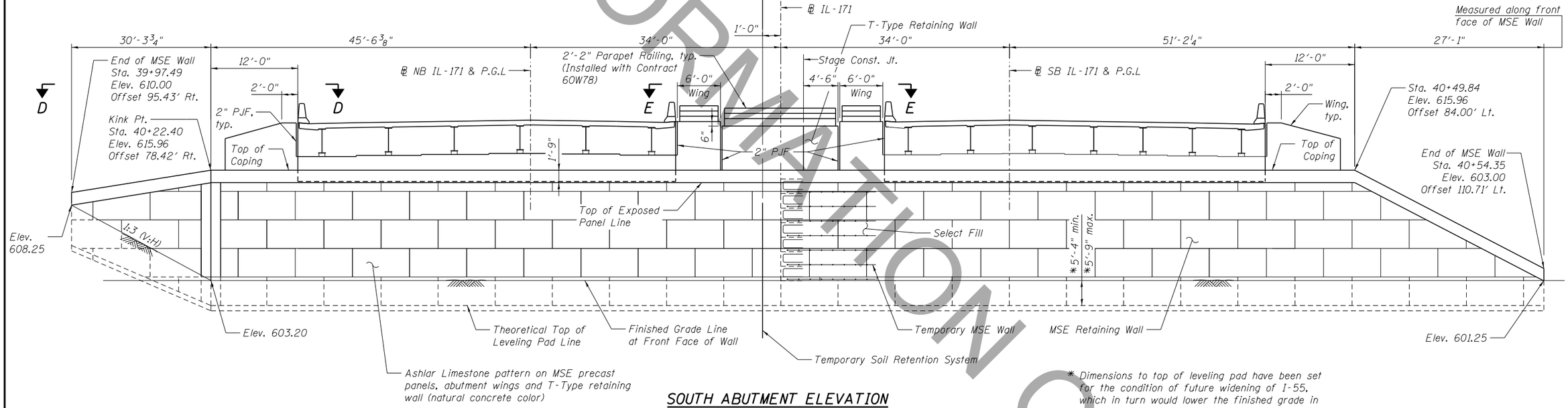


CROSS SECTION
(Looking Upstation)

**** Ramp A transitions from 2% at Sta. 42+49.36 to 6% at Sta. 43+85.36.



SOUTH ABUTMENT ELEVATION
(Looking Downstation)

* Dimensions to top of leveling pad have been set for the condition of future widening of I-55, which in turn would lower the finished grade in front of the MSE wall.

NOTES:

1. MSE wall stations and offsets are measured from the ℄ IL -171 to the front face of precast panels.
2. See Sheet 4 for Views D-D and E-E.

** 60W77 (SB) or 60W78 (NB)

*** (0707-608&611)HB-B (SB) or 0707-608HB-B-1 (NB)

CROSS SECTIONS
IL-171 OVER I-55
FAP 373 (SB) - SECTION (0707-608&611)HB-B
FAP 373 (NB) - SECTION 0707-608HB-B-1
COOK COUNTY
STATION 41+24.39
STRUCTURE NO. 016-1510 (SB)
STRUCTURE NO. 016-1511 (NB)

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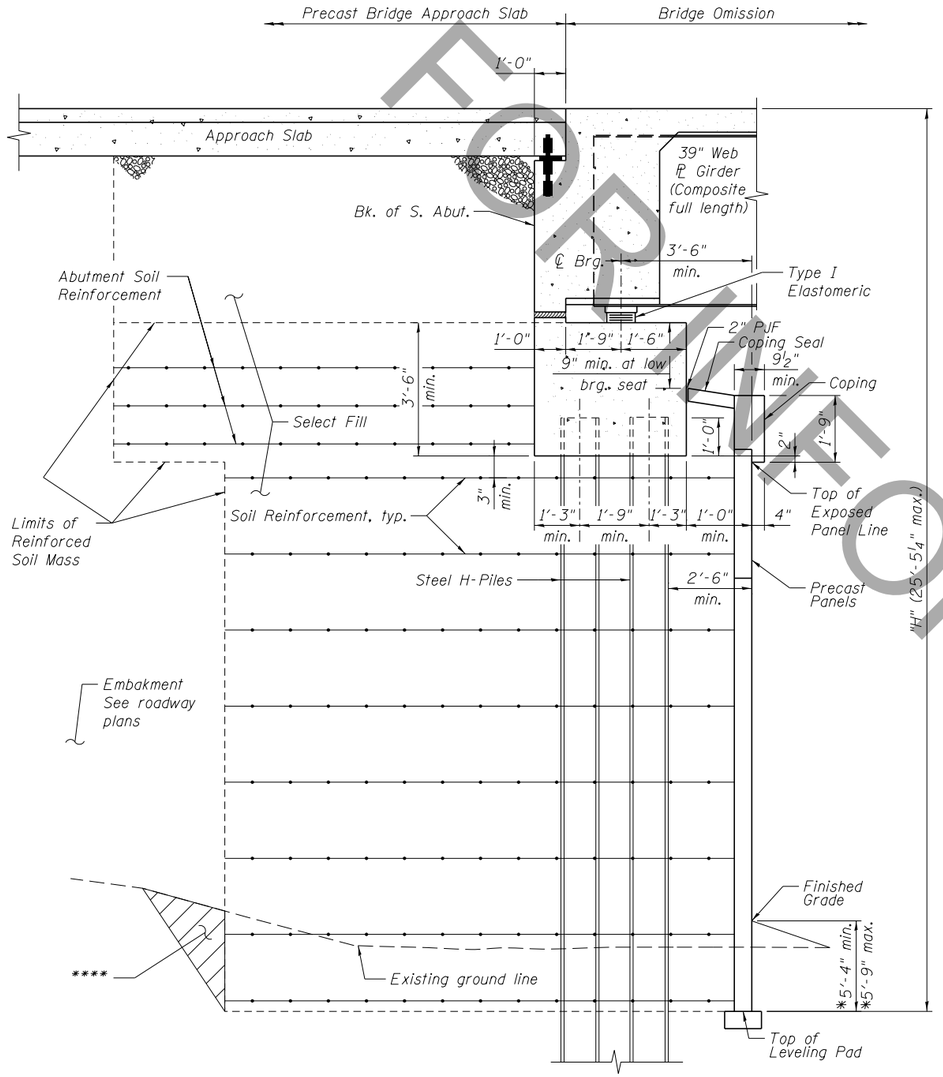
FILE NAME = 016151501511-60J16-TSL-002.dgn	USER NAME = knaus	DESIGNED - AAY	REVISED -
		CHECKED - JHG	REVISED -
	PLOT SCALE =	DRAWN - RMG	REVISED -
	PLOT DATE = 12/13/2013	CHECKED - KJN	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

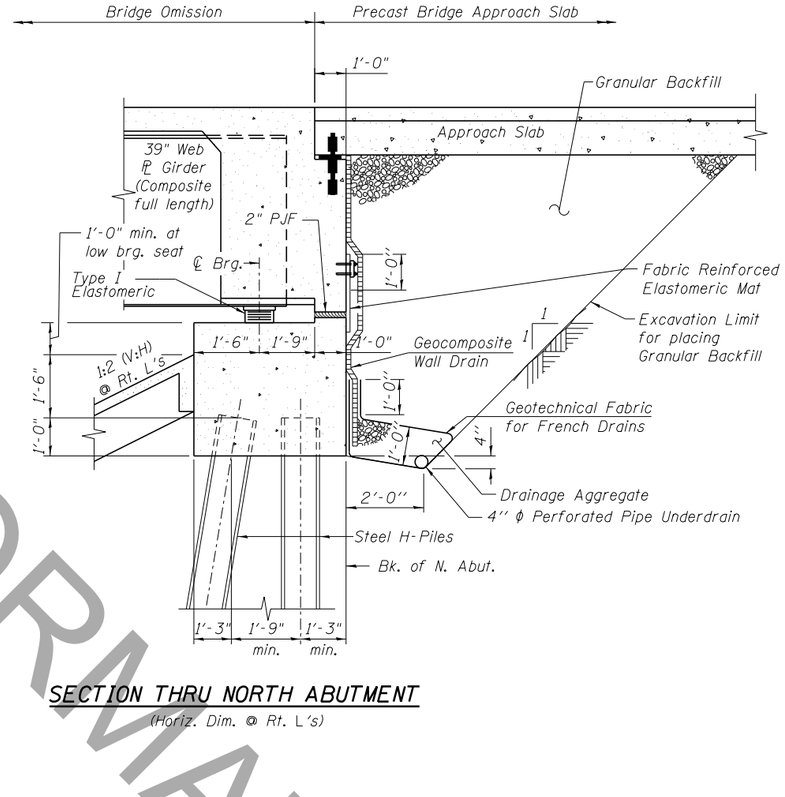
SHEET NO. 2 OF 4 SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
373	***	COOK		
		CONTRACT NO. **		
	ILLINOIS FED. AID PROJECT			



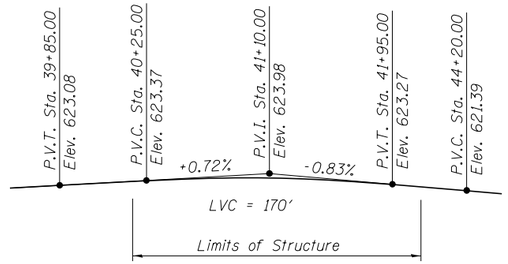
SECTION THRU SOUTH ABUTMENT

(Horiz. Dim. @ Rt. L's)



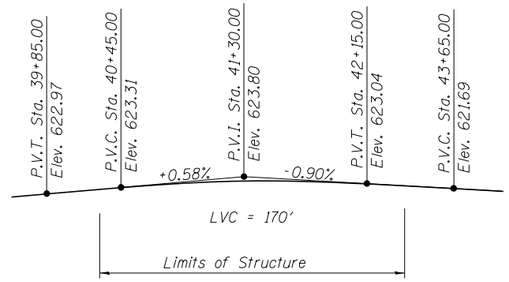
SECTION THRU NORTH ABUTMENT

(Horiz. Dim. @ Rt. L's)



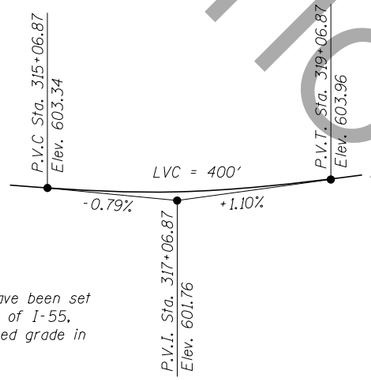
PROFILE GRADE NB IL-171

(Along ℄ NB IL-171)



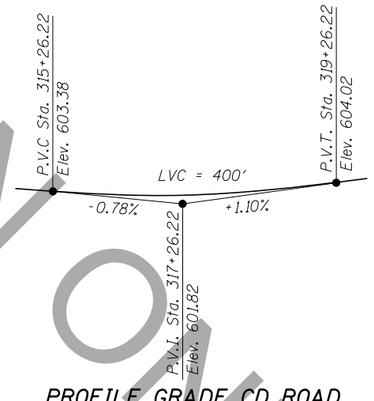
PROFILE GRADE SB IL-171

(Along ℄ SB IL-171)



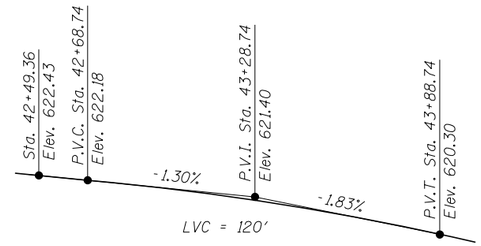
PROFILE GRADE NB & SB I-55

(Along Median Edge of Pavement)



PROFILE GRADE CD ROAD

(Along Edge of Pavement)



PROFILE GRADE RAMP A

(Along ℄ Ramp A)

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

* Dimensions to top of leveling pad have been set for the condition of future widening of I-55, which in turn would lower the finished grade in front of the MSE wall.

** 60W77 (SB) or 60W78 (NB)

*** (0707-608&611)HB-B (SB) or 0707-608HB-B-1 (NB)

SECTIONS & DETAILS
SHEET 1 OF 2
IL-171 OVER I-55
FAP 373 (SB) - SECTION (0707-608&611)HB-B
FAP 373 (NB) - SECTION 0707-608HB-B-1
COOK COUNTY
STATION 41+24.39
STRUCTURE NO. 016-1510 (SB)
STRUCTURE NO. 016-1511 (NB)

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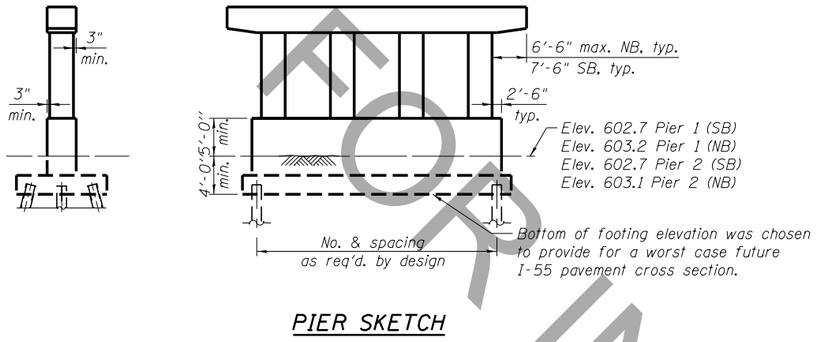
FILE NAME = 016151015l1-60J16-TSL-003.dgn	USER NAME = knaus	DESIGNED - AAY	REVISED -
		CHECKED - JHG	REVISED -
	PLOT SCALE =	DRAWN - RMG	REVISED -
	PLOT DATE = 12/13/2013	CHECKED - KJN	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

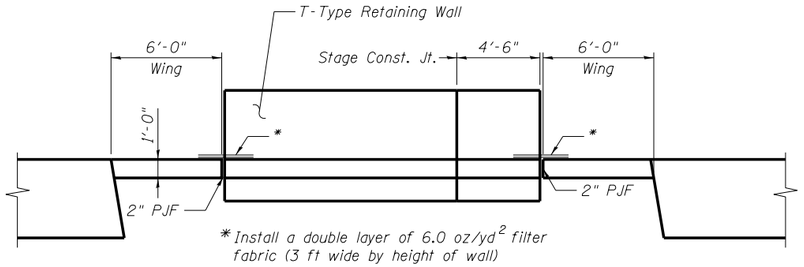
SHEET NO. 3 OF 4 SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
373	***	COOK		
		CONTRACT NO. **		
	ILLINOIS FED. AID PROJECT			

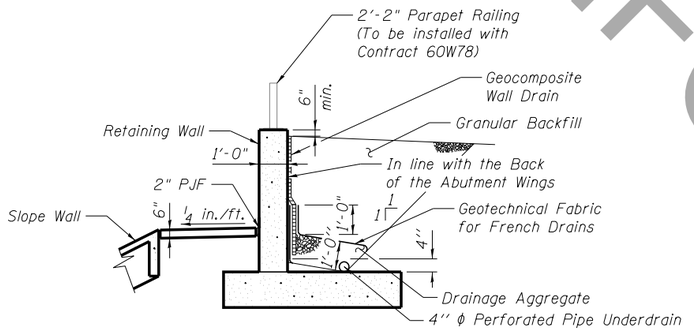
12/13/2013 2:43:17 PM X:\10000S\10093\Eng_Docs_Phase_II\SN.016.1510_1511_1st_Ave_over_I55\TS&L\016151015l1-60J16-TSL-003.dgn



PIER SKETCH

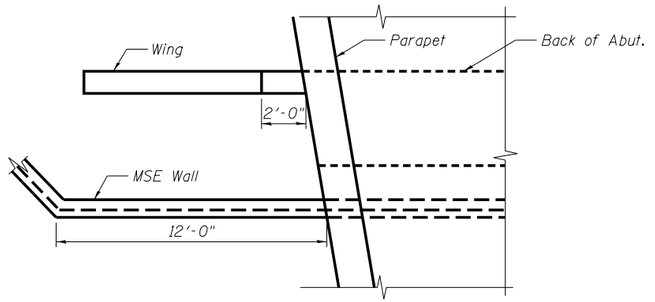


VIEW E-E



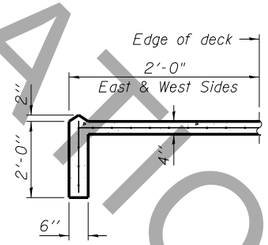
SECTION B-B

(Between North Abutments)

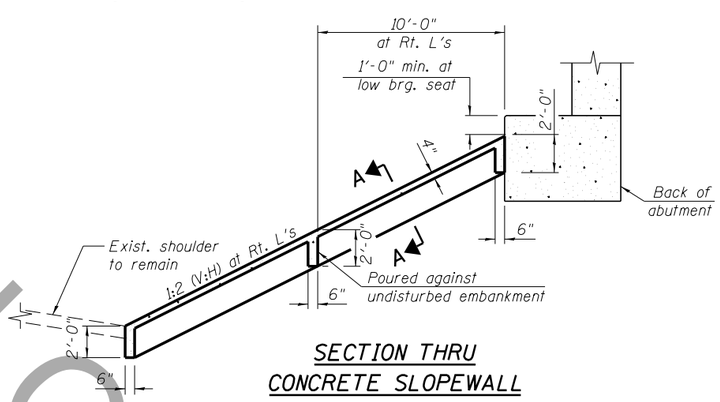


VIEW D-D

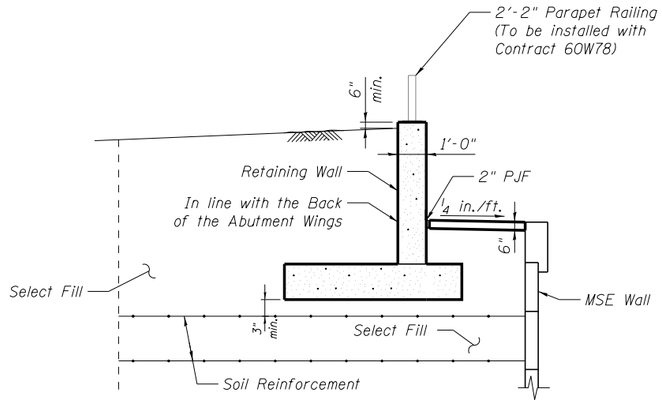
(NB Wing Shown, SB Wing Similar)



SECTION A-A



SECTION THRU CONCRETE SLOPEWALL



SECTION C-C

(Between South Abutments)

** 60W77 (SB) or 60W78 (NB)

*** (0707-608&611)HB-B (SB) or 0707-608HB-B-1 (NB)

SECTIONS & DETAILS
SHEET 2 OF 2
IL-171 OVER I-55
FAP 373 (SB) - SECTION (0707-608&611)HB-B
FAP 373 (NB) - SECTION 0707-608HB-B-1
COOK COUNTY
STATION 41+24.39
STRUCTURE NO. 016-1510 (SB)
STRUCTURE NO. 016-1511 (NB)

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		CHECKED - JHG	REVISED -
	PLOT SCALE =	DRAWN - RMG	REVISED -
	PLOT DATE = 12/13/2013	CHECKED - KJN	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SHEET NO. 4 OF 4 SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
373	***	COOK		
		CONTRACT NO. **		
	ILLINOIS FED. AID PROJECT			

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PLAN
SURVEYED
PLOTTED
NOTE BOOK
NO. ____
BY
DATE

PROFILE
SURVEYED
PLOTTED
NOTE BOOK
NO. ____
BY
DATE

PROP. ℄ RAMP E
RAMP F
RAMP E
RAMP C
RAMP G
NB I-55
SB I-55
C-D ROAD
S.N. 016-0484
℄ IL ROUTE 171
SB IL ROUTE 171
NB IL ROUTE 171
SB PGL
NB PGL
SB-15
SB-16
SB-48
SB-49
SB-35
SB-36
℄ RAMP C (PGL)
S.N. 016-0485
END IMPROVEMENTS
RAMP A, STA. 45+50
℄ RAMP A (PGL)
RAMP A
25+00
30+00
35+00
40+00
45+00
120+00
125+00
130+00
155+00
315+00
320+00
N
50 0 50 100
SCALE: 1"=50'-0"

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

USER NAME =	DESIGNED - RWC	REVISED -	
	DRAWN - RWC	REVISED -	
PLOT SCALE =	CHECKED - AJP	REVISED -	
PLOT DATE =	DATE - 6/24/2013	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ILLINOIS ROUTE 171
NB BRIDGE (S.N. 016-1511) & SB BRIDGE (S.N. 016-1510)
SOIL BORING PLAN

SCALE: 1"=50' | SHEET NO. 1 OF 1 SHEETS | STA. | TO STA.

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
372		COOK		
		CONTRACT NOs. 60W78 & 60W77		
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		

PROPOSED SB IL 171 PGL

EXISTING GROUND @ SB IL 171 PGL

VERTICAL CLEAR. (MIN.) EXIST. 14.42' PROP. 15.00'

EXISTING 5-SPAN STRUCTURE LAYOUT

VERTICAL CLEARANCE (MIN.) 14.78' EXIST. 15.00' PROP.

SB-48
40+57
Baseline
602.6

	N	Qu	W%
PAVEMENT	10		12
	16	4.5P	15
CLAY LOAM (FILL)	33	2.5P	15
	12	2.5P	18
	21		6
FRACTURED ROCK & GRAVEL	19		10
	15		6
CLAYEY FRACTURED ROCK & GRAVEL	16		21
FRACTURED ROCK & GRAVEL	50/4"		12
	55		10
CLAYEY FRACTURED ROCK & GRAVEL	50/2"		8
	50/3"		9
	50/3"		8
BEDROCK			

EOB

SB-15
41+45
77.3' Left
602.5

	N	Qu	W%
PAVEMENT	38		3
	14	4.6B	14
CLAY LOAM (FILL)	18	2.0P	10
	43		7
	43		4
CRUSHED STONE (Fill)	20		11
	50		9
	37		10
	50/4"		14
SANDY LOAM	50/4"		11
	70	4.5P	10
CLAY LOAM with FRACTURED ROCK	41	4.5P	10
SILTY SAND & FRACTURED ROCK	50/6"		9
BEDROCK			

EOB

SB-49
41+98
Baseline
602.7

	N	Qu	W%
PAVEMENT	14		9
	11	3.9S	14
CLAY LOAM (FILL)	31	4.5P	11
	32		3
	18		5
SAND, GRAVEL & FRACTURED ROCK	20		9
	18		8
	20		10
	50/5"		9
	50/3"		8
	50/6"		8
CLAYEY SAND, GRAVEL & FRACTURED ROCK	50/5"		10
	50/2"		10
BEDROCK			

EOB

SB-16
42+61
79.0' Left
601.3

	N	Qu	W%
PAVEMENT			
SILTY CLAY (FILL)	10	4.8B	18
SANDY CLAY LOAM (FILL)	26		16
CLAY LOAM (FILL)	20	4.5P	25
	26		4
	27		8
SAND, GRAVEL & FRACTURED ROCK	22		7
	39		8
	50/3"		6
	78		10
	50/2"		7
	50/4"		10
	50/6"		7
CLAYEY SAND, GRAVEL & FRACTURED ROCK	50/1"		
	50/4"		
BEDROCK			

EOB

LEGEND

BORING NUMBER
STATION
OFFSET
ELEVATION

N-VALUE
SOIL STRENGTH (TSF)
B-BULGE
S-SHEAR
P-POCKET PENETROMETER
MOISTURE CONTENT (%)
NR=NO RECOVERY

	N	Qu	W%
AS			
10		2.5P	22
9	NP		7
16		1.5B	14
27	-		12

EOB

GROUNDWATER ELEVATION
▼ FIRST ENCOUNTER
▽ AT COMPLETION
▽ 24 HRS WATER LEVEL

EOB=END OF BORING

EXISTING GROUND @ NB IL 171 PGL

PROPOSED IL 171 PGL

VERTICAL SCALE: 1"=5'-0"

HORIZONTAL SCALE: 1"=50'-0"

624.57	624.19	623.83	623.31	622.96	622.76	622.53	622.30	621.89	621.45	621.01	620.79	620.45	620.21	619.95
624.64	**624.32**	**624.02**	**623.61**	**623.10**	**622.74**	**623.05**	**623.50**	**623.16**	**622.28**	**621.40**	**620.80**	**620.42**	**620.12**	**619.98**
34+00	35+00	36+00	37+00	38+00	39+00	40+00	41+00	42+00	43+00	44+00	45+00	46+00	47+00	48+00

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805 Amherst Court, Suite 204
Naperville, Illinois 60565
(630) 355-2838

USER NAME =	DESIGNED - RWC	REVISED -	
	DRAWN - RWC	REVISED -	
PLOT SCALE =	CHECKED - AJP	REVISED -	
PLOT DATE =	DATE - 6/24/2013	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ILLINOIS ROUTE 171
SB BRIDGE (S.N. 016-1510)
SOIL BORING PROFILE

SCALE: 1:5V 1:50H | SHEET NO. 1 OF 1 SHEETS | STA. | TO STA.

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
372		COOK		
		CONTRACT NO. 60W77		
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		

PLAN
SURVEYED
PLOTTED
QUANTITIES CHECKED
R/W, OF WAY CHECKED
CADD FILE NAME
NOTE BOOK
NO.
BY
DATE

PROFILE
SURVEYED
PLOTTED
QUANTITIES CHECKED
BAL. NOTED
STRUCTURE NOTATNS CHKD
NOTE BOOK
NO.
BY
DATE

PROPOSED IL 171 PGL

EXISTING GROUND @ NB IL 171 PGL

15.91' VERT. CLEARANCE (MIN.)

VERTICAL CLEARANCE (MIN.) 13.14' EXIST. 15.00' PROP.

EXISTING 5-SPAN STRUCTURE LAYOUT

SB-48
40+57
Baseline
602.6

	N	Qu	W%
PAVEMENT	10		12
CLAY LOAM (FILL)	16	4.5P	15
	33	2.5P	15
	12	2.5P	18
	21		6
FRACTURED ROCK & GRAVEL	19		10
	15		6
CLAYEY FRACTURED ROCK & GRAVEL	16		21
FRACTURED ROCK & GRAVEL	50/4"		
	55		10
CLAYEY FRACTURED ROCK & GRAVEL	50/2"		8
	50/3"		
	50/3"		8
BEDROCK			

EOB

SB-35
41+04
79.3' Right
603.8

	N	Qu	W%
PAVEMENT	30		5
	10	3.0P	15
CLAY LOAM (FILL)	15	4.5P	17
	10	2.3B	13
	15		15
CRUSHED STONE (FILL)	11		7
	24		12
	14		10
CLAY LOAM with FRACTURED ROCK	50/5"	2.0B	12
	50/3"	4.5P	10
	50/3"	4.5P	13
CLAYEY SAND, GRAVEL & FRACTURED ROCK	50/4"	4.5P	9
	50/4"	4.0P	10
BEDROCK			

EOB

SB-49
41+98
Baseline
602.7

	N	Qu	W%
PAVEMENT	14		9
	11	3.9S	14
CLAY LOAM (FILL)	31	4.5P	11
	32		3
	18		5
SAND, GRAVEL & FRACTURED ROCK	20		9
	18		8
	20		10
	50/5"		
	50/3"		
CLAYEY SAND, GRAVEL & FRACTURED ROCK	50/6"		
	50/5"		10
	50/2"		
BEDROCK			

EOB

SB-36
42+35
76.1' Right
602.7

	N	Qu	W%
PAVEMENT	48		5
	11	4.9B	14
CLAY LOAM (FILL)	12	1.9B	16
	30		7
	11		5
SAND, GRAVEL & FRACTURED ROCK	8		5
	21		11
	27		10
	50/4"		3
	50/4"		7
CLAYEY SAND, GRAVEL & FRACTURED ROCK	50/4"		9
	50/6"	3.5P	11
CLAY LOAM			
CLAYEY SAND, GRAVEL & FRACTURED ROCK	50/5"		8
	50/3"		14
BEDROCK			

EOB

LEGEND

BORING NUMBER
STATION
OFFSET
ELEVATION

N-VALUE
SOIL STRENGTH (TSF)
B-BULGE
S-SHEAR
P-POCKET PENETROMETER
MOISTURE CONTENT (%)
NR=NO RECOVERY

	N	Qu	W%
AS			
10		2.5P	22
9		NP	7
16		1.5B	14
27	▽	-	12

EOB

GROUNDWATER ELEVATION
▼ FIRST ENCOUNTER
▽ AT COMPLETION
▽ 24 HRS WATER LEVEL

EOB=END OF BORING

VERTICAL SCALE: 1"=5'-0"

HORIZONTAL SCALE: 1"=50'-0"

EXISTING GROUND @ NB IL 171 PGL
PROPOSED IL 171 PGL

34+00	35+00	36+00	37+00	38+00	39+00	40+00	41+00	42+00	43+00	44+00	45+00	46+00	47+00	48+00
624.59 624.75	624.27 624.37	623.71 623.99	623.48 623.57	623.02 623.08	622.68 622.74	622.53 623.05	622.12 623.50	621.77 623.16	621.41 622.28	621.15 621.39	620.70 620.76	620.46 620.38	620.10 620.09	619.83 619.96

PLAN

SURVEYED	
PLOTTED	
DRAWN	
CHECKED	
R/T. OF WAY CHECKED	
CADD FILE NAME	
NOTE BOOK	
NO.	

PROFILE

SURVEYED	
PLOTTED	
DRAWN	
CHECKED	
BAL. NOTED	
STRUCTURE NOTATNS CHKD	
NOTE BOOK	
NO.	

DATE | BY

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

USER NAME =		DESIGNED - RWC	REVISED -	
		DRAWN - RWC	REVISED -	
PLOT SCALE =		CHECKED - AJP	REVISED -	
PLOT DATE =		DATE - 6/24/2013	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ILLINOIS ROUTE 171
NB BRIDGE (S.N. 016-1511)
SOIL BORING PROFILE

SCALE: 1:5V 1:50H | SHEET NO. 1 OF 1 SHEETS | STA. | TO STA.

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
372		COOK		
		CONTRACT NO. 60W78		
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		

APPENDIX D

BORING AND ROCK CORE LOGS

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

SOIL BORING LOG

GSI Job No. 10025

Date 3/13/12

ROUTE FAP 373 (IL 171) **DESCRIPTION** IL Route 171 from 47th St. to 55th St. **LOGGED BY** NW

SECTION (0707-608&611)HB-B & 0707-608HB-B-1 **LOCATION** SE 1/4, **SEC.** 11, **TWP.** T38N, **RNG.** R12E, 3rd **PM**

COUNTY Cook **DRILLING METHOD** HSA/MUD ROTARY **HAMMER TYPE** CME Automatic

STRUCT. NO. 016-1510 & 016-1511
Station 41+24.39
BORING NO. SB-15
Station 41+45
Offset 77.30ft Left
Ground Surface Elev. 602.50 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft
Groundwater Elev.:
First Encounter 598.5 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
18.0" ASPHALT, 18.0" CRUSHED STONE			
	24		
	22		3
	16		
599.50			
CLAY LOAM-dark brown & gray-very stiff to hard (Fill)			
	8		
	8	4.6	14
-5	6	B	
	8		
	9	2.0	10
	9	P	
594.00			
CRUSHED STONE-dense to very dense (Fill)			
	17		
	19		7
-10	24		
	18		
	20		4
	23		
	8		
	10		11
-15	10		
	15		
	21		9
	29		
	19		
	22		10
-20	15		
CRUSHED STONE-dense to very dense (Fill) *(continued)*			
	14		
	50/4"		14
579.50			
SANDY LOAM with Gravel-gray-very dense			
	50/4"		
			11
-25			
577.00			
CLAY LOAM with Fractured Rock-gray-very dense			
	23		
	31	4.5	10
	39	P	
	11		
	19	4.5	10
-30	22	P	
570.50			
Silty SAND & FRACTURED ROCK-gray-very dense			
	50/6"		
			9
-35			
566.00			
Drillers Observation: Apparent bedrock. 565.50			
Borehole continued with rock coring.			
-40			

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

BBS, from 137 (Rev. 8-99)

Z:\PROJECTS\2010\10025 BENESCH, IL-171 FIRST AVE. (IDOT PTB 154, ITEM 14)\10025 BORING LOGS\10025_LOG.GPJ 11/18/13

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

ROCK CORE LOG

PAGE 1 of 1
DATE 3/13/2012
LOGGED BY DR
GSI JOB No. 10025

FAP 373 (IL 171)
(0707-608&611) HB-B &
SECTION 0707-608HB-B-1
COUNTY Cook
STRUCT. NO. 016-1510 & 016-1511
Station 41+24.39
BORING NO. **SB-15**
Station 41+45
Offset 77.3' Left
Ground Surface Elev. 602.5

DESCRIPTION 1st Ave. Bridge Rehabilitation & Replacement, 47th St. to 55th St.
LOCATION SEC 11, 12, 13 & 14 T 38 N, R 12 E, 3rd PM
CORING METHOD Rotary Wash
CORING BARREL TYPE & SIZE NX Double Swivel-10 ft
Core Diameter 2.0 in
Top of Rock Elev. 566.0
Begin Core Elev. 565.5

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	89.0	32.0	n/a	1248 @ -37.3'
-42					
-47					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-37.0' to -47.0')
Light gray with horizontal to wavy bedding. Weathered with numerous horizontal & vertical fractures throughout.

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

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SOIL BORING LOG

GSI Job No. 10025

Date 3/21/12

ROUTE FAP 373 (IL 171) **DESCRIPTION** IL Route 171 from 47th St. to 55th St. **LOGGED BY** NW

SECTION (0707-608&611)HB-B & 0707-608HB-B-1 **LOCATION** SE 1/4, **SEC.** 11, **TWP.** T38N, **RNG.** R12E, 3rd **PM**

COUNTY Cook **DRILLING METHOD** HSA/MUD ROTARY **HAMMER TYPE** CME Automatic

STRUCT. NO. 016-1510 & 016-1511
Station 41+24.39
BORING NO. SB-16
Station 42+61
Offset 79.60ft Left
Ground Surface Elev. 601.30 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft
Groundwater Elev.:
First Encounter 589.3 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
11.0" ASPHALT							
600.38							
SILTY CLAY-dark brown & gray-hard (Fill)	9						
	5	4.8	18		36		10
	5	B			42		
598.30							
SANDY CLAY LOAM with Gravel-brown-medium dense (Fill)	6				50/2"		
	12		16				7
-5	14			-25			
595.80							
CLAY LOAM-dark gray-hard (Fill)	13				41		
	7	4.5	25		50/4"		10
	13	P					
593.30							
SAND, GRAVEL & FRACTURED ROCK-gray-medium dense to very dense	17				50/6"		
	13		4				7
-10	13			-30			
	10						
▼	12		8				
	15						
	7				50/1"		
	10		7				
-15	12			-35			
	14						
	17		8				
	22						
	22				50/4"		
	50/3"		6				
-20				-40			
				580.80			
				Clayey SAND, GRAVEL & FRACTURED ROCK-gray-very dense	24		

Z:\PROJECTS\2010\10025 BENESCH, IL-171 FIRST AVE. (IDOT PTB 154, ITEM 14)\10025 BORING LOGS\10025_LOG.GPJ 11/18/13

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

BBS, from 137 (Rev. 8-99)

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SOIL BORING LOG

GSI Job No. 10025

Date 3/21/12

ROUTE FAP 373 (IL 171) **DESCRIPTION** IL Route 171 from 47th St. to 55th St. **LOGGED BY** NW

SECTION (0707-608&611)HB-B & 0707-608HB-B-1 **LOCATION** SE 1/4, **SEC.** 11, **TWP.** T38N, **RNG.** R12E, 3rd **PM**

COUNTY Cook **DRILLING METHOD** HSA/MUD ROTARY **HAMMER TYPE** CME Automatic

STRUCT. NO. 016-1510 & 016-1511
Station 41+24.39

BORING NO. SB-16
Station 42+61
Offset 79.60ft Left
Ground Surface Elev. 601.30 ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
560.30			
Drillers Observation: Apparent bedrock. 559.30			
Borehole continued with rock coring.			
-45			
-50			
-55			
-60			

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

Groundwater Elev.:
First Encounter 589.3 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

Z:\PROJECTS\2010\10025 BENESCH, IL-171 FIRST AVE. (IDOT PTB 154, ITEM 14)\10025 BORING LOGS\10025_LOG.GPJ 11/18/13

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

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ROCK CORE LOG

DATE 3/21/2012

LOGGED BY DR

GSI JOB No. 10025

FAP 373 (IL 171)
(0707-608&611) HB-B &
SECTION 0707-608HB-B-1

DESCRIPTION 1st Ave. Bridge Rehabilitation & Replacement, 47th St. to 55th St.

LOCATION SEC 11, 12, 13 & 14 T 38 N, R 12 E, 3rd PM

COUNTY Cook

CORING METHOD Rotary Wash

STRUCT. NO. 016-1510 & 016-1511

Station 41+24.39

BORING NO. **SB-16**

Station 42+61

Offset 79.6' Left

Ground Surface Elev. *601.3*

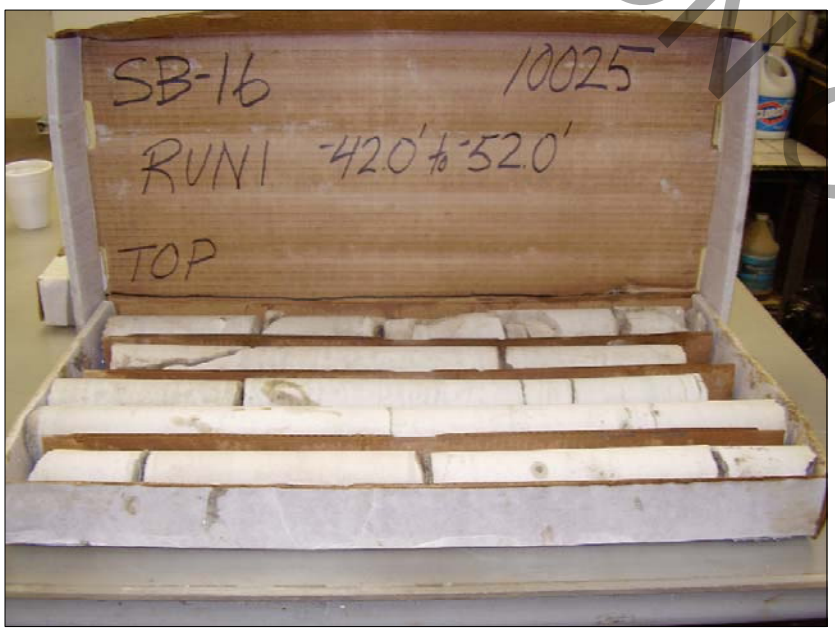
CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Core Diameter 2.0 in

Top of Rock Elev. *560.3*

Begin Core Elev. *599.3*

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE RUN 1 (−42.0' to −52.0') Light gray & fine grained with horizontal bedding. Highly fractured from −42.5' to −44.5'. Horizontal fracture with thin clay parting @ −45.3'. Horizontal fractures @ −46.4', −47.2', −47.4', −48.0', −49.5', −50.2', −50.9' & −51.7'.	1	98.0	73.5	n/a	1391 @ −42.0'
−47					
−52					



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

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

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GSI Job No. 10025

SOIL BORING LOG

Page 1 **of** 1

Date 3/12/12

ROUTE FAP 373 (IL 171) **DESCRIPTION** IL Route 171 from 47th St. to 55th St. **LOGGED BY** JZ

SECTION (0707-608&611)HB-B & 0707-608HB-B-1 **LOCATION** SW 1/4, **SEC.** 12, **TWP.** T38N, **RNG.** R12E, 3rd **PM**

COUNTY Cook **DRILLING METHOD** HSA/MUD ROTARY **HAMMER TYPE** CME Automatic

STRUCT. NO. 016-1510 & 016-1511
Station 41+24.39
BORING NO. SB-35
Station 41+04
Offset 77.30ft Right
Ground Surface Elev. 603.80 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 (%)	Description
				18.0" ASPHALT, 18.0" CRUSHED STONE
	20			
	15		5	
	15			
				600.80 CLAY LOAM-dark brown & gray-very stiff to hard (Fill)
	2			
-5	5	3.0	15	
	5	P		
	5			
	8	4.5	17	
	7	P		
	5			
-10	5	2.3	13	
	5	B		
				593.30 CRUSHED STONE-medium dense (Fill)
	13			
	10		15	
	5			
	10			
	3		7	
-15	8			
	17			
	11		12	
	13			
	15			
	6		10	
-20	8			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				583.30 CLAY LOAM with Fractured Rock-gray-very dense
	21			
	50/5"	2.0	12	
		B		
	51			
	50/3"	4.5	10	
-25		P		
				578.30 Clayey SAND, GRAVEL & FRACTURED ROCK-gray-very dense
	50/3"			
		4.5	13	
		P		
	50/4"			
		4.5	9	
-30		P		
	43			
	50/4"	4.0	10	
-35		P		
				568.80 Drillers Observation: Apparent bedrock. 567.80 Borehole continued with rock coring.
-40				

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

BBS, from 137 (Rev. 8-99)

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ROCK CORE LOG

PAGE 1 of 1
DATE 3/12/2012
LOGGED BY DR
GSI JOB No. 10025

FAP 373 (IL 171)
(0707-608&611) HB-B &
SECTION 0707-608HB-B-1
COUNTY Cook
STRUCT. NO. 016-1510 & 016-1511
Station 41+24.39
BORING NO. **SB-35**
Station 41+04
Offset 77.3' Right
Ground Surface Elev. *603.8*

DESCRIPTION 1st Ave. Bridge Rehabilitation & Replacement, 47th St. to 55th St.
LOCATION SEC 11, 12, 13 & 14 T 38 N, R 12 E, 3rd PM
CORING METHOD Rotary Wash
CORING BARREL TYPE & SIZE NX Double Swivel-10 ft
Core Diameter 2.0 in
Top of Rock Elev. *568.8*
Begin Core Elev. *567.8*

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE RUN 1 (-36.0' to -46.0') Light gray with horizontal to wavy bedding. Weathered with numerous horizontal & vertical fractures throughout.	1	98.5	35.0	n/a	1206 @ -36.0'
-41					
-46					

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

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SOIL BORING LOG

GSI Job No. 10025

Date 3/19/12

ROUTE FAP 373 (IL 171) **DESCRIPTION** IL Route 171 from 47th St. to 55th St. **LOGGED BY** NW

SECTION (0707-608&611)HB-B & 0707-608HB-B-1 **LOCATION** SE 1/4, **SEC.** 11, **TWP.** T38N, **RNG.** R12E, 3rd **PM**

COUNTY Cook **DRILLING METHOD** HSA/MUD ROTARY **HAMMER TYPE** CME Automatic

STRUCT. NO. 016-1510 & 016-1511
Station 41+24.39
BORING NO. SB-36
Station 42+35
Offset 76.10ft Right
Ground Surface Elev. 602.70 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft
Groundwater Elev.:
First Encounter 588.7 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
				15.0" ASPHALT
				601.45
	10			CRUSHED STONE-dense (Fill)
	23		5	
	25			
				599.20
	5			CLAY LOAM-dark brown & gray-very stiff to hard (Fill)
	6	4.9	14	
-5	5	B		
	3			
	5	1.9	16	
	7	B		
				594.20
	7			SAND, GRAVEL & FRACTURED ROCK-gray-loose to medium dense
	12		7	
-10	18			
	5			
	5		5	
	6			
▼	6			
	4		5	
-15	4			
	8			
	10		11	
	11			
	10			
	12		10	
-20	15			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
				SAND, GRAVEL & FRACTURED ROCK-gray-loose to medium dense *(continued)*
	50/4"			
			3	
	50/4"			
			7	
-25				
				577.20
	43			Clayey SAND, GRAVEL & FRACTURED ROCK-gray-very dense
	50/4"		9	
				574.70
	50/6"			CLAY LOAM-gray-very dense
		3.5	11	
-30		P		
				570.70
	50/5"			Clayey SAND, GRAVEL & FRACTURED ROCK-gray-very dense
			8	
-35				
				565.70
	50/3"			FRACTURED ROCK & GRAVEL-gray-very dense
			14	
-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)

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SOIL BORING LOG

GSI Job No. 10025

Date 3/19/12

ROUTE FAP 373 (IL 171) **DESCRIPTION** IL Route 171 from 47th St. to 55th St. **LOGGED BY** NW

SECTION (0707-608&611)HB-B & 0707-608HB-B-1 **LOCATION** SE 1/4, **SEC.** 11, **TWP.** T38N, **RNG.** R12E, 3rd **PM**

COUNTY Cook **DRILLING METHOD** HSA/MUD ROTARY **HAMMER TYPE** CME Automatic

STRUCT. NO. 016-1510 & 016-1511
Station 41+24.39

BORING NO. SB-36
Station 42+35
Offset 76.10ft Right
Ground Surface Elev. 602.70 ft

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

Groundwater Elev.:
First Encounter 588.7 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	
FRACTURED ROCK & GRAVEL-gray-very dense *(continued)*				
560.70				
Drillers Observation: Apparent bedrock.				
559.20				
Borehole continued with rock coring.				
-45				
-50				
-55				
-60				

Z:\PROJECTS\2010\10025 BENESCH, IL-171 FIRST AVE. (IDOT PTB 154, ITEM 14)\10025 BORING LOGS\10025_LOG.GPJ 11/18/13

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

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ROCK CORE LOG

DATE 3/19-20/2012

LOGGED BY DR

GSI JOB No. 10025

FAP 373 (IL 171)
(0707-608&611) HB-B &
SECTION 0707-608HB-B-1

DESCRIPTION 1st Ave. Bridge Rehabilitation & Replacement, 47th St. to 55th St.

LOCATION SEC 11, 12, 13 & 14 T 38 N, R 12 E, 3rd PM

COUNTY Cook

CORING METHOD Rotary Wash

STRUCT. NO. 016-1510 & 016-1511

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station 41+24.39

Core Diameter 2.0 in

BORING NO. **SB-36**

Top of Rock Elev. 560.7

Station 42+35

Begin Core Elev. 559.2

Offset 76.1' Right

Ground Surface Elev. 602.7

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	96.0	91.0	n/a	1498 @ -43.5'
-48.5					
-53.5					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-43.5' to -53.5')
Light gray & fine grained with horizontal bedding. Horizontal fractures @ -44.7', -45.6', -47.1', -47.4', -48.3', -49.0' & -49.4'. Horizontal fracture with 1/2" clay parting @ -49.7'. Horizontal fractures @ -50.5', -51.3' & -52.1'.

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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SOIL BORING LOG

GSI Job No. 10025

Page 1 **of** 1

Date 3/27/12

ROUTE FAP 373 (IL 171) **DESCRIPTION** IL Route 171 from 47th St. to 55th St. **LOGGED BY** NW

SECTION (0707-608&611)HB-B & 0707-608HB-B-1 **LOCATION** SW 1/4, **SEC.** 12, **TWP.** T38N, **RNG.** R12E, 3rd **PM**

COUNTY Cook **DRILLING METHOD** HSA/MUD ROTARY **HAMMER TYPE** CME Automatic

STRUCT. NO. 016-1510 & 016-1511
Station 41+24.39

BORING NO. SB-48
Station 40+57
Offset 0.00ft
Ground Surface Elev. 602.60 ft

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

Groundwater Elev.:
First Encounter 588.6 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
14.0" ASPHALT, 4.0" GRAVEL & STONE			
601.10	7		
CLAY LOAM-brown & gray-very stiff to hard (Fill)	5 5		12
	6		
	7 9	4.5 P	15
-5	10		
	19 24	2.5 P	15
	4		
	5 7	2.5 P	18
-10			
591.60	10		
FRACTURED ROCK & GRAVEL-gray-medium dense	12 9		6
▼	6		
	7 12		10
-15	7		
	7 8		6
584.60	10		
Clayey SAND, GRAVEL & FRACTURED ROCK-gray-medium dense	7 9		21
-20			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
582.10			
GRAVEL & FRACTURED ROCK-gray-very dense	19		
	50/4"		12
579.60			
Clayey SAND, GRAVEL & FRACTURED ROCK-gray-dense to very dense	16		
	24 31		10
-25	50/2"		
			8
	50/3"		
			9
-30			
	50/3"		
568.10			8
Drillers Observation: Apparent bedrock.			
-35			
567.10			
Borehole continued with rock coring.			
-40			

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

BBS, from 137 (Rev. 8-99)

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

ROCK CORE LOG

DATE 3/27/2012

LOGGED BY DR

GSI JOB No. 10025

FAP 373 (IL 171)
(0707-608&611) HB-B &
SECTION 0707-608HB-B-1

DESCRIPTION 1st Ave. Bridge Rehabilitation & Replacement, 47th St. to 55th St.

LOCATION SEC 11, 12, 13 & 14 T 38 N, R 12 E, 3rd PM

COUNTY Cook

CORING METHOD Rotary Wash

STRUCT. NO. 016-1510 & 016-1511

Station 41+24.39

BORING NO. **SB-48**

Station 40+57

Offset Baseline

Ground Surface Elev. 602.6

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Core Diameter 2.0 in

Top of Rock Elev. 568.1

Begin Core Elev. 567.1

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	90.5	57.5	n/a	1114 @ -37.5'
-40.5					
-45.5					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-35.5' to -45.5')
Light gray mottled gray. slightly porous with horizontal bedding. Horizontal fractures @ -35.6' & -35.8'. Vertical fracture from -36.0' to -36.9'. Horizontal fracture @ -37.5'. Transverse fracture with 1/2" clay parting from -38.1' to -38.4'. Horizontal fractures @ -39.3', -40.2' & -40.4'. Weathered vertical fracture from -41.5' to -42.4'.

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.
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Naperville, Illinois 60565
(630) 355-2838

SOIL BORING LOG

GSI Job No. 10025

Date 3/16/12

ROUTE FAP 373 (IL 171) **DESCRIPTION** IL Route 171 from 47th St. to 55th St. **LOGGED BY** NW

SECTION (0707-608&611)HB-B & 0707-608HB-B-1 **LOCATION** SE 1/4, **SEC.** 11, **TWP.** T38N, **RNG.** R12E, 3rd **PM**

COUNTY Cook **DRILLING METHOD** HSA/MUD ROTARY **HAMMER TYPE** CME Automatic

STRUCT. NO. 016-1510 & 016-1511
Station 41+24.39
BORING NO. SB-49
Station 41+98
Offset 0.00ft
Ground Surface Elev. 602.70 ft

Surface Water Elev. n/a ft
Stream Bed Elev. n/a ft
Groundwater Elev.:
First Encounter 588.7 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
				12.0" ASPHALT
601.70				
	9			CRUSHED STONE with Clay-medium dense (Fill)
	6		9	
	8			
599.20				
	4			CLAY LOAM-dark brown & gray-very stiff to hard (Fill)
	5	3.9	14	
-5	6	S		
	13			
	15	4.5	11	
	16	P		
594.70				
	20			SAND, GRAVEL & FRACTURED ROCK-gray-medium dense to very dense
	16		3	
-10	16			
	8			
	9		5	
	9			
▼	9			
	10		9	
-15	10			
	8			
	9		8	
	9			
	9			
	11		10	
-20	9			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material
	50/5"			SAND, GRAVEL & FRACTURED ROCK-gray-medium dense to very dense *(continued)*
			9	
579.70				
	50/3"			Clayey SAND, GRAVEL & FRACTURED ROCK-gray-very dense
			8	
-25				
	50/6"			
			8	
	50/5"			
			8	
-30				
	50/5"			
			10	
-35				
	50/2"			
			10	
562.70 -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)

Geo Services, Inc.
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Naperville, Illinois 60565
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SOIL BORING LOG

GSI Job No. 10025

Date 3/16/12

ROUTE FAP 373 (IL 171) **DESCRIPTION** IL Route 171 from 47th St. to 55th St. **LOGGED BY** NW

SECTION (0707-608&611)HB-B & 0707-608HB-B-1 **LOCATION** SE 1/4, **SEC.** 11, **TWP.** T38N, **RNG.** R12E, 3rd **PM**

COUNTY Cook **DRILLING METHOD** HSA/MUD ROTARY **HAMMER TYPE** CME Automatic

STRUCT. NO. 016-1510 & 016-1511
Station 41+24.39

BORING NO. SB-49
Station 41+98
Offset 0.00ft
Ground Surface Elev. 602.70 ft

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

Groundwater Elev.:
First Encounter 588.7 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Description
				Drillers Observation: Apparent bedrock.
560.20				Borehole continued with rock coring.
-45				
-50				
-55				
-60				

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

Geo Services, Inc.
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ROCK CORE LOG

PAGE 1 of 1
DATE 3/16/2012
LOGGED BY DR
GSI JOB No. 10025

FAP 373 (IL 171)
(0707-608&611) HB-B &
SECTION 0707-608HB-B-1
COUNTY Cook
STRUCT. NO. 016-1510 & 016-1511
Station 41+24.39
BORING NO. **SB-49**
Station 41+98
Offset Baseline
Ground Surface Elev. 602.7

DESCRIPTION 1st Ave. Bridge Rehabilitation & Replacement, 47th St. to 55th St.
LOCATION SEC 11, 12, 13 & 14 T 38 N, R 12 E, 3rd PM
CORING METHOD Rotary Wash
CORING BARREL TYPE & SIZE NX Double Swivel-10 ft
Core Diameter 2.0 in
Top of Rock Elev. 562.7
Begin Core Elev. 560.2

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE RUN 1 (−42.5' to −52.5') Light gray mottled gray with horizontal bedding. Horizontal fractures @ −43.7', −44.9', −47.0' & −48.1'. Horizontal fractures with thin clay partings @ −48.2', −48.5' & −48.6'.	1	79.0	75.5	n/a	1403 @ −42.9'
−47.5					
−52.5					

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)

APPENDIX E

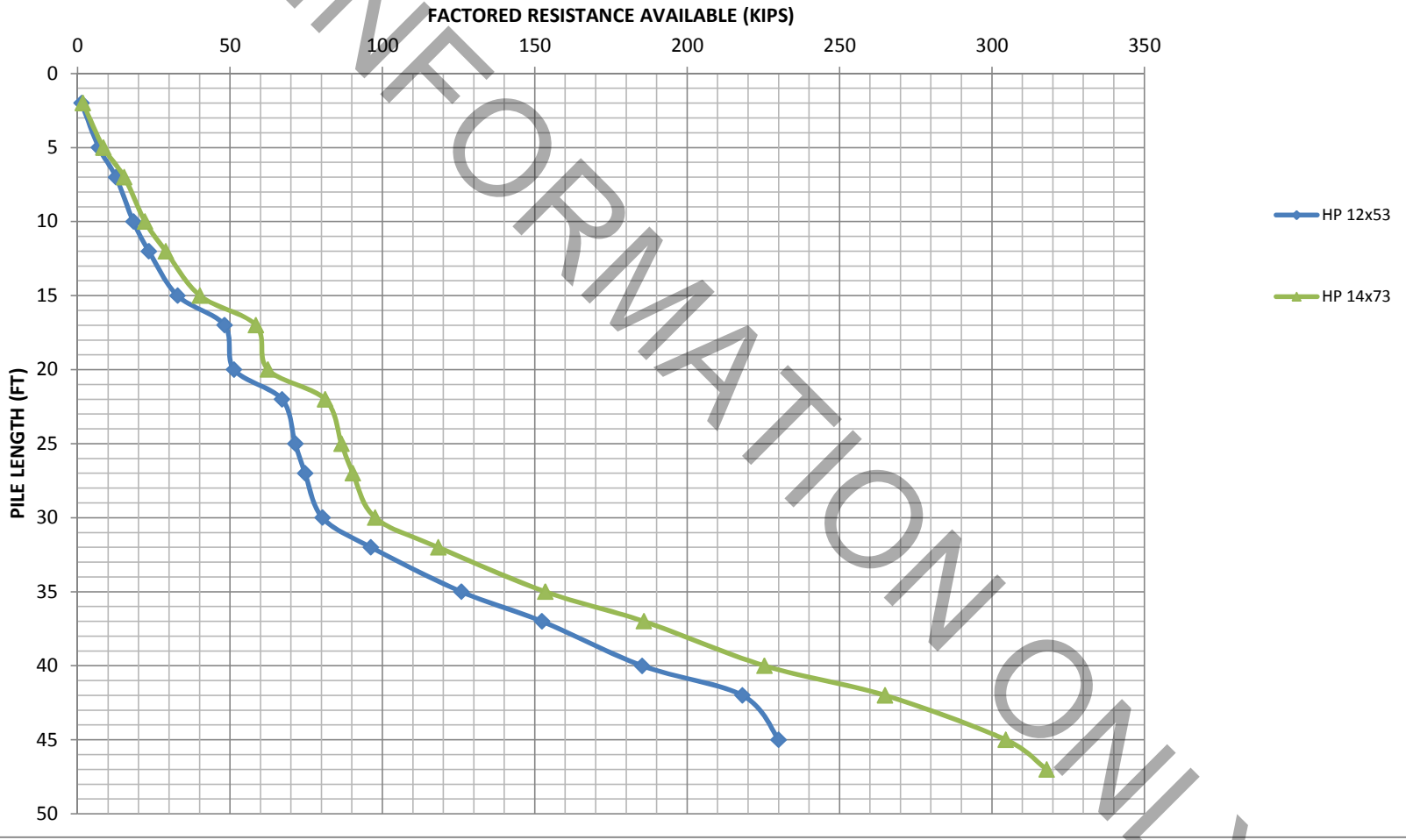
PILE DESIGN TABLES

SN 016-1510; Boring SB-16 North Abutment (Elevation 613.5 Begin Friction, 615.5 for Pile Cutoff)										
Estimated Pile Length (ft.)	HP 12x53		HP 14x73							
	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	1	2	2	3						
5	7	13	9	15						
7	13	23	15	28						
10	18	33	22	40						
12	23	43	29	53						
15	33	60	40	73						
17	48	88	59	106						
20	51	93	62	114						
22	67	122	81	148						
25	71	130	87	157						
27	75	136	90	164						
30	80	146	98	178						
32	96	175	118	215						
35	126	229	153	279						
37	152	277	186	338						
40	185	337	225	410						
42	218	397	265	482						
45	230	418	305	554						
47			318	578						

Denotes pile on/in bedrock

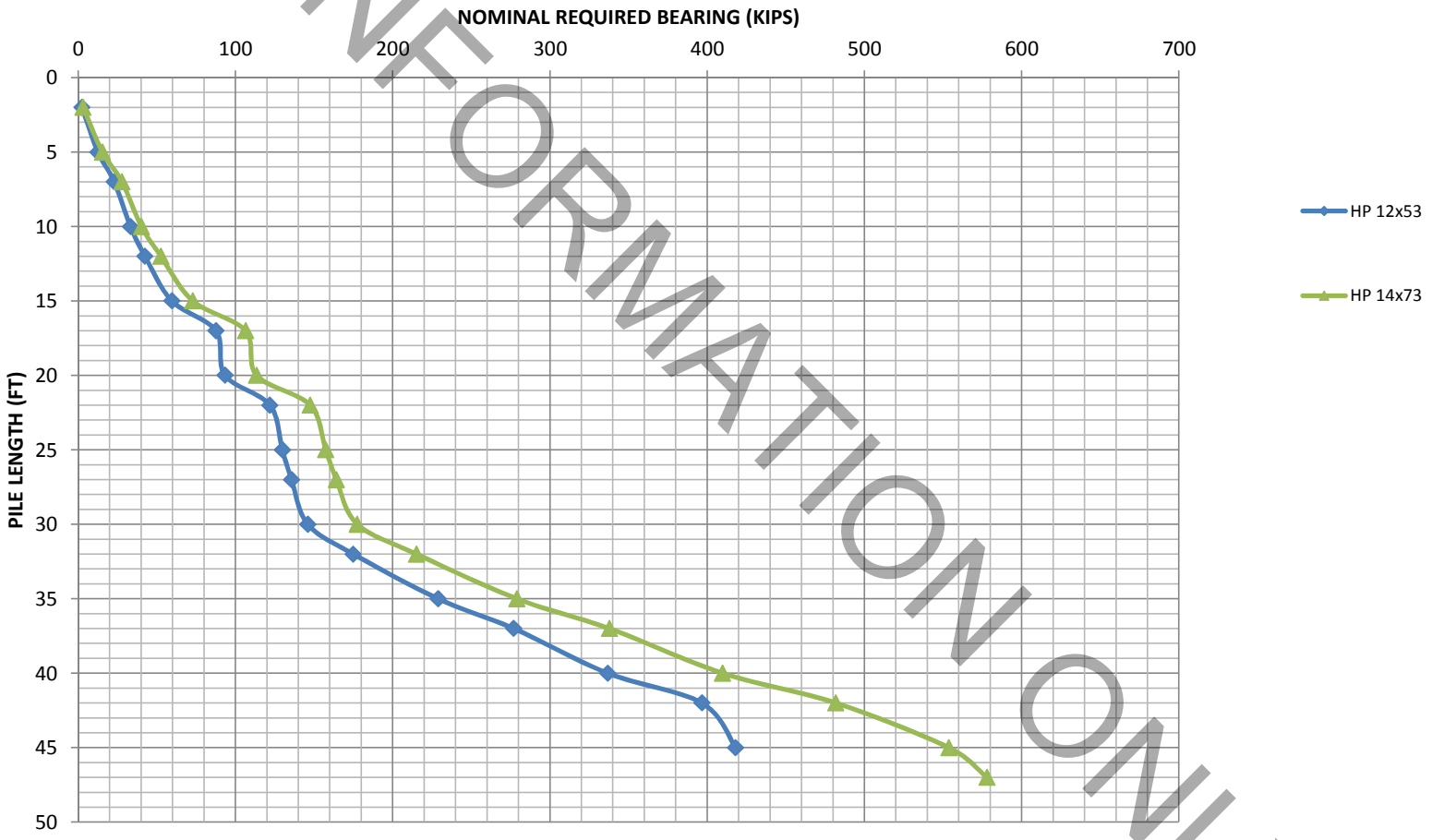
PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH
SN 016-1510; BORING SB-16

Elevation 613.5 Begin Friction, 615.5 for Pile Cutoff (pile length = 0.0 feet)



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
SN 016-1510; BORING SB-16

Elevation 613.5 Begin Friction, 615.5 for Pile Cutoff (pile length = 0.0 feet)

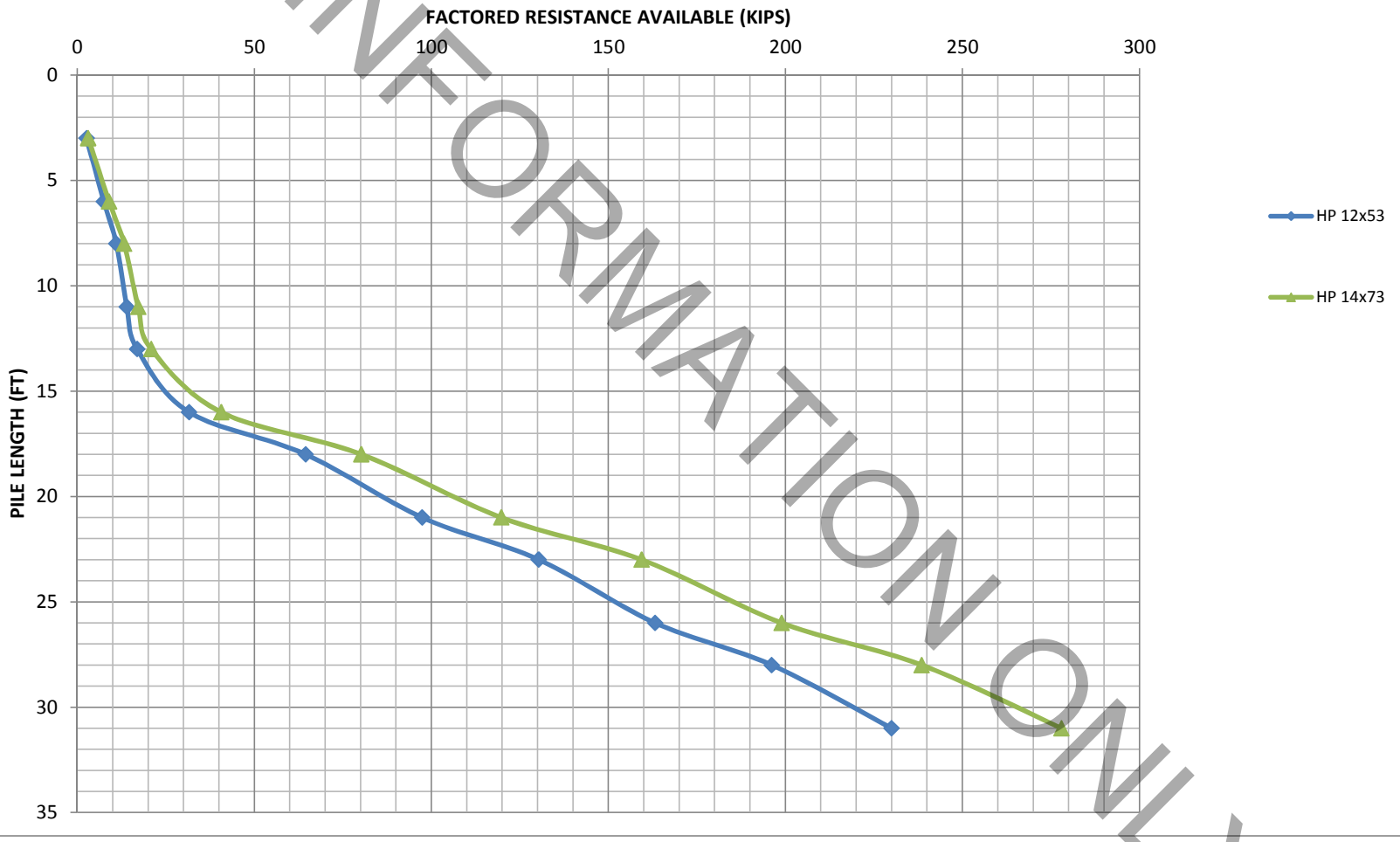


SN 016-1510; Boring SB-49 Pier 2 (Elevation 595.5 Begin Friction, 597.5 for Pile Cutoff)										
Estimated Pile Length (ft.)	HP 12x53		HP 14x73							
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (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	3	5	3	6						
6	7	14	9	16						
8	11	20	13	24						
11	14	25	17	31						
13	17	31	21	38						
16	32	57	41	74						
18	65	117	80	146						
21	97	177	120	218						
23	130	237	159	290						
26	163	297	199	362						
28	196	357	239	434						
31	230	418	278	578						

Denotes pile on/in bedrock

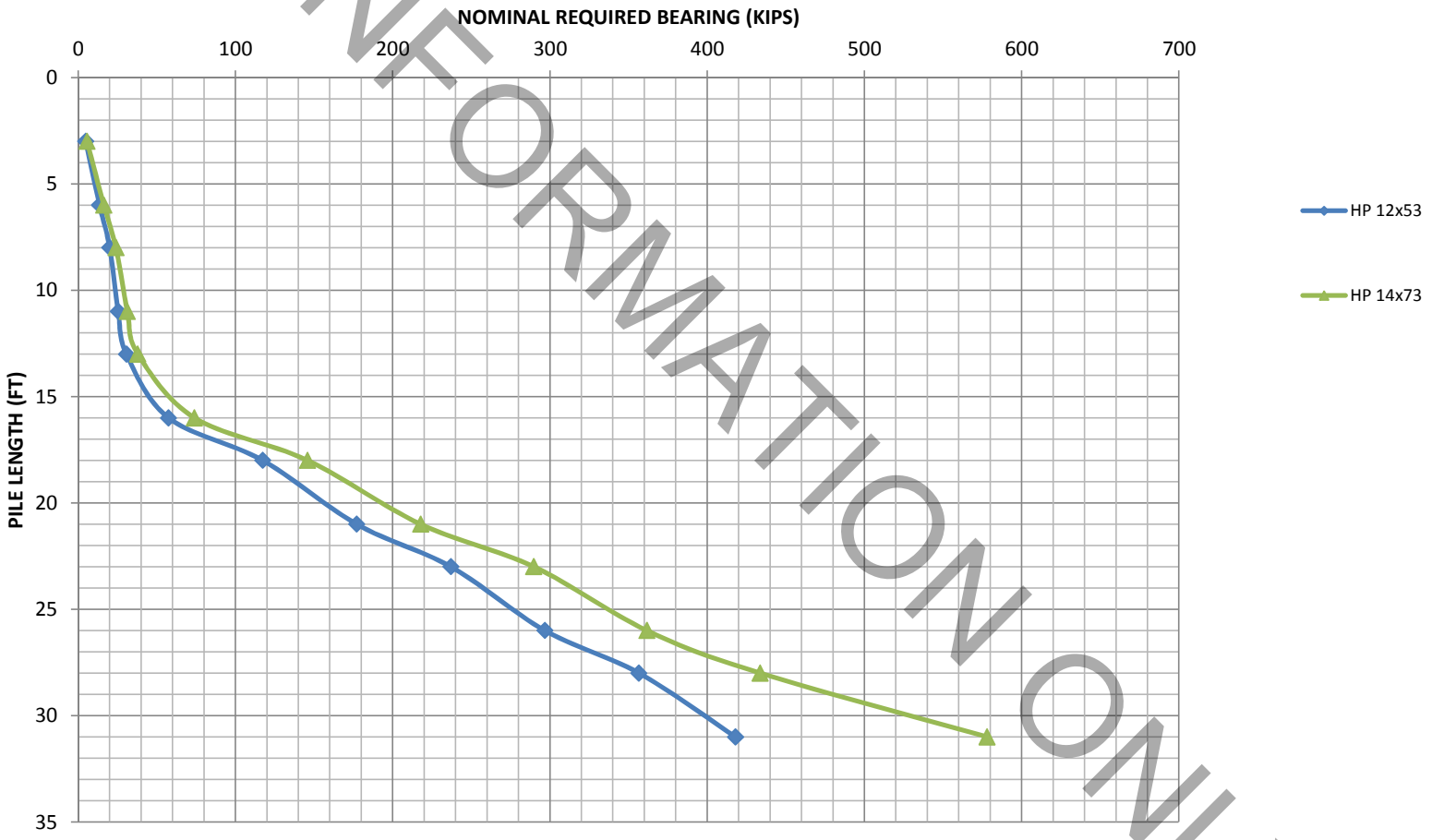
PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH
SN 016-1510; BORING SB-49

Elevation 595.5 Begin Friction, 597.5 for Pile Cutoff (pile length = 0.0 feet)



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
SN 016-1510; BORING SB-49

Elevation 595.5 Begin Friction, 597.5 for Pile Cutoff (pile length = 0.0 feet)



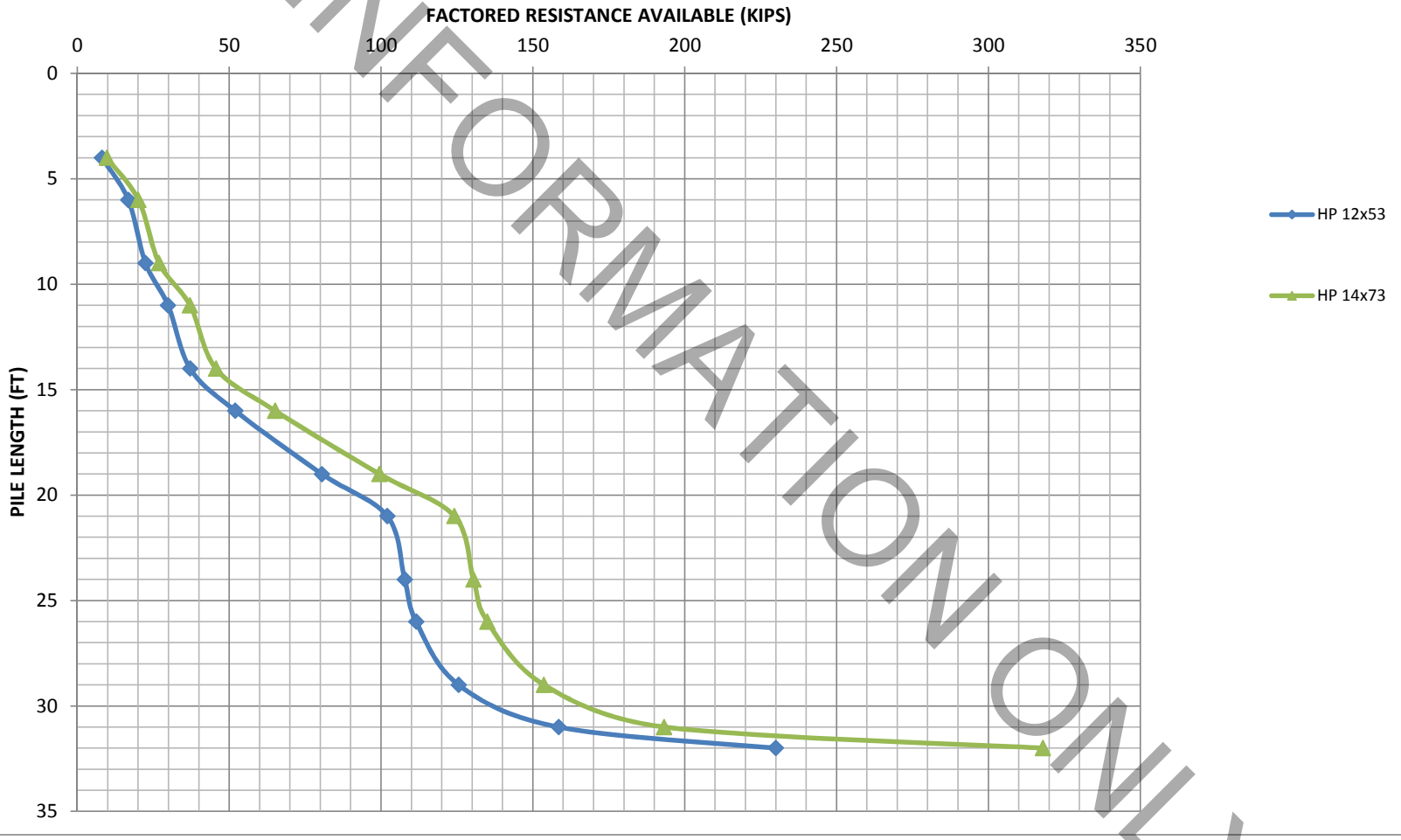
Estimated H-Pile Lengths and Capacities

SN 016-1510; Boring SB-15 Pier 1 (Elevation 596.5 Begin Friction, 598.5 for Pile Cutoff)										
Estimated Pile Length (ft.)	HP 12x53		HP 14x73							
	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)
4	8	15	10	18						
6	17	31	20	37						
9	22	41	27	49						
11	30	54	37	67						
14	37	68	46	83						
16	52	95	65	118						
19	81	146	99	181						
21	102	186	124	226						
24	108	196	130	237						
26	112	203	135	245						
29	126	228	154	279						
31	158	288	193	351						
32	230	363	318	578						

Denotes pile on/in bedrock

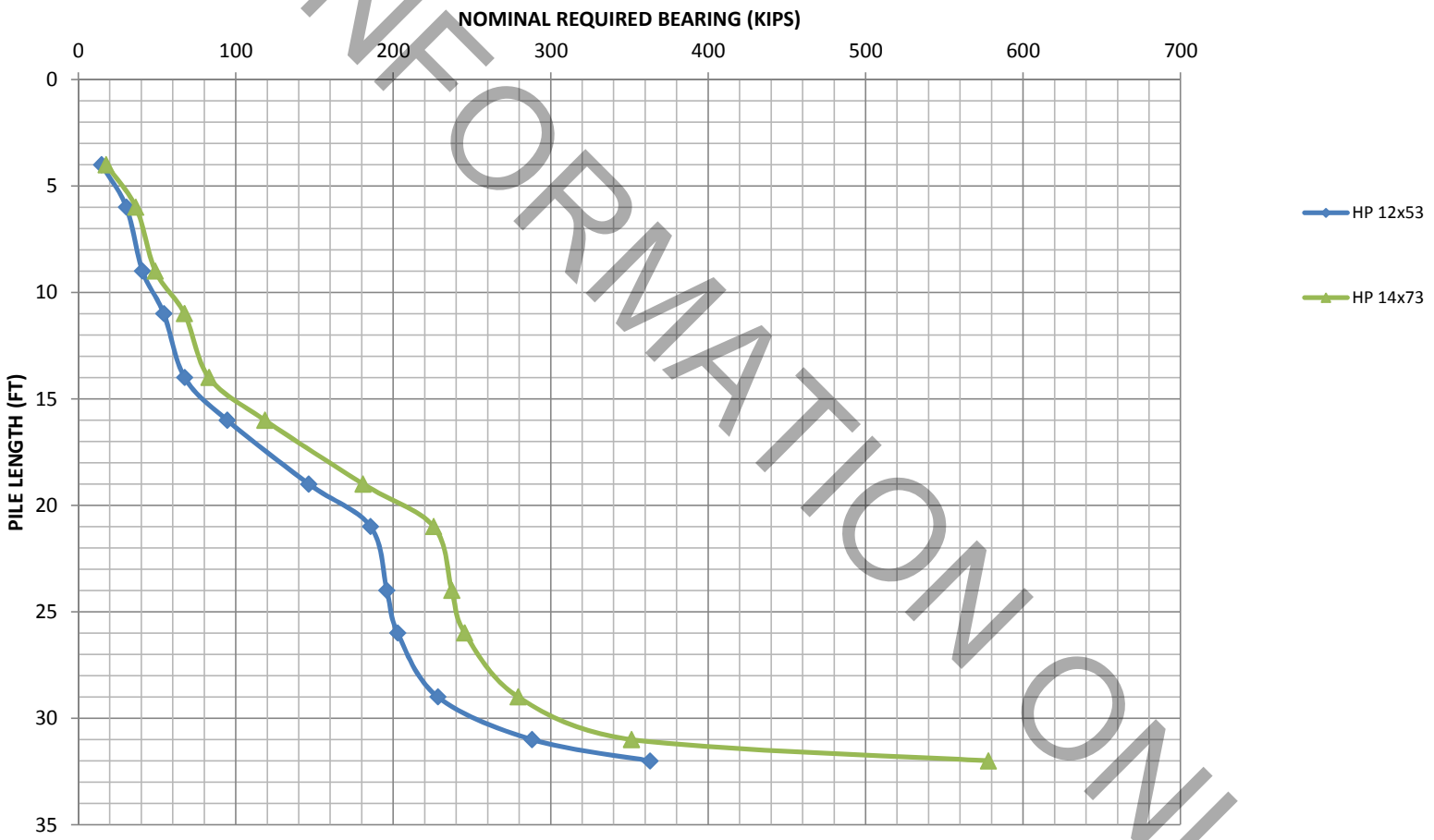
PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH
SN 016-1510; BORING SB-15

Elevation 596.5 Begin Friction, 598.5 for Pile Cutoff (pile length = 0.0 feet)



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
SN 016-1510; BORING SB-15

Elevation 596.5 Begin Friction, 598.5 for Pile Cutoff (pile length = 0.0 feet)



Estimated H-Pile Lengths and Capacities

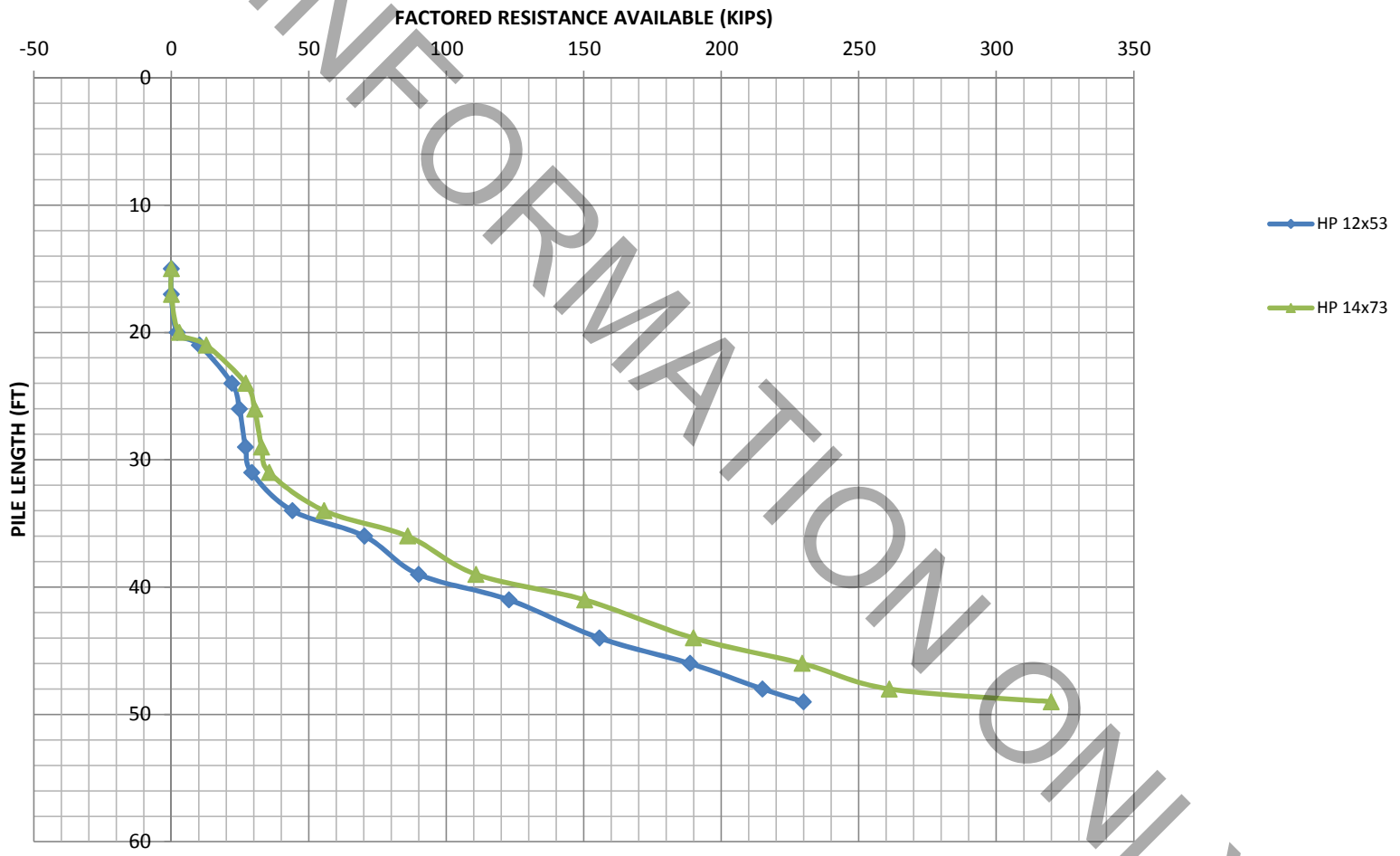
SN 016-1510; Boring SB-48 South Abutment (Elevation 597.0 Begin Friction, 616.5 for Pile Cutoff)										
Estimated Pile Length (ft.)	HP 12x53		HP 14x73							
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, 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)
15	0	0	0	0						
17	0	0	0	0						
20	2	4	3	5						
21	10	19	13	23						
24	22	40	27	49						
26	25	45	30	55						
29	27	49	33	60						
31	29	53	36	65						
34	44	80	56	101						
36	70	128	86	156						
39	90	163	111	201						
41	123	223	150	273						
44	156	283	190	345						
46	189	343	229	417						
48	215	391	261	475						
49	230	418	320	578						

Denotes pile on/in bedrock

Note (1): South Abutment has MSE wall, friction starts at elevation 597

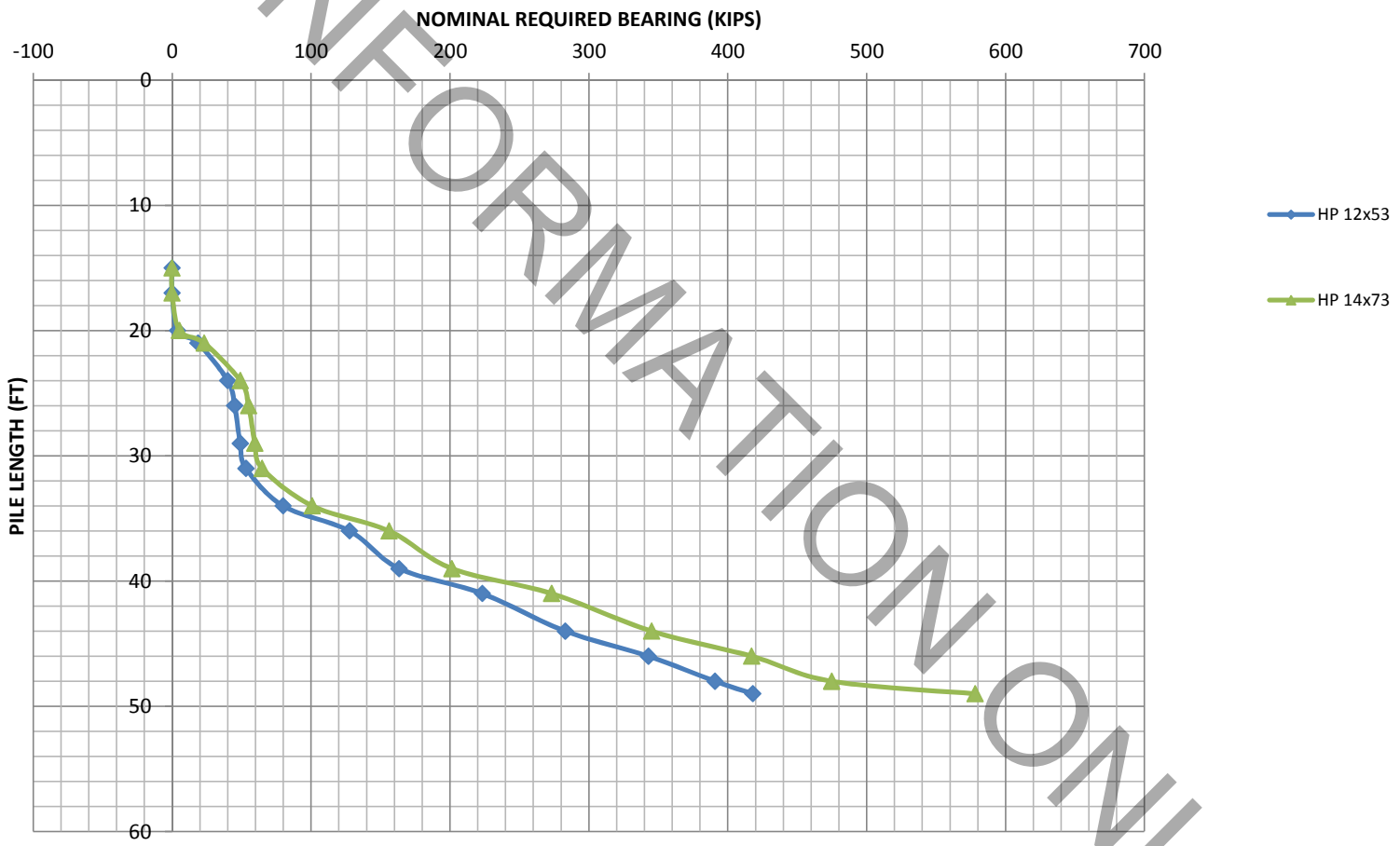
PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH
SN 016-1510; BORING SB-48

Elevation 597.0 Begin Friction, 616.5 for Pile Cutoff (pile length = 0.0 feet)



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
SN 016-1510; BORING SB-48

Elevation 597.0 Begin Friction, 616.5 for Pile Cutoff (pile length = 0.0 feet)

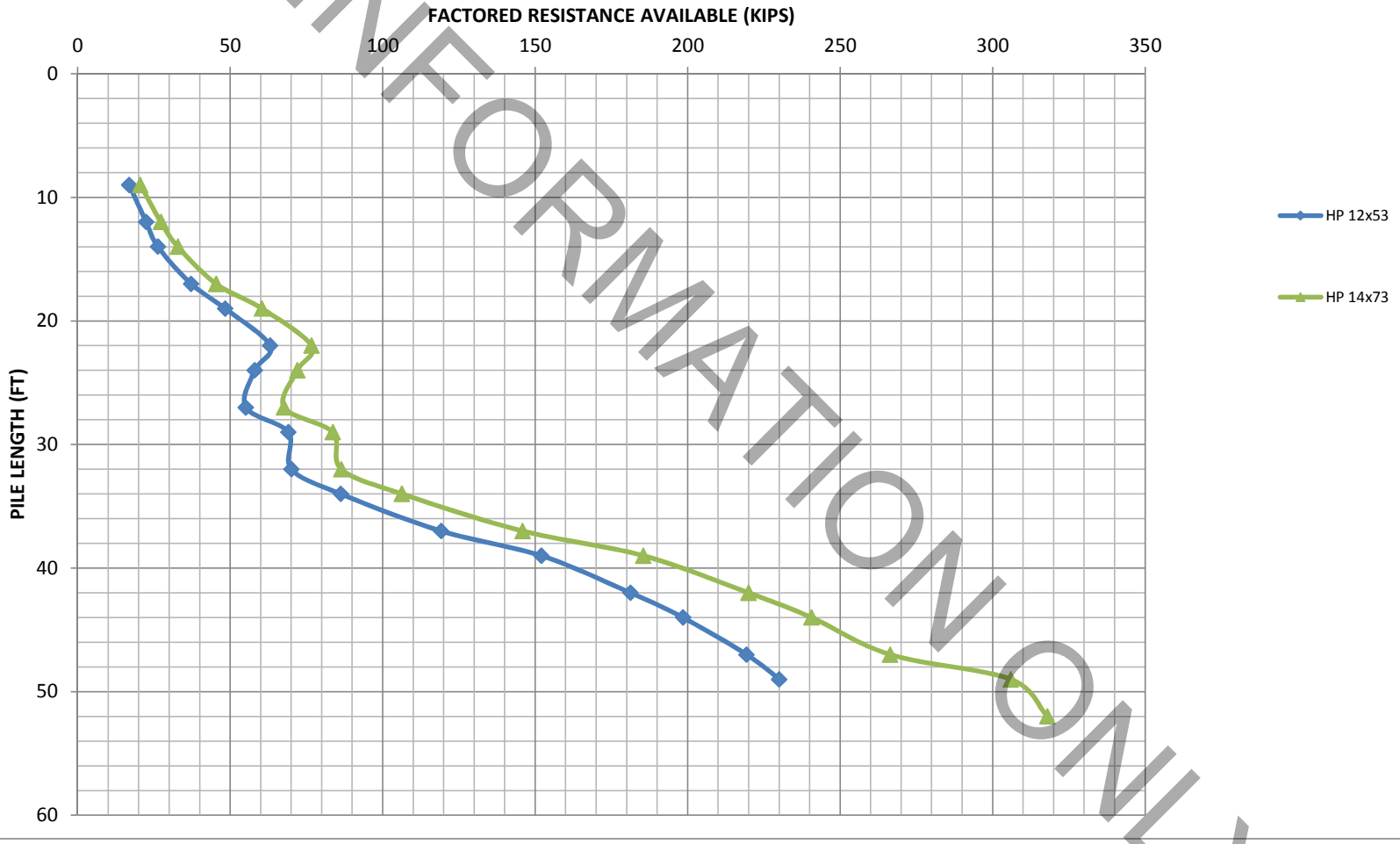


SN 016-1511; Boring SB-36 North Abutment (Elevation 613.9 Begin Friction, 615.9 for Pile Cutoff)										
Estimated Pile Length (ft.)	HP 12x53		HP 14x73							
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, 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)
9	17	31	20	37						
12	22	41	27	50						
14	26	48	33	60						
17	37	68	45	83						
19	48	88	60	110						
22	63	115	77	139						
24	58	106	72	131						
27	55	100	68	123						
29	69	126	84	152						
32	70	127	86	157						
34	86	157	106	193						
37	119	217	146	265						
39	152	276	185	337						
42	181	330	220	400						
44	198	361	241	438						
47	219	399	266	484						
49	230	418	306	556						
52			318	578						

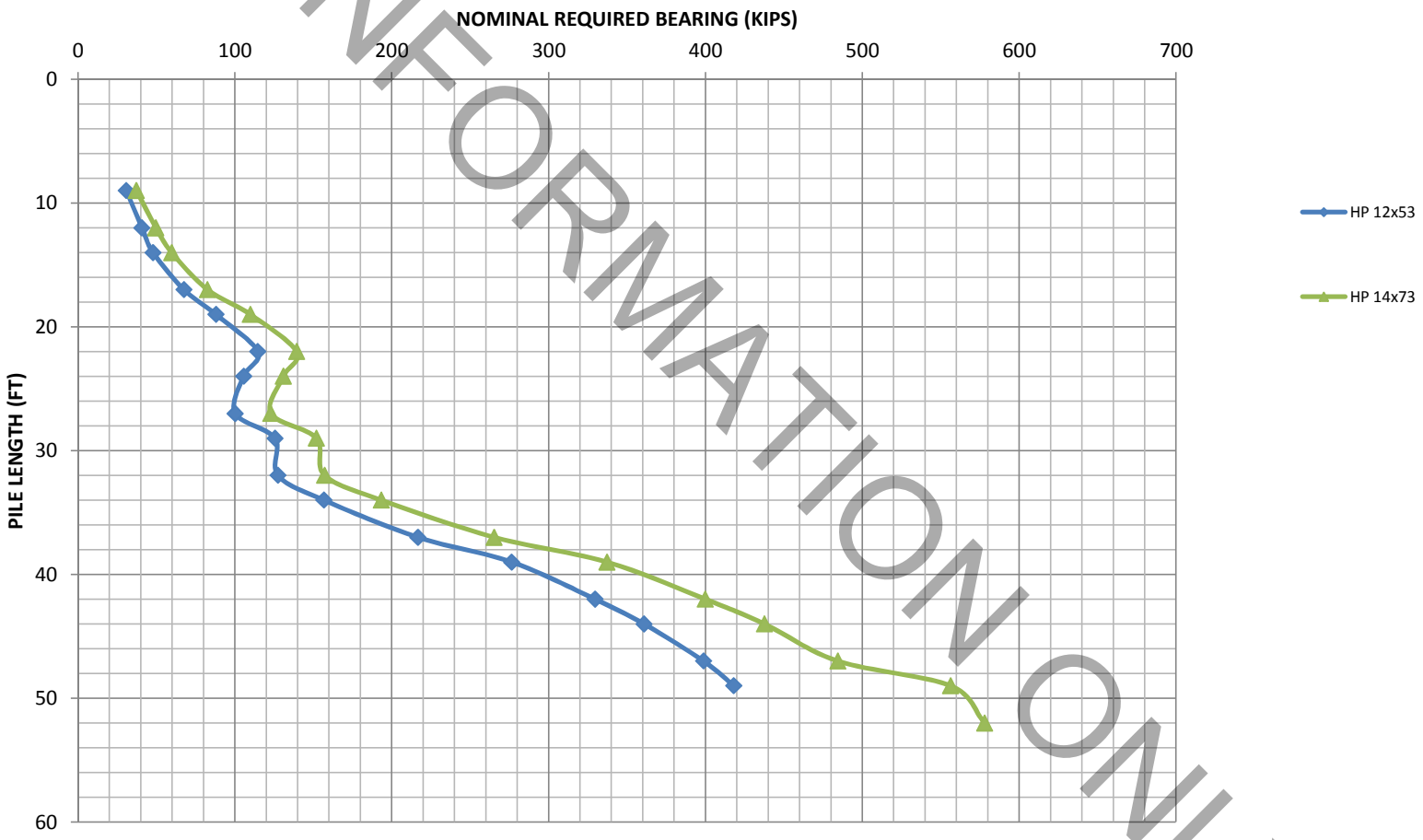
Denotes pile on bedrock

PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH
SN 016-1511; BORING SB-36

Elevation 613.9 Begin Friction, 615.9 for Pile Cutoff (pile length = 0.0 feet)



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
SN 016-1511; BORING SB-36
Elevation 613.9 Begin Friction, 615.9 for Pile Cutoff (pile length = 0.0 feet)

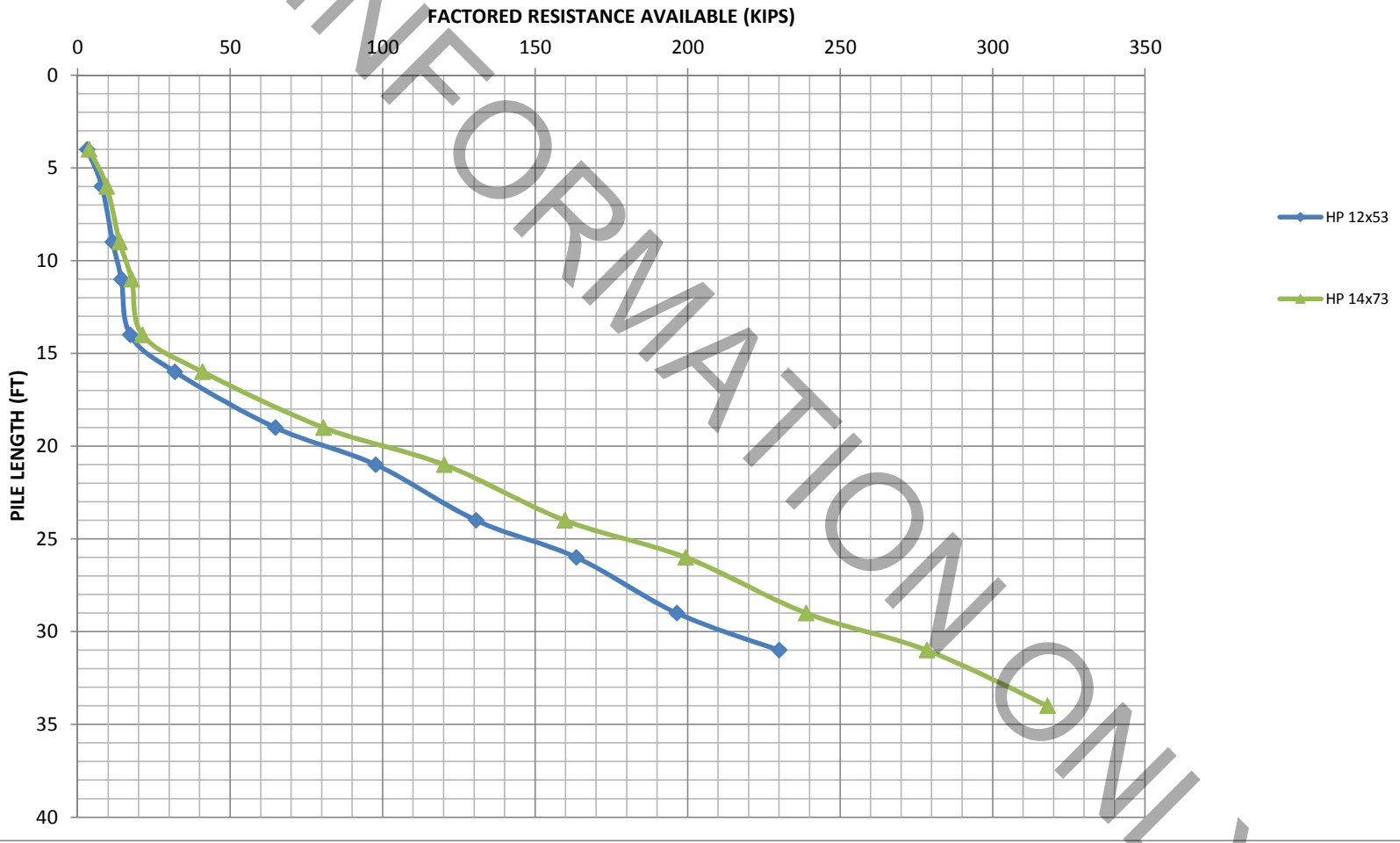


SN 016-1511; Boring SB-49 Pier 2 (Elevation 596.0 Begin Friction, 598.0 for Pile Cutoff)										
Estimated Pile Length (ft.)	HP 12x53		HP 14x73							
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (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)
4	3	6	4	7						
6	8	14	10	17						
9	11	21	14	25						
11	14	26	18	32						
14	17	31	21	39						
16	32	58	41	75						
19	65	118	81	147						
21	98	178	120	218						
24	131	238	160	290						
26	164	297	199	362						
29	196	357	239	434						
31	230	418	278	506						
34			318	578						

Denotes pile on/in bedrock

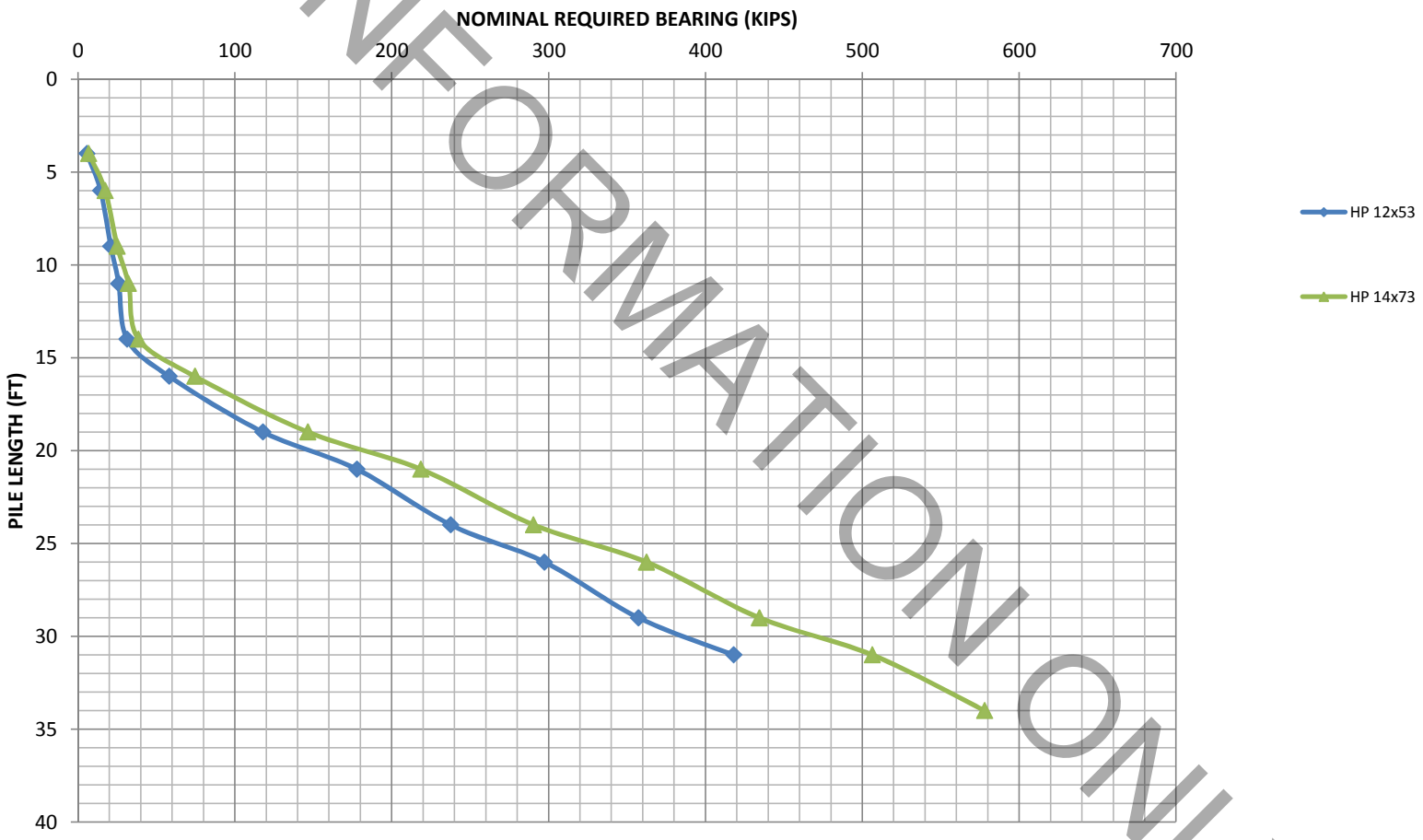
PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH
SN 016-1511; BORING SB-49

Elevation 596.0 Begin Friction, 598.0 for Pile Cutoff (pile length = 0.0 feet)



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
SN 016-1511; BORING SB-49

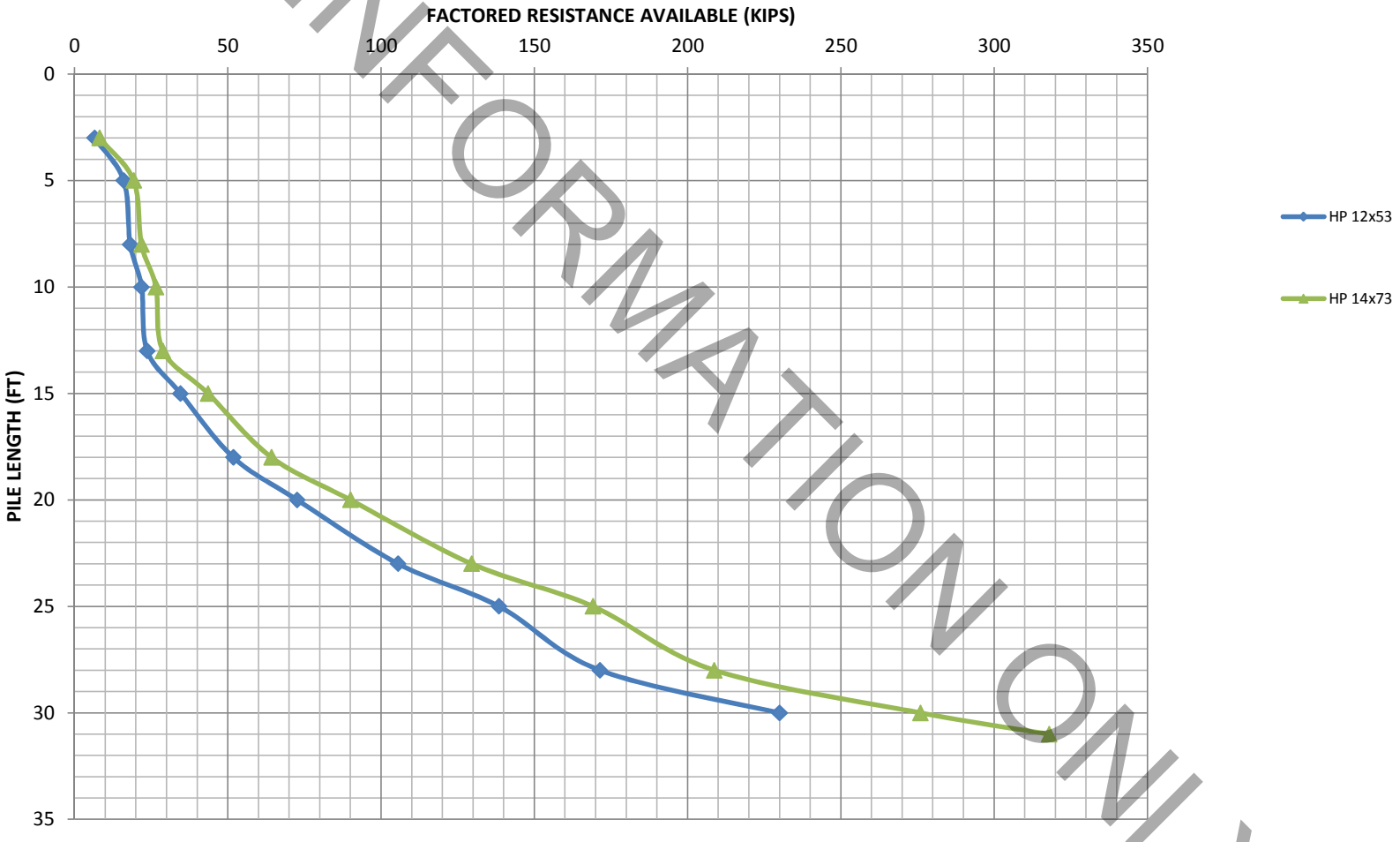
Elevation 596.0 Begin Friction, 598.0 for Pile Cutoff (pile length = 0.0 feet)



SN 016-1511; Boring SB-35 Pier 1 (Elevation 597.0 Begin Friction, 599.0 for Pile Cutoff)										
Estimated Pile Length (ft.)	HP 12x53		HP 14x73							
	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	7	12	8	15						
5	16	29	19	35						
8	18	33	22	40						
10	22	40	27	48						
13	24	43	29	52						
15	35	63	44	79						
18	52	94	64	117						
20	73	132	90	164						
23	106	192	130	236						
25	138	252	169	308						
28	171	312	209	380						
30	230	418	276	502						
31			318	578						
	Denotes pile on/in bedrock									

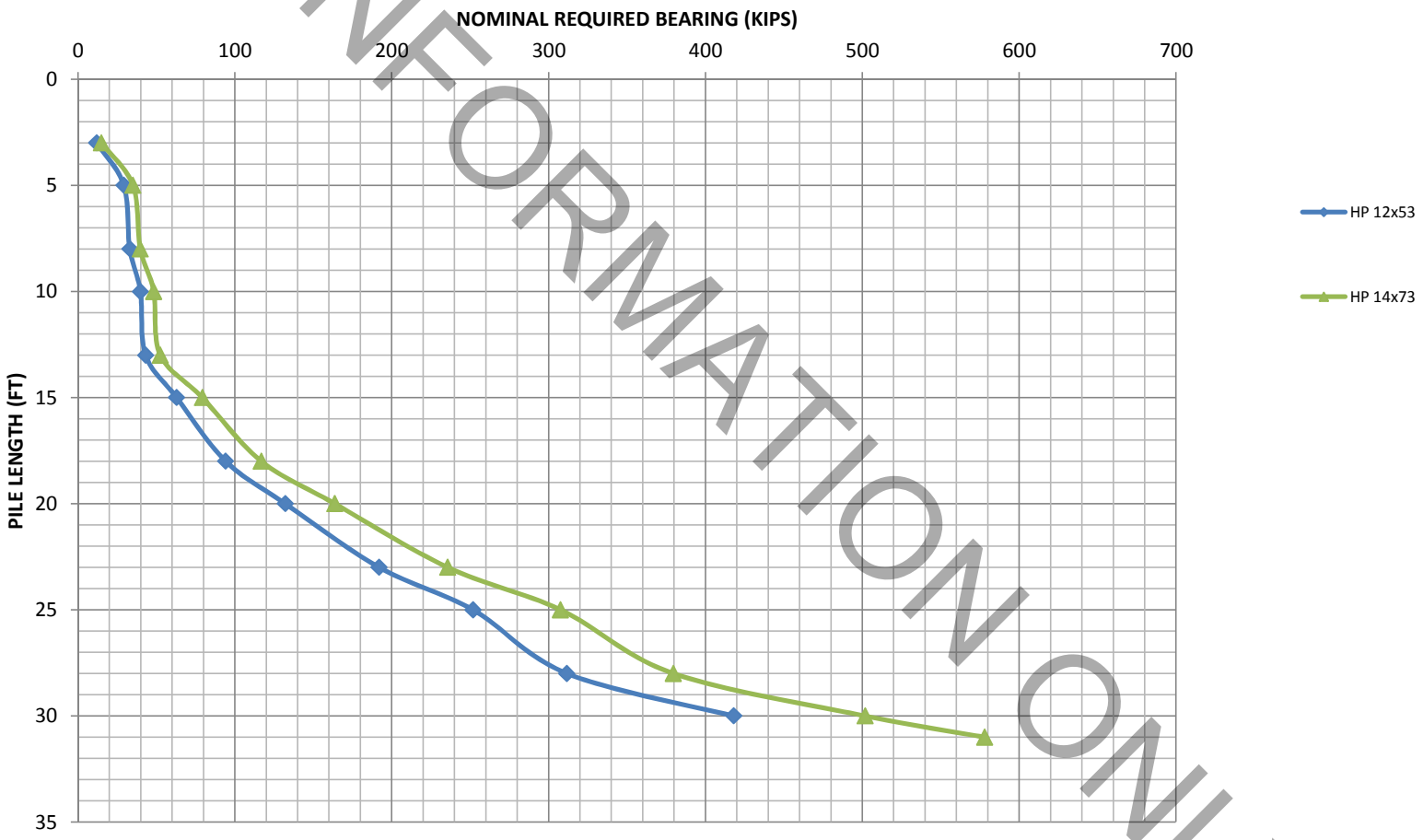
PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH
SN 016-1511; BORING SB-35

Elevation 597.0 Begin Friction, 599.0 for Pile Cutoff (pile length = 0.0 feet)



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
SN 016-1511; BORING SB-35

Elevation 597.0 Begin Friction, 599.0 for Pile Cutoff (pile length = 0.0 feet)



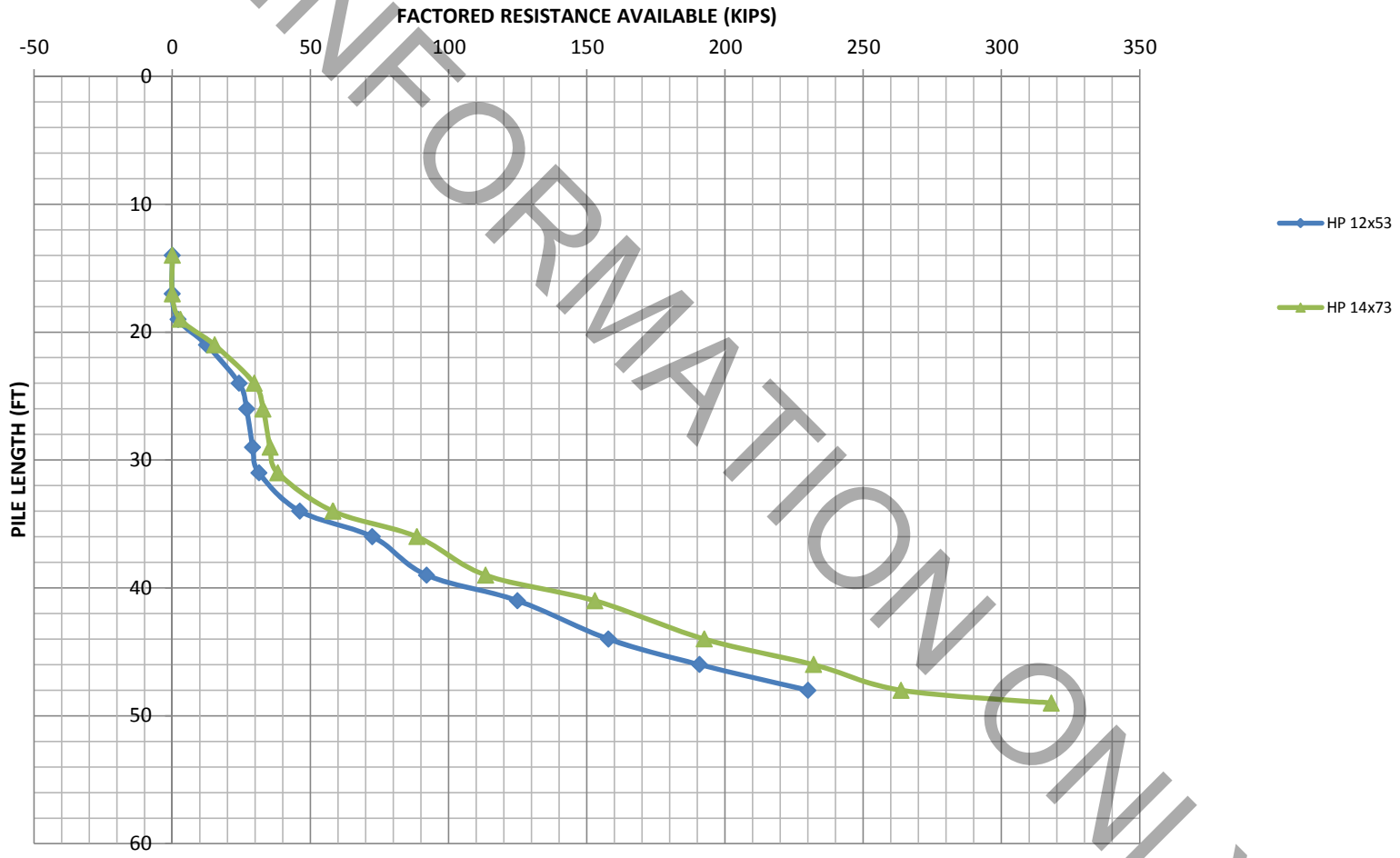
SN 016-1511; Boring SB-48 South Abutment (Elevation 597.5 Begin Friction, 616.6 for Pile Cutoff)										
Estimated Pile Length (ft.)	HP 12x53		HP 14x73							
	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, NRB (Kips)	Factored Resistance Available, FRA (Kips)	Nominal Requred Bearing, 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)
14	0	0	0	0						
17	0	0	0	0						
19	2	4	3	5						
21	12	23	15	28						
24	24	44	30	54						
26	27	49	33	60						
29	29	53	35	64						
31	31	57	38	69						
34	46	84	58	106						
36	72	132	88	161						
39	92	167	113	206						
41	125	227	153	278						
44	158	287	192	350						
46	191	347	232	422						
48	230	418	264	479						
49			318	578						

Denotes pile on bedrock

Note (1): South Abutment has MSE wall, friction starts at elevation 597.5

PILE BEARING (FRA) VS. ESTIMATED PILE LENGTH
SN 016-1511; BORING SB-48

Elevation 597.5 Begin Friction, 616.6 for Pile Cutoff (pile length = 0.0 feet)



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
SN 016-1511; BORING SB-48

Elevation 597.5 Begin Friction, 616.6 for Pile Cutoff (pile length = 0.0 feet)