STRUCTURE GEOTECHNICAL REPORT

IL-171 over the Des Plaines River Valley

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

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

SN 016-2456 (Contract 60W75)

SN 016-2457 (Contract 60J16)

Cook County, Illinois

STRUCTURAL ENGINEER:

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

Alfred Benesch & Company
205 North Michigan Avenue
Suite 2400
Chicago, Illinois 60601
(312) 565-0450

Prepared by:

Geo Services, Inc.
805 Amherst Court
Suite 204
Naperville, Illinois 60565
(630) 305-9186

JOB NO. 10025

11/06/13

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

November 6, 2013

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 the Des Plaines River Valley
IL-171 (First Avenue) from 47th Street to 55th Street
Existing SN 016-2456 (Contract: 60W75) & 016-2457 (Contract: 60J16)
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 widening of the existing bridge structures carrying IL-171 over the Des Plaines River Valley. A total of seven (7) structural soil borings (SB-22, SB-23 and SB-42 through SB-46) 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

Andrew J. Ptak, P.E.
Office Manager

enc.

ALEX U BARLAN
062-062481
LICENSED
PROFESSIONAL
ENGINEER
STATE OF ILLINOIS
11/30/13

805 Amherst Court, Suite 204 ♦ Naperville, IL 60565-3448 ♦ Phone (630) 305-9186 ♦ Fax (630) 355-2838
www.geoservicesinc.net

TABLE OF CONTENTS

SECTION 01: INTRODUCTION

This report presents the results of the geotechnical investigation for the bridge widening and rehabilitation of the IL-171 Bridges over the Des Plaines River Valley for the IL-171 First Avenue from 47th Street to 55th Street Project, IDOT Job Number: D-91-191-10 (PTB 154, Item 014). The results of the seven (7) structure borings (SB-22 through SB-23 and SB-42 through SB-46) 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. Boring locations were surveyed in the field by Benesch surveyors, and 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 016-2456 (NB) and SN 016-2457 (SB) were built 1964 and are twelve-span, continuous welded plate girder structures. The overall lengths of the existing bridges (no skew) are 966’-0” (NB) and 973’-3 5/8” (SB) measured from the centerline of piers 4 (SB) and 23 (NB) to the centerline of piers 16 (SB) and 35 (NB). The out-to-out width of the northbound bridge varies from 40’-0” to 70’-5 5/8” and the southbound bridge varies from 51’-2” to 94’-6”. Existing plan information indicates the use of steel H-piles for support of the footings of the piers.

The existing bridges are proposed to be widened approximately 5 feet for the existing Piers 5, 6, 24, 25, 26, 27 and 28. The estimated service loads provided by Benesch are shown on Table 1, and the proposed bottom of footing elevations for the piers are shown on the following tables 2 and 3.

Table 1 – Estimated Service Loads

Location	(DL+SDL+LL) Kips
Pier 5	1,690
Pier 6	1,710
Pier 24	1,290
Pier 25	1,300
Pier 26	1,120
Pier 27	1,100
Pier 28	1,100

Table 2 – Southbound Bottom of Footing Elevations (SN 016-2457)

Location	Elevation
Pier 5	598.5
Pier 6	598.7

Table 3 – Northbound Bottom of Footing Elevations (SN 016-2456)

Location	Elevation
Pier 24	598.5
Pier 25	598.7
Pier 26	598.9
Pier 27	599.0
Pier 28	599.2

SECTION 03: SUBSURFACE INVESTIGATION PROCEDURES

The borings were performed during the months of May, 2012 and January, 2013 with a truck-mounted drilling rig. Borings performed near the west piers (SB-22, SB-23, SB-42 and SB-43) were performed on the bridge and were performed by drilling through the existing bridge decks and extended to the land below using hollow stem augers. Upon reaching the ground level, borings were advanced by means of hollow stem augers to 10 feet to stabilize the hole and by rotary drilling techniques to completion. The remainder of the borings (SB-44 through SB-46) were drilled at existing ground level and advanced by means of hollow stem augers to 10 feet and continued with rotary drilling techniques 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

Borings SB-22, SB-23, SB-42 and SB-43 were performed on the bridge deck, with hollow stem augers extending to the ground level below. The surface was located near elevation 600 to 603. Very loose to loose cinders, sands and gravel fill were encountered to an elevation of 587 to 590. Underlying these fill materials, dense to very dense loam, sand, gravel, stone and fractured rock were encountered to varying elevations of bedrock (ranging from approximate elevation of 584 to 590). SB-43 varied from the other three borings, instead having fill materials extending down from the surface to an elevation of 559 where bedrock was encountered. When encountered, the very dense loam, sand, gravel and fractured rock typically had moistures in the low teens. The rock cores taken indicated Silurian System, Niagaran Dolomite with an R.Q.D.s in the range of 54% to 88%.

The remainder of the borings (SB-44 through SB-46) were drilled at existing grade level around an elevation of 603 feet. Surficial soils generally consisted of cinders, sands, gravels and stone fill material extending to bedrock. SB-44 and SB-45 had fill materials extending to bedrock around an elevation of 567 to 573, while fill material extended deeper in SB-46 to an elevation of 547 where bedrock was encountered. The rock cores taken retrieved for these piers indicated Silurian System, Niagaran Dolomite with R.Q.D.s in the range of 37% to 75%.

SECTION 06: WATER TABLE CONDITIONS

Water was encountered in some of the borings around an elevation of 593 in the fill soils. Borings performed in the nearby Des Plaines River indicated a top-of-river elevation of approximately 590 feet with a river bed elevation varying from 587 to 583. We estimate the long term water table around the elevation of 585 to 595 based on the water level encountered in the borings with consideration to the water level of the Des Plaines River. Fluctuations in the amount of water accumulated and in the hydrostatic water table can be anticipated depending on variations in precipitation, surface runoff and the Des Plaines River.

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

The site has a seismic acceleration coefficient of 0.04g, Seismic Category A and a Soil Profile Type I. Liquefiable layers and down drag are not expected to impact the design of the new bridge.

Scour

No piers are located in any waterways and scour is not considered an issue.

Settlement

There are no abutments and no embankment for these bridges. No new fill is anticipated and settlement is considered negligible.

Slope Stability

Widening will only occur at the southbound piers 5 and 6 and northbound piers 24, 25, 26, 27 and 28. These piers will be piled supported and resist slope failure. No slope stability issues are associated with these pier structures.

SECTION 08: RECOMMENDATIONS

H-pile Deep 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 and wing walls. Due to high loadings of the structure and the very loose to loose fill material, the use of spread footings is not recommended for support of the bridge pier widening.

Steel shell piles and H-piles may be used for design of the deep foundation system. When using steel H-piles, H-piles shall be according to AASHTO M270 Grade 50. The majority of the pile capacity will be achieved through end bearing on top of or in bedrock. With shell pile design, end capacity soils are encountered on top of bedrock. Pile data for H-piles and shell piles is 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.

Pile capacities and lengths were calculated to the piles' Maximum Nominal Required Bearing (NRB). Pile capacities have also been assumed to start friction calculation at the approximate elevation of existing footing. Allowable Resistance Available (ARA) has been calculated and is shown on the pile design tables located in Appendix E. A modified IDOT static method was used to develop the SGR pile design tables. Nominal required bearing was calculated from ASD skin-friction (with pile type correction factors) and end-bearing calculations. A factor of safety of 3.0 was used in calculations for the Allowable Resistance Available (ARA). Pile lengths were picked with respect to the loadings and geometry of the proposed structures. Selection of the pile type should be based on economic and construction considerations.

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 abutment 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.

Straight-shaft Caisson Foundation Recommendations

As an alternative, straight-shaft caissons may be considered for design at the piers. We anticipate that caisson foundations will be more costly and pose greater risk than driven pile foundations, but we have included recommendations as they are still feasible. The Engineer should select a foundation system based on economic and schedule considerations. If a caisson foundation is selected, we recommend that the straight-shaft caissons be either based on top of the sound bedrock or rock-socketed.

We recommend designing the shafts as end-bearing elements on top of sound rock. Sound bedrock varies from an elevation of 590 feet in the west piers (piers 5 and 24) with deeper bedrock around an elevation of 547 feet at pier 28. Considering the lowest strength core taken from the borings (SB-44 with 770 tsf), we recommend using an allowable end-bearing capacity of 60 tons per square foot for caissons (tsf) founded on the bedrock (to be checked against service loads). To the extent rock-socketing is provided, we recommend an allowable friction value (in addition to the end bearing) of 3.0 tsf/ft for side resistance for rock-socketed caissons over the depth of the rock-socket to resist vertical and uplift loads (this is an allowable value to be compared to service loads). From the AASHTO LRFD Bridge Manual 2012, “m” and “s” values were calculated as 0.575 and 0.00293 respectively; the bedrock is considered GOOD QUALITY. The Carter and Kulhawy equation was used to compute the bearing with a factor of safety of 3.0.

Based on the soil borings, saturated cinders and silty and sandy soils are to be encountered at all piers. We recommend that the contractor be informed that construction will require construction methods, such as the use of temporary casing and/or drilling slurry, to maintain the stability of the drilled shaft caisson side walls. As per section 516 of the IDOT Standard Specification for Road and Bridge Construction, it is the contractor’s responsibility to determine the method to construct the drilled shaft caisson to meet the requirements of the specifications and design.

Considering the piers are located near the river and after review of the boring and core logs, there is potential for water infiltration though the cinders, sandy fill soils and bedrock at isolated locations. We recommend that the plans alert the contractor to potential need to work under slurry during construction due to water. Use of a slurry would also require tremie methods of concrete placement, and will also require special cleanout procedures at the bottom of the hole (e.g. “airlift” technique) prior to concrete placement.

A minimum caisson shaft diameter of 2.5 feet is recommended. The concrete slump should be in the range of 5 to 7 inches. The recommended minimum 28-day compression strength of the concrete should be a minimum of 5,000 psi.

The decision to use straight-shaft caissons may also incur additional unforeseen costs. There is potential for boulders to be encountered in the granular soils above bedrock, creating the possibility for "hard-drilling" and increased costs. The contractor should be prepared for difficult drilling and have the appropriate tooling onsite during construction.

We estimate settlements of 1/4 inch or less (in addition to the elastic compression of the pile itself) for straight-shaft caissons founded on bedrock.

Lateral Resistance Recommendations

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

Table 4 – Soil Parameters for Lateral Resistance

Material (elevation, feet)	Unit Weight (pcf)	Drained Friction Angle (°)	Undrained Cohesion (psf)	Lateral Modulus of Subgrade Reaction (pci)	Strain
Very Loose to Loose Cinders, Sands, Gravels Fill (Surface to bedrock)	120	28	-	25	-

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

Table 5 – 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 (Varied elevations, see logs)	150	2×10^6	See Lab Data on Rock Core Logs	37% to 88%	0.0001

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 piers 5, 6, 24 and 25, if temporary soil retention is needed, the contractor will need to design and construct a temporary retaining wall due to the shallow bedrock. For piers 26, 27 and 28, the IDOT Temporary Sheet Piling Design Charts may be used, however due to weak soils, the IDOT Sheet Piling Design Charts may provide limited soil retention. Lateral soil properties provided in **Section 08: Recommendations** may be used for temporary soil retention wall design.

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

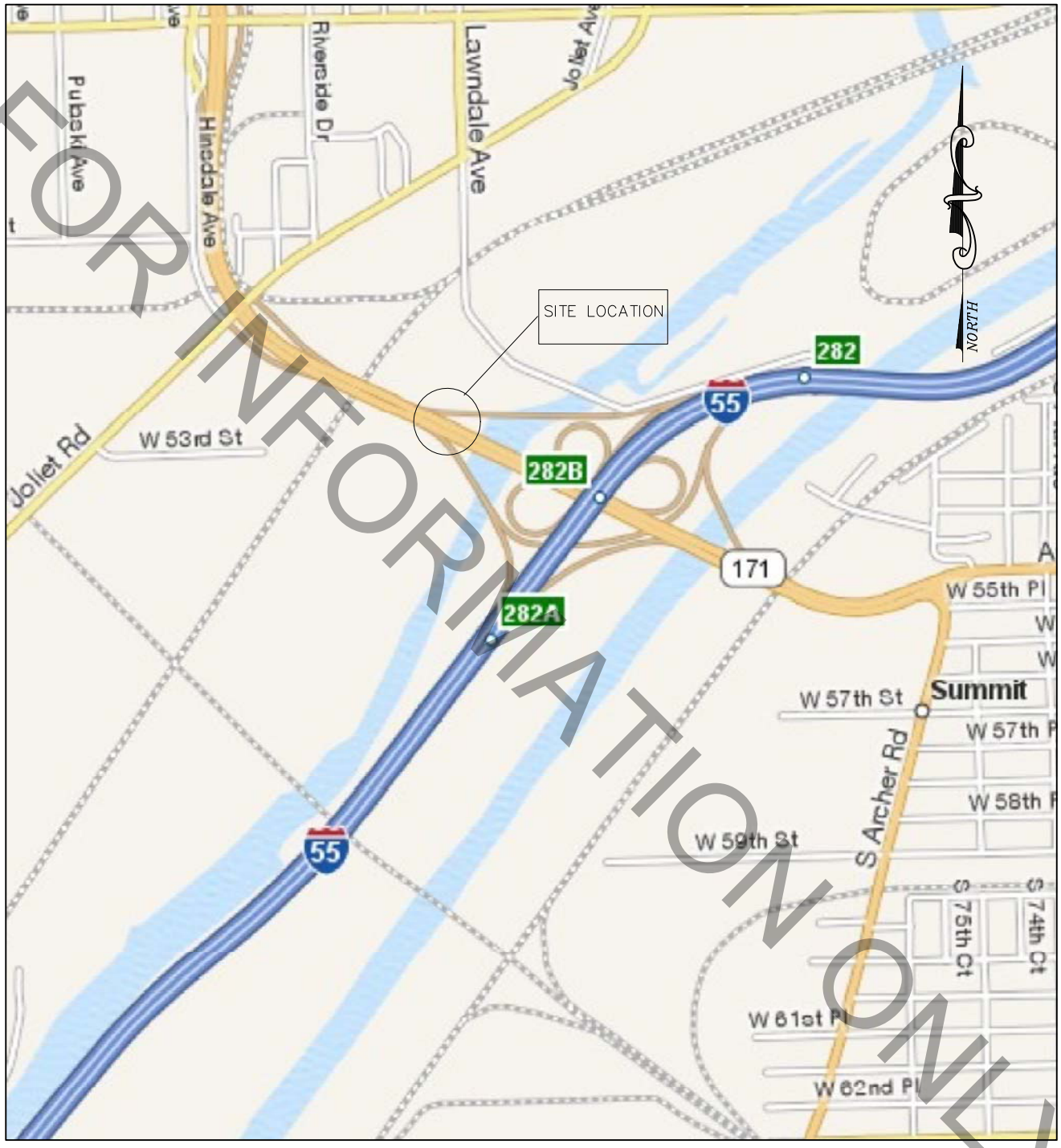
WATER LEVEL MEASUREMENT SYMBOLS

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			
STRUCTURE GEOTECHNICAL REPORT IL–171 over the Des Plaines River Valley IDOT Job # D–91–191–10, PTB# 154–14 Existing SN 016–2456 & 016–2457 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	September 9, 2013
		GSI JOB No.	10025
		SCALE	NTS

APPENDIX C

TS&L, SOIL BORING PLAN AND PROFILE

PLAN
NOTE BOOK
NO.
SURVEYED
PLOTTED
DRAWN
CHECKED
FINAL NOTES
STRUCTURE NOTATIONS CKED
DES PLAINES RIVER
BY
DATE

PROFILE
NOTE BOOK
NO.
SURVEYED
PLOTTED
DRAWN
CHECKED
FINAL NOTES
STRUCTURE NOTATIONS CKED
DES PLAINES RIVER
BY
DATE

RAMP H
℄ RAMP E
RAMP E
205+00
200+00
SB PGL
SB-22
SB-23
SB IL ROUTE 171
S.N. 016-2457
℄ IL ROUTE 171
EXISTING ROW
0+00
55+00
60+00
65+00
NB IL ROUTE 171
SB-42
SB-43
SB-44
SB-45
SB-46
NB PGL
℄ RAMP B
RAMP B
155+00
60+001
EXISTING ROW
S.N. 016-2456
DES PLAINES RIVER
150+00
N
50 0 50 100
SCALE: 1"=50'-0"

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

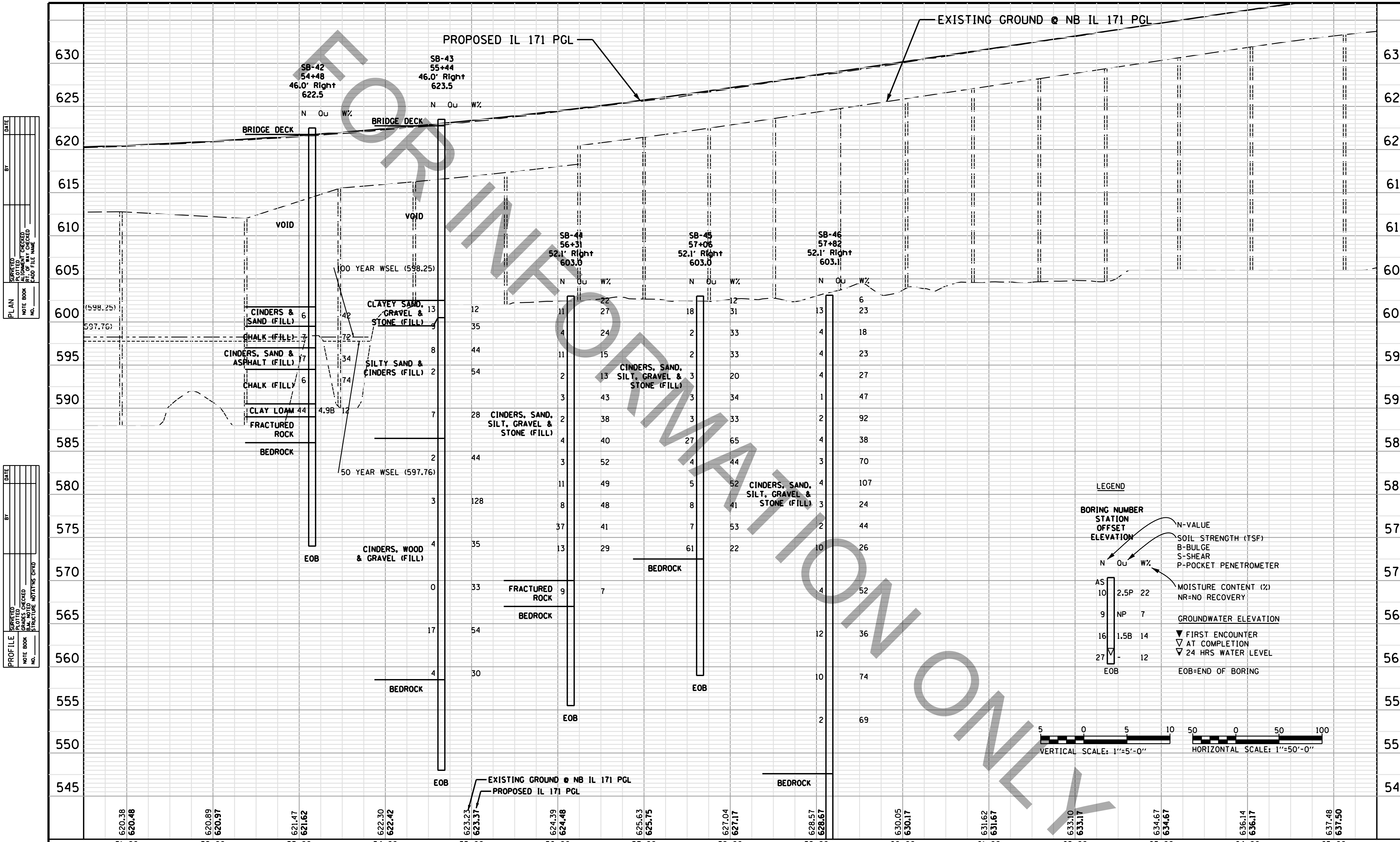
USER NAME =	DESIGNED - RWC	REVISED -	
	DRAWN - RWC	REVISED -	
PLOT SCALE =	CHECKED - AJP	REVISED -	
PLOT DATE =	DATE - 9/4/2013	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ILLINOIS ROUTE 7 OVER THE Des PLAINES RIVER
SB BRIDGE (S.N. 016-2457) & NB BRIDGE (S.N. 016-2456)
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	XXX	COOK		
		CONTRACT NO. XXX		
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		



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 - 9/4/2013	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ILLINOIS ROUTE 7 OVER THE Des PLAINES RIVER VALLEY
NB BRIDGE (S.N. 016-2456)
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	XXX	COOK		
		CONTRACT NO. XXX		

FED. ROAD DIST. NO. | ILLINOIS | FED. AID PROJECT

PROPOSED SB IL 171 PGL

EXISTING GROUND @ SB IL 171 PGL

SB-22
54+37
49.8' Left
622.4

SB-23
55+44
53.2' Left
623.3

BRIDGE DECK

BRIDGE DECK

VOID

VOID

100 YEAR WSEL (598.25)

50 YEAR WSEL (597.76)

N	Qu	W%	
8	19		
10	22		
4	19		CINDERS & SAND (FILL)
2	38		
3	80		
40	11		SILTY CLAY LOAM

BEDROCK

EOB

N	Qu	W%	
4		18	
5		15	CINDERS, SAND & STONE (FILL)
11	0.3P	29	TOPSOIL

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 @ SB IL 171 PGL

PROPOSED IL 171 PGL

51+00	52+00	53+00	54+00	55+00	56+00	57+00	58+00	59+00	60+00	61+00	62+00	63+00	64+00	65+00
620.48 **620.49**	620.92 **620.96**	621.51 **621.60**	622.29 **622.39**	623.19 **623.33**	624.30 **624.43**	625.52 **625.69**	627.06 **627.10**	628.57 **628.58**	630.04 **630.07**	631.54 **631.56**	633.01 **633.05**	634.56 **634.53**	635.97 **636.02**	637.29 **637.40**

PLAN
SURVEYED
PLOTTED
HORIZ. CHECKED
R/T. OF WAY CHECKED
CADD FILE NAME
NOTE BOOK
NO.
BY
DATE

PROFILE
SURVEYED
PLOTTED
CROSS CHECKED
BM. NOTED
STRUCTURE NOTATIONS CHKD
NOTE BOOK
NO.
BY
DATE

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

USER NAME =	DESIGNED - RWC	REVISED - 11/6/2012	
	DRAWN - RWC	REVISED -	
PLOT SCALE =	CHECKED - AJP	REVISED -	
PLOT DATE =	DATE - 9/4/2013	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ILLINOIS ROUTE 7 OVER THE Des PLAINES RIVER
SB BRIDGE (S.N. 016-2457)
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	XXX	COOK		
		CONTRACT NO. XXX		
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

Page 1 **of** 1

Date 5/3/12

ROUTE FAP 372 (IL 171) **DESCRIPTION** IL Route 171 from 47th St. to 55th St. **LOGGED BY** NW

SECTION 2013-038B-R **LOCATION** SE 1/4, **SEC.** 11, **TWP.** T38N, **RNG.** R12E, 3rd **PM**

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

STRUCT. NO. 016-2457
Station 58+29.83

BORING NO. SB-22
Station 54+37
Offset 49.80ft Left
Ground Surface Elev. 622.40 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 (%)
9.5" CONCRETE BRIDGE DECK			
621.61			
VOID			
-5			
-10			
-15			
603.40			
CINDERS & SAND-brown-very loose to loose (Fill)	4		
-20	5		19
CINDERS & SAND-brown-very loose to loose (Fill) *(continued)*	5 5		
	3		
	5 4 6		22
	3		
-25	2 2		19
	1		
	1 1		38
	2		
-30	1 2		80
590.40			
SILTY CLAY LOAM-gray-dense			
	3		
-35	15 25		11
583.90			
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 5/3/2012

LOGGED BY DR

GSI JOB No. 10025

FAP 372 (IL 171) DESCRIPTION 1st Ave. Bridge Rehabilitation & Replacement, 47th St. to 55th St.

SECTION 2013-038B-R LOCATION SEC 11, 12, 13 & 14 T 38 N, R 12 E, 3rd PM

COUNTY Cook CORING METHOD Rotary Wash

STRUCT. NO. 016-2457 CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station 58+29.83 Core Diameter 2.0 in

BORING NO. **SB-22** Top of Rock Elev. *583.9*

Station 54+37 Begin Core Elev. *583.9*

Offset 49.8' Left

Ground Surface Elev. *622.4*

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	88.0	n/a	944 @ -38.5'
-43.5					
-48.5					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-38.5' to -48.5')
Light gray mottled gray with horizontal bedding. Porous with some horizontal fractures throughout. Clay seam from -39.2' to -40.0'.

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)

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

Page 1 **of** 1

Date 5/3/12

ROUTE FAP 372 (IL 171) **DESCRIPTION** IL Route 171 from 47th St. to 55th St. **LOGGED BY** RR

SECTION 2013-038B-R **LOCATION** SE 1/4, **SEC.** 11, **TWP.** T38N, **RNG.** R12E, 3rd **PM**

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

STRUCT. NO. 016-2457
Station 58+29.83

BORING NO. SB-23
Station 55+44
Offset 53.20ft Left
Ground Surface Elev. 623.30 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 (%)
9.0" CONCRETE BRIDGE DECK			
622.55			
VOID			
-5			
-10			
-15			
-20			
VOID *(continued)*			
599.80			
CINDERS, SAND & STONE-brown-very loose to loose (Fill)	8		
-25	3 1		18
	5		
	2 3		15
595.30			
TOPSOIL-black	4		
	6	0.3	29
-30	5	P	
589.80			
Borehole continued with rock coring.			
-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)

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

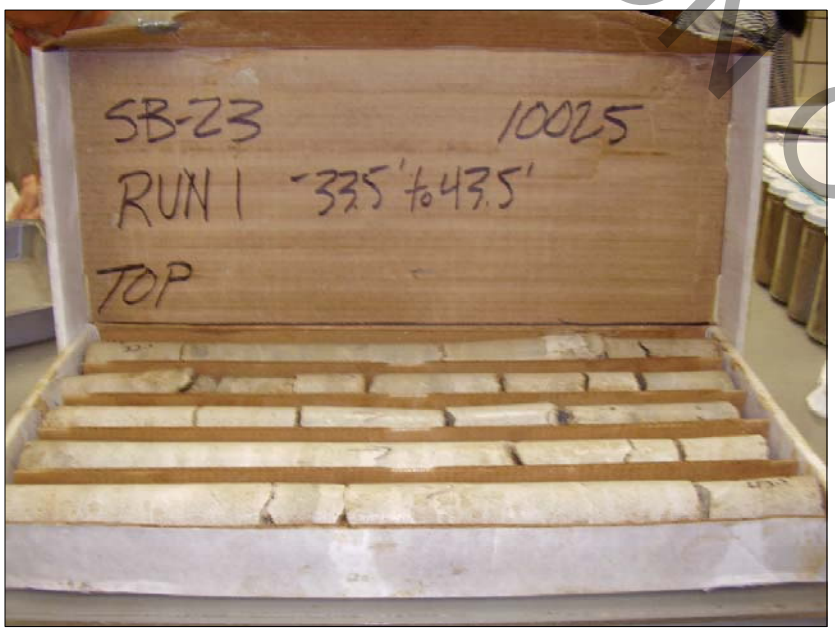
ROCK CORE LOG

PAGE 1 of 1
DATE 5/3/2012
LOGGED BY JK
GSI JOB No. 10025

FAP 372 (IL 171)
DESCRIPTION 1st Ave. Bridge Rehabilitation & Replacement, 47th St. to 55th St.
SECTION 2013-038B-R
LOCATION SEC 11, 12, 13 & 14 T 38 N, R 12 E, 3rd PM
COUNTY Cook
CORING METHOD Rotary Wash
STRUCT. NO. 016-2457
CORING BARREL TYPE & SIZE NX Double Swivel-10 ft
Station 58+29.83
Core Diameter 2.0 in
BORING NO. **SB-23**
Top of Rock Elev. 589.8
Station 55+44
Begin Core Elev. 589.8
Offset 53.2' Left
Ground Surface Elev. 623.3

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	54.0	n/a	1006 @ -33.9'
-38.5					
-43.5					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-33.5' to -43.5')
Light gray with horizontal bedding. Porous with 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)

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

GSI Job No. 10025

SOIL BORING LOG

Page 1 **of** 1

Date 5/2/12

ROUTE FAP 372 (IL 171) **DESCRIPTION** IL Route 171 from 47th St. to 55th St. **LOGGED BY** RR

SECTION 2013-037B-R **LOCATION** SE 1/4, **SEC.** 11, **TWP.** T38N, **RNG.** R12E, 3rd **PM**

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

STRUCT. NO. 016-2456
Station 58+29.83

BORING NO. SB-42
Station 54+48
Offset 46.00ft Right
Ground Surface Elev. 622.50 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 (%)	Description	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
				9.0" CONCRETE BRIDGE DECK				
				621.75 VOID				
						3		
						3		42
						3		
					599.50			
						Chalk-white-loose (Fill)		
						4		
						4		72
-5					-25	3		
					597.00			
						CINDERS, SAND & ASPHALT-medium dense (Fill)		
						5		
						8		34
						9		
					594.50			
						Chalk-white-loose (Fill)		
						2		
						4		74
-10					-30	2		
						18		
					590.50	20	4.9	12
						CLAY LOAM-brown-hard	24	B
					589.00			
						Drillers Observation: Fractured rock.		
-15					-35			
					586.00			
						Drillers Observation: Apparent bedrock.		
					584.00			
						Borehole continued with rock coring.		
602.50 -20					-40			

Z:\PROJECTS\2010\10025 BENESCH, IL-171 FIRST AVE. (IDOT PTB 154, ITEM 14)\10025 BORING LOGS\10025_LOG.GPJ 11/7/13

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)

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

ROCK CORE LOG

PAGE 1 of 1
DATE 5/2/2012
LOGGED BY JK
GSI JOB No. 10025

FAP 372 (IL 171)
DESCRIPTION 1st Ave. Bridge Rehabilitation & Replacement, 47th St. to 55th St.
SECTION 2013-037B-R
LOCATION SEC 11, 12, 13 & 14 T 38 N, R 12 E, 3rd PM
COUNTY Cook
CORING METHOD Rotary Wash
STRUCT. NO. 016+2456
Station 58+29.83
CORING BARREL TYPE & SIZE NX Double Swivel-10 ft
Core Diameter 2.0 in
Top of Rock Elev. 586.0
BORING NO. **SB-42**
Station 54+48
Offset 46.0' Right
Begin Core Elev. 584.0
Ground Surface Elev. 622.5

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	96.0	82.5	n/a	942 @ -38.5'

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-38.5' to -48.5')
Light gray to gray with horizontal bedding. Porous with some horizontal & vertical fractures throughout.

-43.5
-48.5

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)

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 5/2/12

ROUTE FAP 372 (IL 171) **DESCRIPTION** IL Route 171 from 47th St. to 55th St. **LOGGED BY** NW

SECTION 2013-037B-R **LOCATION** SE 1/4, **SEC.** 11, **TWP.** T38N, **RNG.** R12E, 3rd **PM**

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

STRUCT. NO. 016-2456
Station 58+29.83

BORING NO. SB-43
Station 55+44
Offset 46.00ft Right
Ground Surface Elev. 623.50 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 (%)
9.0" CONCRETE BRIDGE DECK			
622.75			
VOID			
-5			
-10			
-15			
-20			
VOID *(continued)*			
602.50			
Clayey SAND, GRAVEL & STONE-dark brown-medium dense (Fill)	7 16 9 4		12
600.50			
Silty SAND & CINDERS-brown & black-very loose to loose (Fill)	4 2 3 6		35
-25	9		
	4 4		44
	1		
-30	1 1		54
	2		
-35	1 6		28
586.50			
CINDERS, WOOD & GRAVEL-dark brown & black-very loose to medium dense (Fill)	1		
-40	1 1		44

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

BBS, from 137 (Rev. 8-99)

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 5/2/12

ROUTE FAP 372 (IL 171) **DESCRIPTION** IL Route 171 from 47th St. to 55th St. **LOGGED BY** NW

SECTION 2013-037B-R **LOCATION** SE 1/4, **SEC.** 11, **TWP.** T38N, **RNG.** R12E, 3rd **PM**

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

STRUCT. NO. 016-2456
Station 58+29.83

BORING NO. SB-43
Station 55+44
Offset 46.00ft Right
Ground Surface Elev. 623.50 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 (%)
	CINDERS, WOOD & GRAVEL-dark brown & black-very loose to medium dense (Fill) *(continued)*		
	4		
-45	2 1		128
	2		
-50	2 2		35
	0		
-55	0 0		33
	15		
-60	12 5		54

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
	CINDERS, WOOD & GRAVEL-dark brown & black-very loose to medium dense (Fill) *(continued)*		
	1		
-65	2 2		30
558.50			
	Drillers Observation: Apparent bedrock.		
558.00			
	Borehole continued with rock coring.		
-70			
-75			
-80			

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

ROCK CORE LOG

DATE 5/2/2012

LOGGED BY DR

GSI JOB No. 10025

FAP 372 (IL 171) DESCRIPTION 1st Ave. Bridge Rehabilitation & Replacement, 47th St. to 55th St.

SECTION 2013-037B-R LOCATION SEC 11, 12, 13 & 14 T 38 N, R 12 E, 3rd PM

COUNTY Cook CORING METHOD Rotary Wash

STRUCT. NO. 016-2456 CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station 58+29.83 Core Diameter 2.0 in

BORING NO. **SB-43** Top of Rock Elev. 558.5

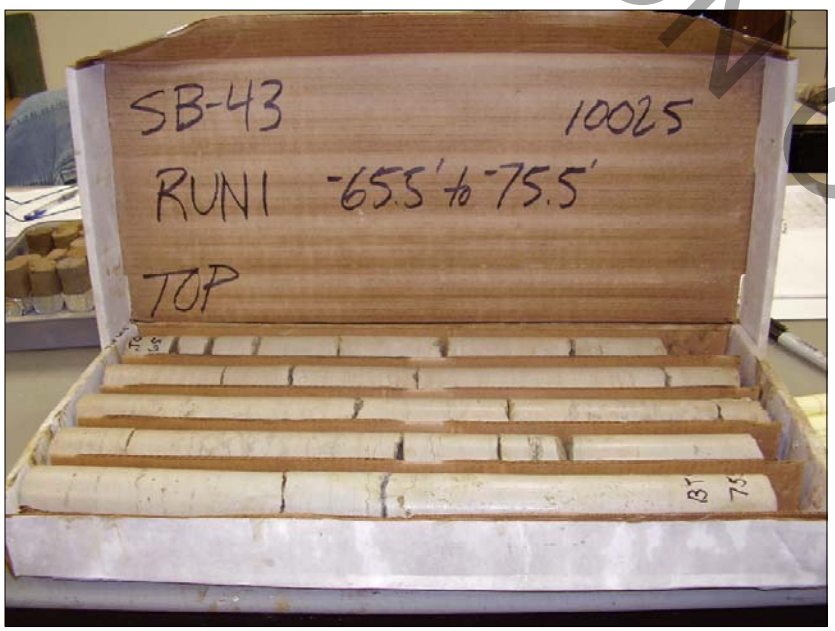
Station 55+44 Begin Core Elev. 558.0

Offset 46.0' Right

Ground Surface Elev. 623.5

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	96.0	65.5	n/a	1166 @ -69.9'
-70.5					
-75.5					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-65.5' to -75.5')
Light gray mottled gray with horizontal bedding. Slightly porous with 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)

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

Page 1 **of** 1

Date 1/16/13

ROUTE FAP 372 (IL 171) **DESCRIPTION** IL Route 171 from 47th St. to 55th St. **LOGGED BY** JZ

SECTION 2013-037B-R **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. 016-2456
Station 58+29.83

BORING NO. SB-44
Station 56+31
Offset 52.10ft Right
Ground Surface Elev. 603.00 ft

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

Groundwater Elev.:
First Encounter 593.0 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
CINDERS, SAND, SILT, GRAVEL & STONE with Wood & Muck-dark brown to black-very loose to dense (Fill)			
	7		22
	5 6		27
	4		
-5	2 2		24
	4		
	7 4		15
	1		
▼-10	1 1		13
	1		
	1 2		43
	1		
-15	1 1		38
	1		
	2 2		40
	1		
-20	1 2		52
	7		
-25	6 5		49
	4		
	3 5		48
	10		
	17 20		41
	5		
-30	6 7		29
	570.00		
FRACTURED ROCK & STONE-loose	5		
-35	2 7		7
	567.00		
Drillers Observation: Apparent Bedrock			
	565.50		
Borehole continued with rock coring.			
-40			

Z:\PROJECTS\2010\10025 BENESCH, IL-171 FIRST AVE. (IDOT PTB 154, ITEM 14)\10025 BORING LOGS\10025_LOG.GPJ 11/7/13

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)

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

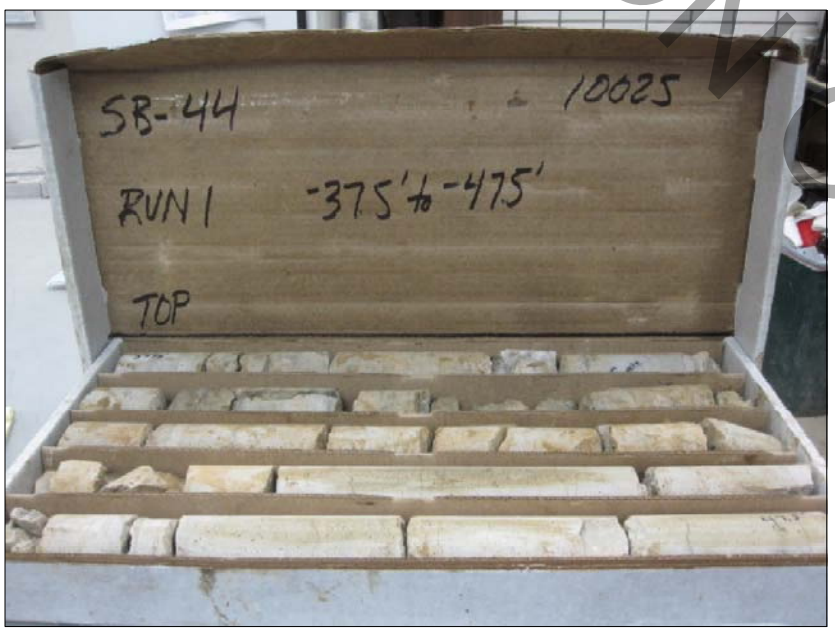
ROCK CORE LOG

PAGE 1 of 1
DATE 1/16/2013
LOGGED BY JK
GSI JOB No. 10025

FAP 372 (IL 171)
DESCRIPTION 1st Ave. Bridge Rehabilitation & Replacement, 47th St. to 55th St.
SECTION 2013-037B-R
LOCATION SEC 11, 12, 13 & 14 T 38 N, R 12 E, 3rd PM
COUNTY Cook
CORING METHOD Rotary Wash
STRUCT. NO. 016+2456
Station 58+29.83
CORING BARREL TYPE & SIZE NX Double Swivel-10 ft
Core Diameter 2.0 in
Top of Rock Elev. 567.0
BORING NO. SB-44
Station 56+31
Offset 52.1' Right
Begin Core Elev. 565.5
Ground Surface Elev. 603.0

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	36.5	n/a	771 @ -38.3'
-42.5					
-47.5					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-37.5' to -47.5')
Light gray mottled gray with horizontal to wavy bedding. Slightly porous with some vugs. Numerous horizontal fractures throughout with some intersecting vertical fractures. Highly fractured from -38.7' to -44.2'.



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) 355-2838

SOIL BORING LOG

GSI Job No. 10025

Page 1 **of** 1

Date 1/16/13

ROUTE FAP 372 (IL 171) **DESCRIPTION** IL Route 171 from 47th St. to 55th St. **LOGGED BY** JZ

SECTION 2013-037B-R **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. 016-2456
Station 58+29.83

BORING NO. SB-45
Station 57+06
Offset 52.10ft Right
Ground Surface Elev. 603.00 ft

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

Groundwater Elev.:
First Encounter 593.0 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material Description
				CINDERS, SAND, SILT, GRAVEL & STONE with Wood & Muck-dark brown to black-very loose to dense (Fill)
			12	
	10			
	11		31	
	7			
	1			
	1		33	
-5	1			
	1			
	1		33	
	1			
	1			
	2		20	
▼-10	1			
	2			
	2		34	
	1			
	1			
	1		33	
-15	2			
	9			
	12		65	
	15			
	6			
	2		44	
-20	2			
				CINDERS, SAND, SILT, GRAVEL & STONE with Wood & Muck-dark brown to black-very loose to dense (Fill) *(continued)*
	3			
	2		52	
	3			
	2			
	3		41	
-25	5			
	2			
	3		53	
	4			
	9			
	11		22	
-30	50			
				572.50
				Drillers Observation: Apparent Bedrock
				569.00
-35				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 1/16/2013

LOGGED BY JK

GSI JOB No. 10025

FAP 372 (IL 171)

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

SECTION 2013-037B-R

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

COUNTY Cook

CORING METHOD Rotary Wash

STRUCT. NO. 016+2456

Station 58+29.83

CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Core Diameter 2.0 in

Top of Rock Elev. 572.5

BORING NO. **SB-45**

Station 57+06

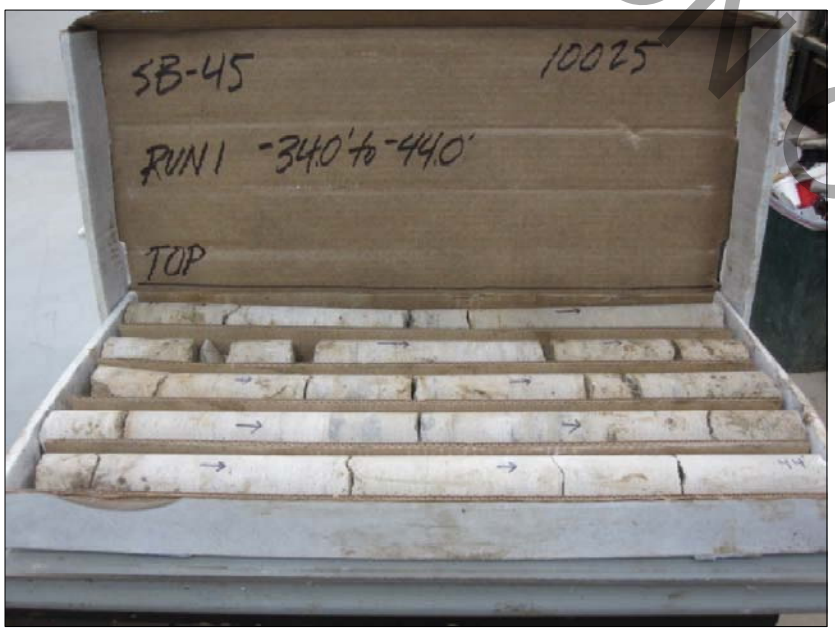
Offset 52.1' Right

Begin Core Elev. 569.0

Ground Surface Elev. 603.0

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	71.0	n/a	946 @ -34.5'
-39.0					
-44.0					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-34.0' to -44.0')
Light gray mottled gray & slightly porous with horizontal to wavy bedding. Horizontal fractures @ -34.4', -35.0', -35.2', -36.0', -36.3', -36.6', -38.0', -38.2', -38.6', -39.0', -39.5', -39.6', -40.0', -40.2', -41.0', -41.8', -42.2', -42.8', -43.4' & -43.7'.



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)

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 1/16/13

ROUTE FAP 372 (IL 171) **DESCRIPTION** IL Route 171 from 47th St. to 55th St. **LOGGED BY** KD

SECTION 2013-037B-R **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. 016-2456
Station 58+29.83

BORING NO. SB-46
Station 57+82
Offset 52.10ft Right
Ground Surface Elev. 603.10 ft

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

Groundwater Elev.:
First Encounter 593.1 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material Description
				CINDERS, SAND, SILT, GRAVEL & STONE with Wood & Muck-dark brown to black-very loose to dense (Fill)
			6	
	6			
	6		23	
	7			
	1			
	2		18	
-5	2			
	1			
	2		23	
	2			
	2			
	3		27	
▼-10	1			
	1			
	1		47	
	0			
	1			
	1		92	
-15	1			
	1			
	2		38	
	2			
	2			
	2		70	
-20	1			

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)	Material Description
				CINDERS, SAND, SILT, GRAVEL & STONE with Wood & Muck-dark brown to black-very loose to dense (Fill) *(continued)*
	2			
	2		107	
	2			
	2			
	2		24	
-25	1			
	1			
	1		44	
	1			
	9			
	5		26	
-30	5			
	2			
	2		52	
-35	2			
	4			
	6		36	
-40	6			

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

SOIL BORING LOG

GSI Job No. 10025

Date 1/16/13

ROUTE FAP 372 (IL 171) **DESCRIPTION** IL Route 171 from 47th St. to 55th St. **LOGGED BY** KD

SECTION 2013-037B-R **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. 016-2456
Station 58+29.83

BORING NO. SB-46
Station 57+82
Offset 52.10ft Right
Ground Surface Elev. 603.10 ft

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

Groundwater Elev.:
First Encounter 593.1 ft ▼
Upon Completion n/a ft
After ____ **Hrs.** ____ ft

DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
	2		
	2		74
-45	8		
	2		
	1		69
-50	1		
-55			
-60			

CINDERS, SAND, SILT, GRAVEL & STONE with Wood & Muck-dark brown to black-very loose to dense (Fill) *(continued)*

547.10
Drillers Observation: Apparent Bedrock 546.60

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)

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

ROCK CORE LOG

DATE 1/16/2013

LOGGED BY DR

GSI JOB No. 10025

FAP 372 (IL 171) DESCRIPTION 1st Ave. Bridge Rehabilitation & Replacement, 47th St. to 55th St.

SECTION 2013-037B-R LOCATION SEC 11, 12, 13 & 14 T 38 N, R 12 E, 3rd PM

COUNTY Cook CORING METHOD Rotary Wash

STRUCT. NO. 016-2456 CORING BARREL TYPE & SIZE NX Double Swivel-10 ft

Station 58+29.83 Core Diameter 2.0 in

BORING NO. **SB-46** Top of Rock Elev. 547.1

Station 57+82 Begin Core Elev. 546.6

Offset 52.1' Right

Ground Surface Elev. 603.1

DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
	1	100.0	74.5	n/a	1362 @ -58.5'
-61.5					
-66.5					

SILURIAN SYSTEM, NIAGARAN SERIES DOLOMITE
RUN 1 (-29.5' to -34.5')
Light gray mottled gray, fine grained with horizontal bedding and a few small vugs. Vertical fracture with intersecting horizontal fractures from -56.5' to -57.6'. Horizontal fractures @ -59.0', -60.0', -60.1', -60.4', -60.7', -60.9', -61.7', -62.7', -63.2', -63.8', -64.1', -64.6', -65.2' & -66.0'.

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)

APPENDIX E

PILE DESIGN TABLES

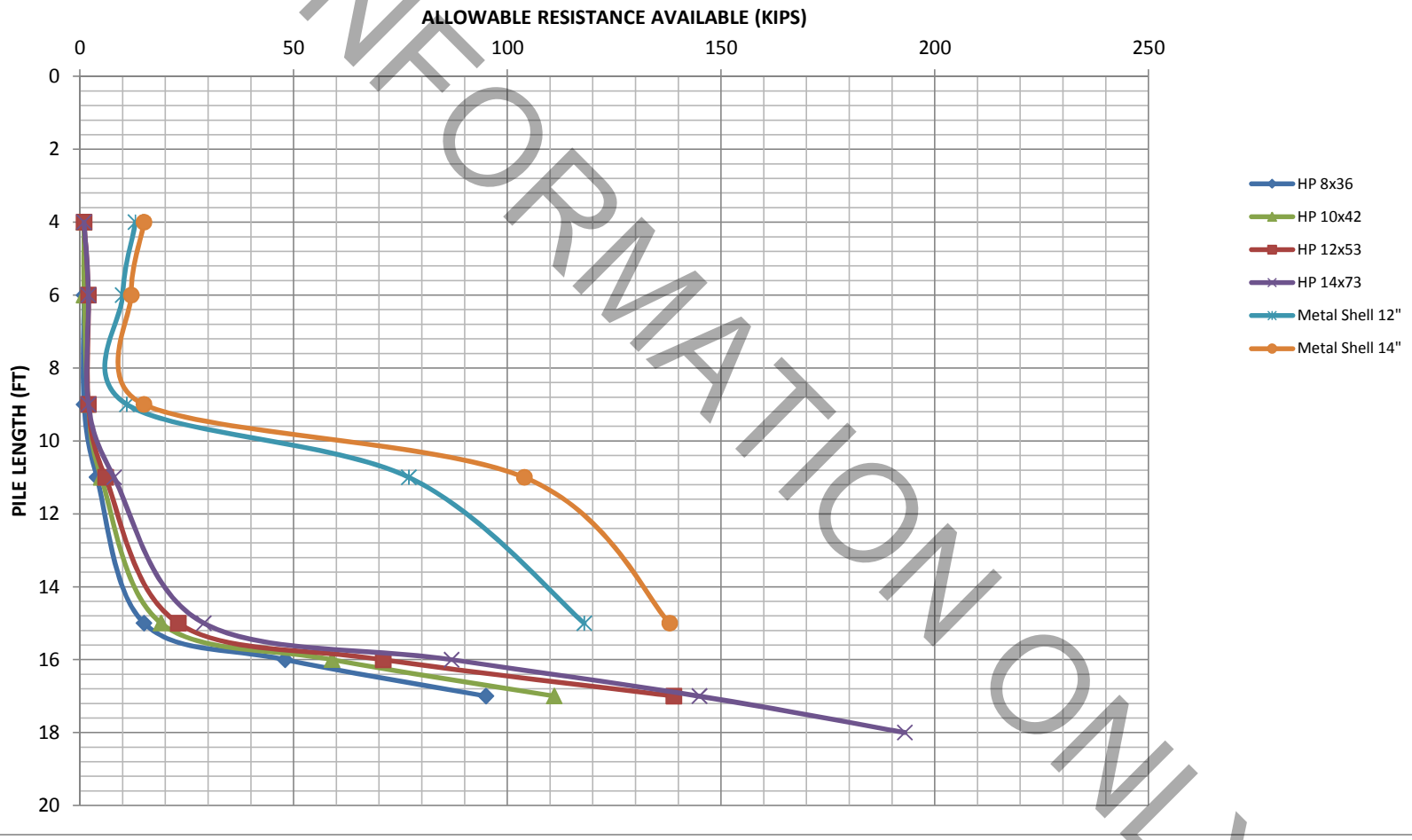
Estimated Pile Lengths and Capacities

Boring SB-42 Pier 24 (Elevation 598.5 Begin Friction, 600.5 for Pile Cutoff)												
Estimated Pile Length (ft.)	HP 8x36		HP 10x42		HP 12x53		HP 14x73		Metal Shell 12"		Metal Shell 14"	
	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)
4	1	3	1	3	1	3	1	3	13	38	15	45
6	1	3	1	4	2	5	2	5	10	30	12	35
9	1	4	2	5	2	6	2	7	11	34	15	44
11	4	12	5	14	6	17	8	23	77	232	104	313
15	15	46	19	56	23	68	29	87	118	353	138	413
16	48	143	59	177	71	213	87	261				
17	95	286	111	335	139	418	145	434				
18							193	578				

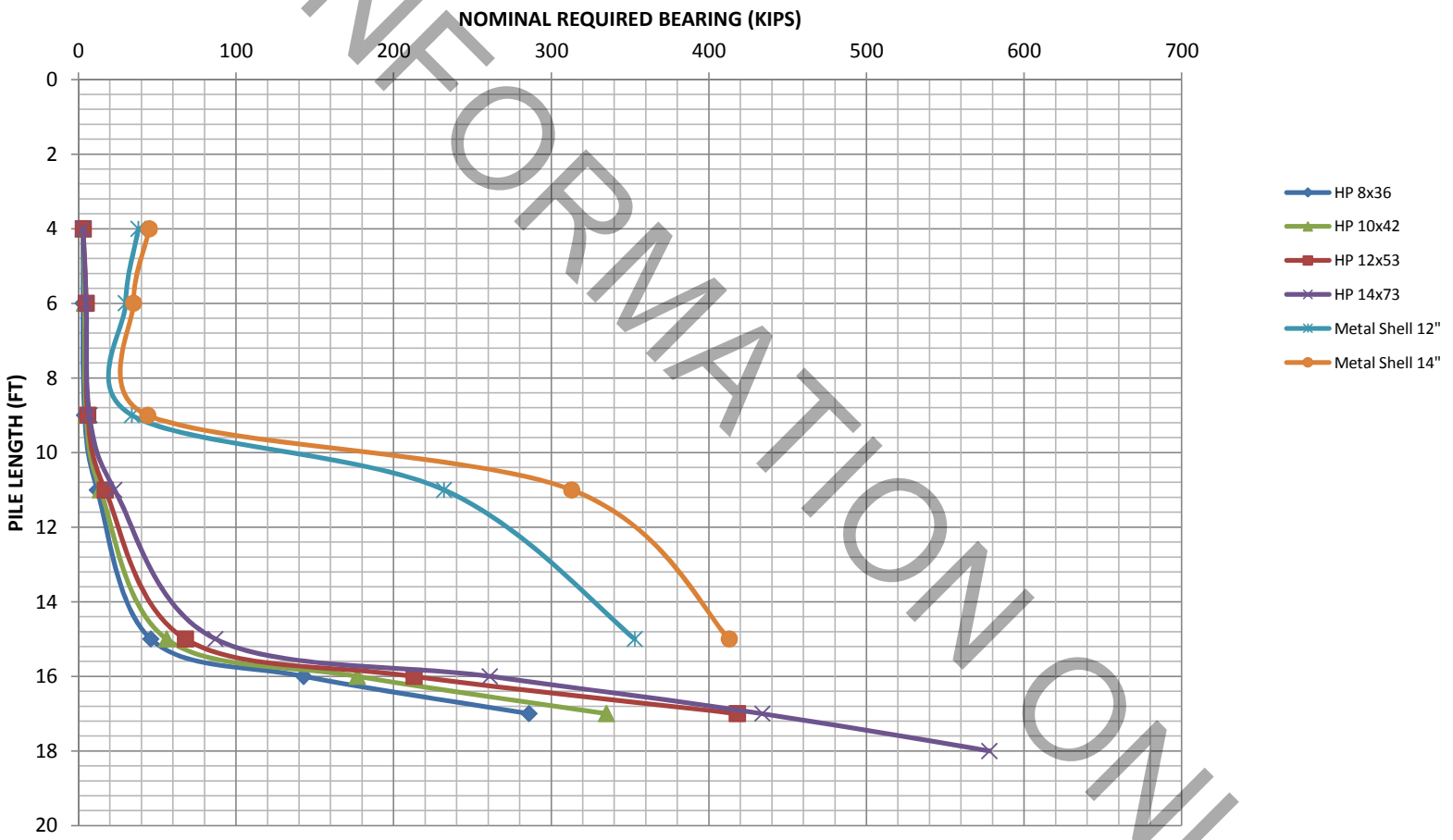
Note (1): Shell Pile data in table reflects a 0.25-inch wall thickness

Denotes pile on/in bedrock

PILE BEARING (ARA) VS. ESTIMATED PILE LENGTH
SN 016-2456 Pier 24; BORING SB-42
Elevation 598.5 Begin Friction, 600.5 for Pile Cutoff (pile length = 0.0 feet)



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
SN 016-2456 Pier 24; BORING SB-42
Elevation 598.5 Begin Friction, 600.5 for Pile Cutoff (pile length = 0.0 feet)



Estimated Pile Lengths and Capacities

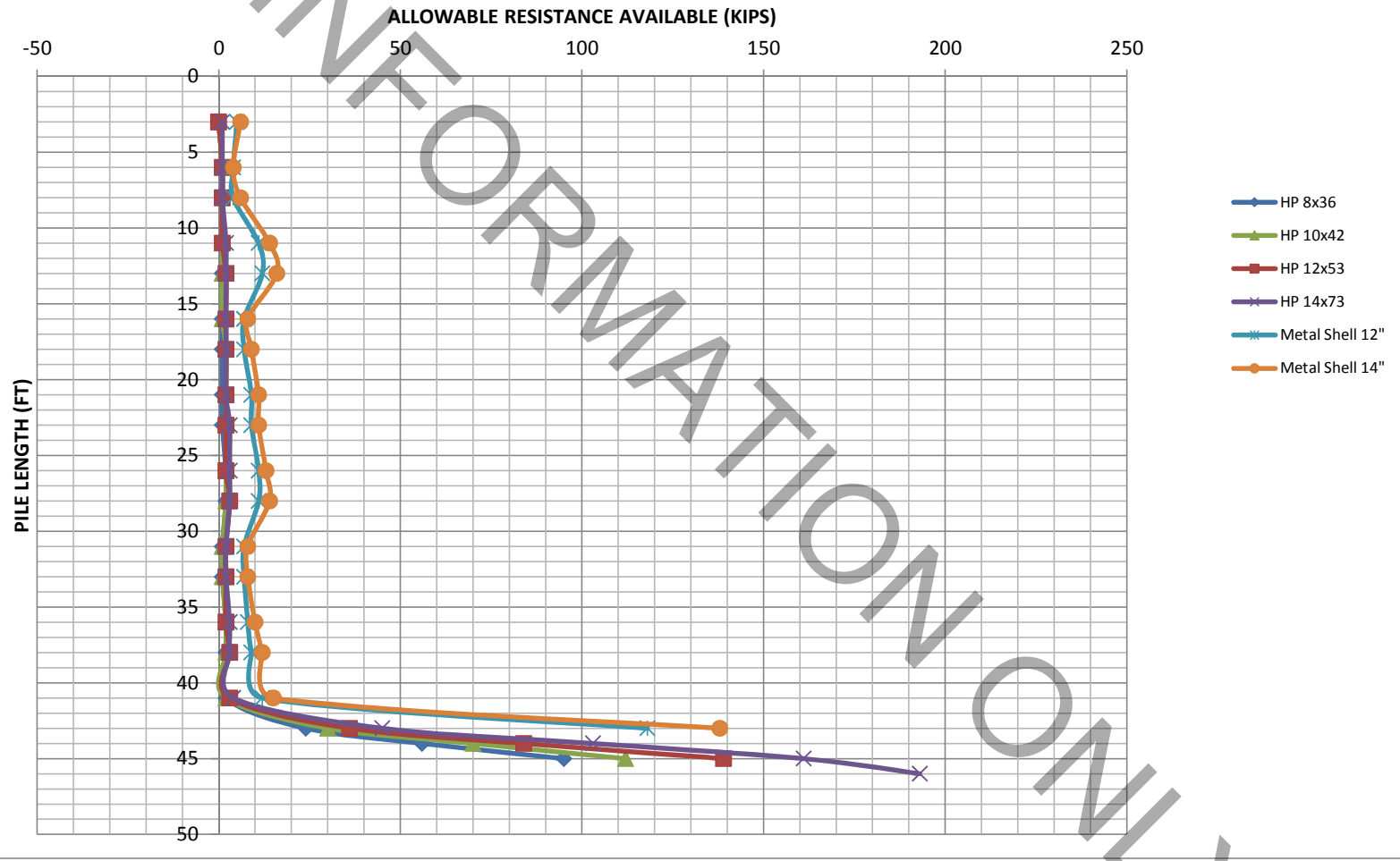
Boring SB-43 Pier 25(Elevation 598.7 Begin Friction, 600.7 for Pile Cutoff)												
Estimated Pile Length (ft.)	HP 8x36		HP 10x42		HP 12x53		HP 14x73		Metal Shell 12"		Metal Shell 14"	
	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)
3	0	1	0	1	0	1	1	2	5	15	6	18
6	1	2	1	2	1	2	1	3	4	11	4	13
8	1	2	1	2	1	3	1	3	4	13	6	17
11	1	3	1	3	1	4	2	5	11	33	14	43
13	1	3	1	4	2	5	2	6	12	36	16	47
16	1	3	1	4	2	5	2	6	7	20	8	25
18	1	4	2	5	2	5	2	7	7	21	9	26
21	1	4	2	5	2	6	2	7	9	26	11	32
23	1	4	2	5	2	6	3	8	9	27	11	34
26	2	5	2	6	2	7	3	9	11	32	13	40
28	2	5	2	6	3	8	3	9	11	34	14	42
31	1	3	1	4	2	5	2	6	7	21	8	24
33	1	3	1	4	2	5	2	6	7	21	8	24
36	2	4	2	6	2	7	3	9	8	24	10	29
38	2	5	2	7	3	8	3	10	9	28	12	35
41	2	6	2	7	3	9	4	11	12	37	15	46
43	24	73	30	89	36	108	45	134	118	353	138	413
44	56	169	70	210	84	252	103	308				
45	95	286	112	335	139	418	161	482				
46							193	578				

Note (1): Shell Pile data in table reflects a 0.25-inch wall thickness

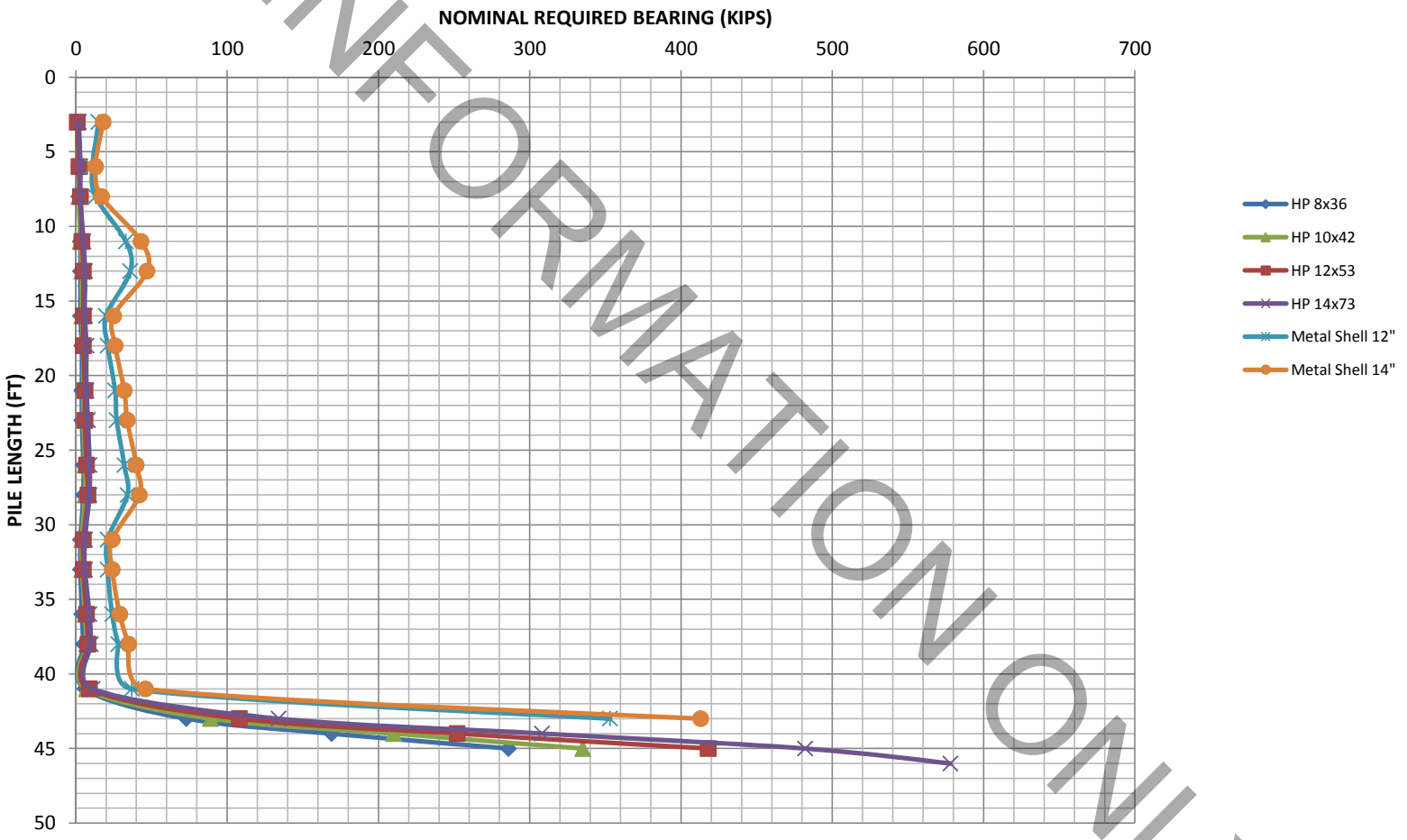
Denotes pile on/in bedrock

PILE BEARING (ARA) VS. ESTIMATED PILE LENGTH
SN 016-2456 Pier 25; BORING SB-43

Elevation 598.7 Begin Friction, 600.7 for Pile Cutoff (pile length = 0.0 feet)



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
SN 016-2456 Pier 25; BORING SB-43
Elevation 598.7 Begin Friction, 600.7 for Pile Cutoff (pile length = 0.0 feet)



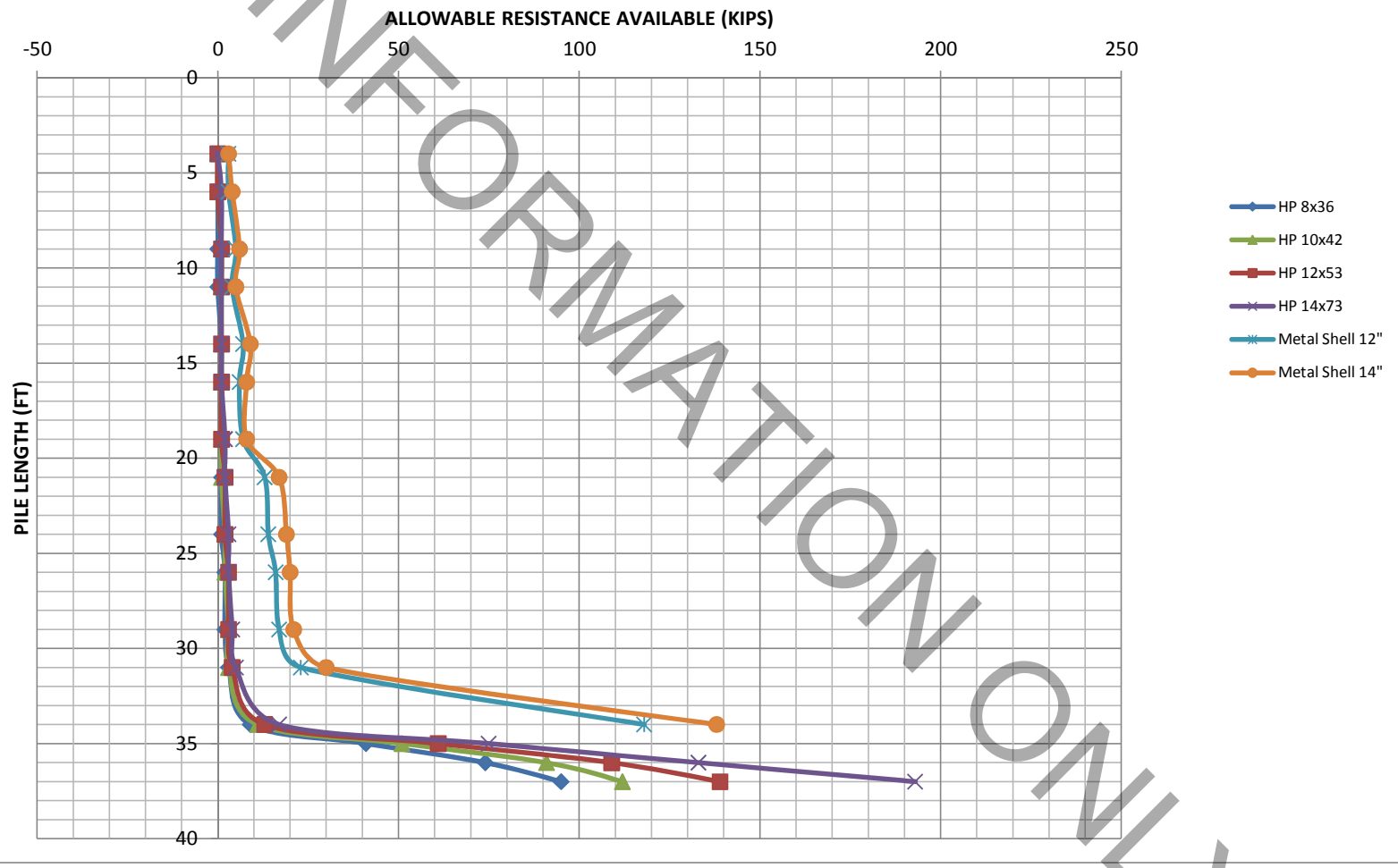
Estimated Pile Lengths and Capacities

Boring SB-44 Pier 26(Elevation 598.9 Begin Friction, 600.9 for Pile Cutoff)												
Estimated Pile Length (ft.)	HP 8x36		HP 10x42		HP 12x53		HP 14x73		Metal Shell 12"		Metal Shell 14"	
	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)
4	0	1	0	1	0	1	0	1	3	9	3	10
6	0	1	0	1	0	1	1	2	3	9	4	11
9	0	1	1	2	1	2	1	2	5	15	6	19
11	0	1	1	2	1	2	1	3	4	12	5	16
14	1	2	1	2	1	3	1	4	7	21	9	27
16	1	2	1	3	1	3	1	4	6	19	8	24
19	1	3	1	3	1	4	2	4	7	20	8	25
21	1	4	1	4	2	5	2	5	13	40	17	52
24	1	4	2	5	2	7	3	7	14	43	19	56
26	2	5	2	7	3	8	3	8	16	47	20	60
29	2	6	3	8	3	9	4	10	17	50	21	64
31	3	8	3	9	4	11	5	11	23	68	30	89
34	9	27	11	32	13	39	17	52	118	353	138	413
35	41	124	51	153	61	184	75	226				
36	74	221	91	274	109	328	133	400				
37	95	286	112	335	139	418	193	578				

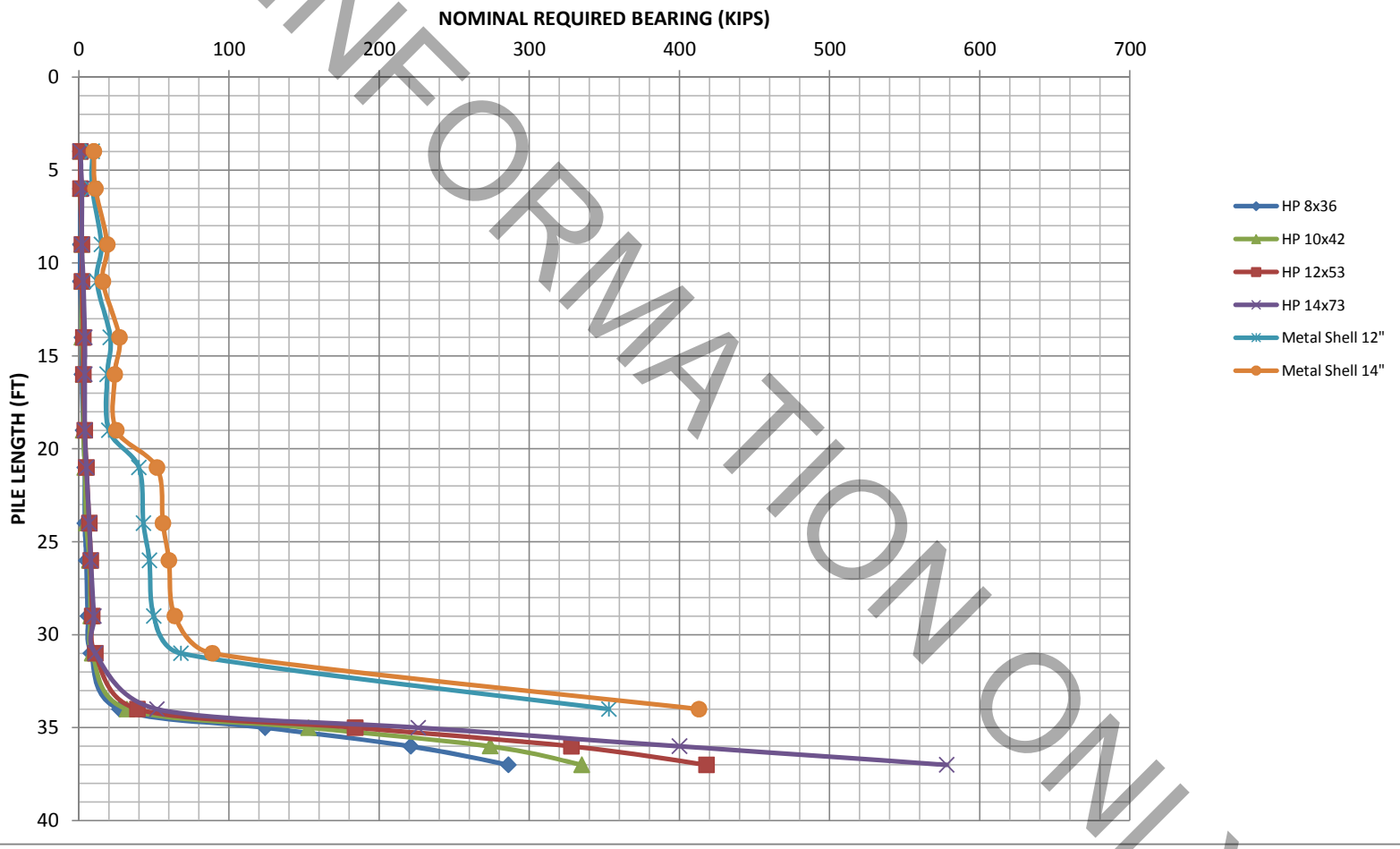
Note (1): Shell Pile data in table reflects a 0.25-inch wall thickness

Denotes pile on/in bedrock

PILE BEARING (ARA) VS. ESTIMATED PILE LENGTH
SN 016-2456 Pier 26; BORING SB-44
Elevation 598.9 Begin Friction, 600.9 for Pile Cutoff (pile length = 0.0 feet)



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
SN 016-2456 Pier 26; BORING SB-44
Elevation 598.9 Begin Friction, 600.9 for Pile Cutoff (pile length = 0.0 feet)



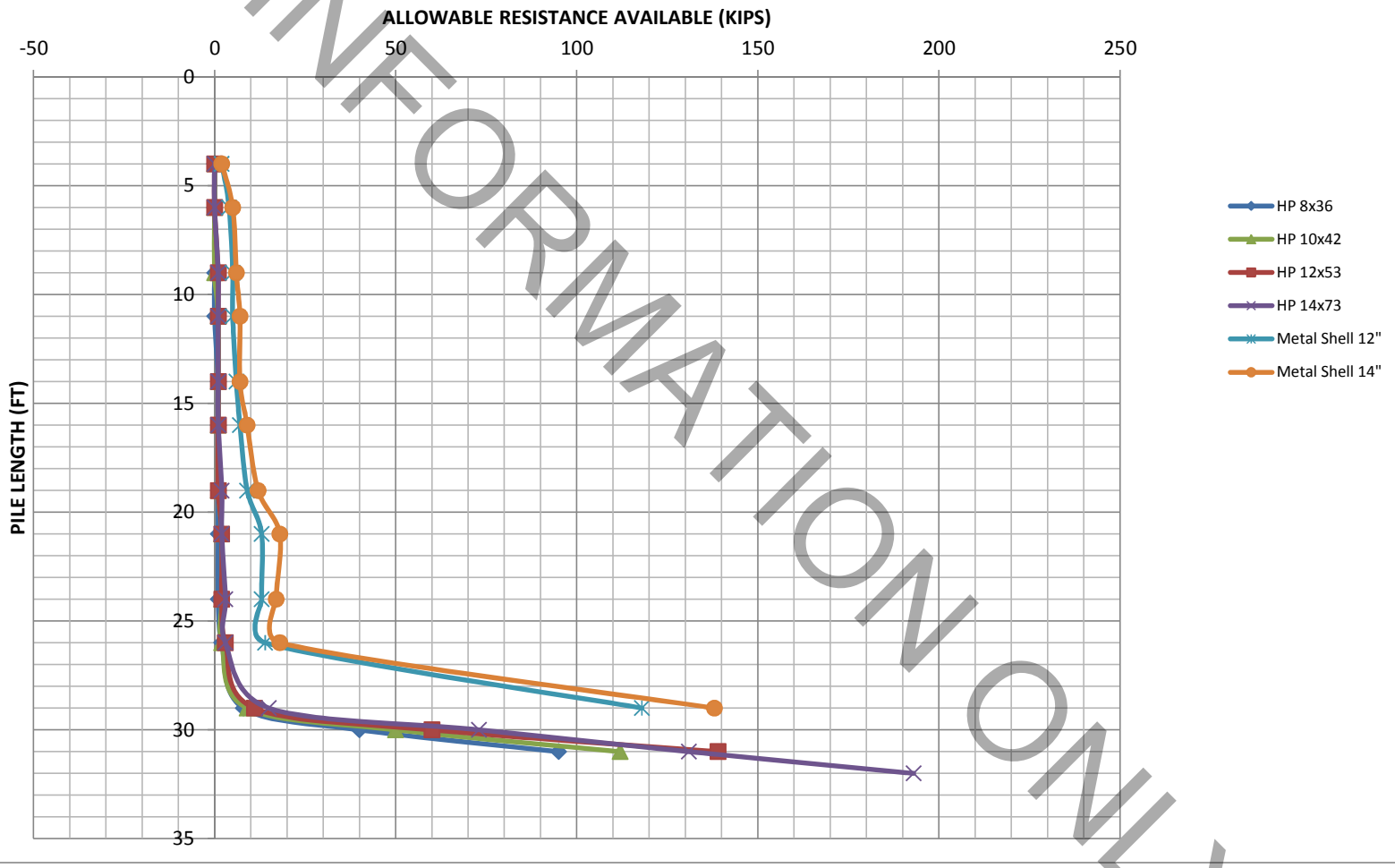
Estimated Pile Lengths and Capacities

Boring SB-45 Pier 27(Elevation 599.0 Begin Friction, 601.0 for Pile Cutoff)												
Estimated Pile Length (ft.)	HP 8x36		HP 10x42		HP 12x53		HP 14x73		Metal Shell 12"		Metal Shell 14"	
	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)
4	0	0	0	0	0	0	0	1	2	5	2	6
6	0	1	0	1	0	1	0	1	4	12	5	14
9	0	1	0	1	1	2	1	2	5	14	6	18
11	0	1	1	2	1	2	1	3	5	15	7	20
14	1	2	1	2	1	3	1	3	6	17	7	21
16	1	2	1	3	1	3	1	4	7	22	9	28
19	1	3	1	3	1	4	2	5	9	27	12	35
21	1	4	2	5	2	5	2	7	13	40	18	53
24	1	4	2	5	2	7	3	8	13	40	17	52
26	2	5	2	6	3	8	3	9	14	43	18	55
29	8	23	9	28	11	34	15	46	118	353	138	413
30	40	120	50	149	60	179	73	220				
31	95	286	112	335	139	418	131	393				
32							193	578				

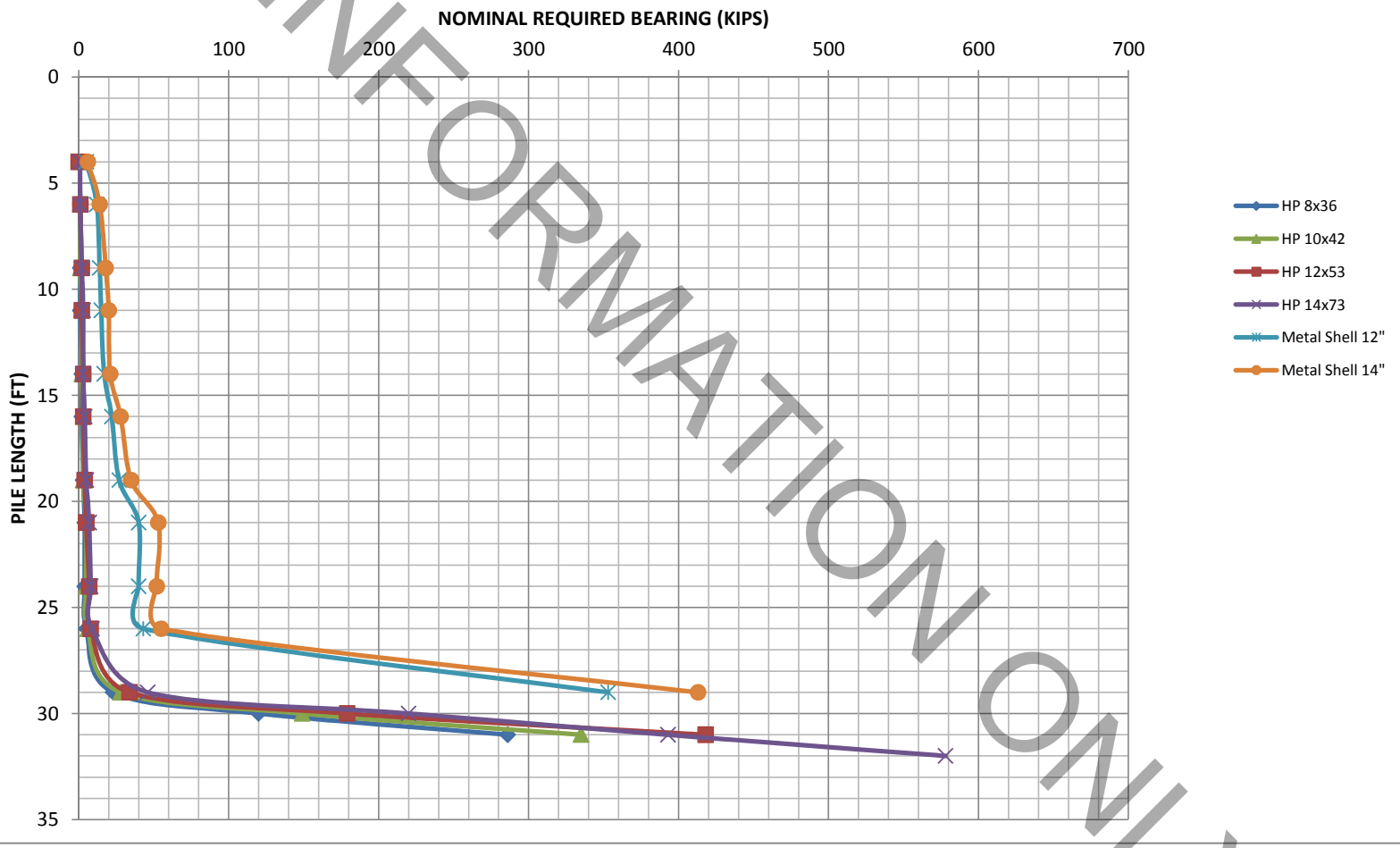
Note (1): Shell Pile data in table reflects a 0.25-inch wall thickness

Denotes pile on/in bedrock

PILE BEARING (ARA) VS. ESTIMATED PILE LENGTH
SN 016-2456 Pier 27; BORING SB-45
Elevation 599.0 Begin Friction, 601.0 for Pile Cutoff (pile length = 0.0 feet)



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
SN 016-2456 Pier 27; BORING SB-45
Elevation 599.0 Begin Friction, 601.0 for Pile Cutoff (pile length = 0.0 feet)



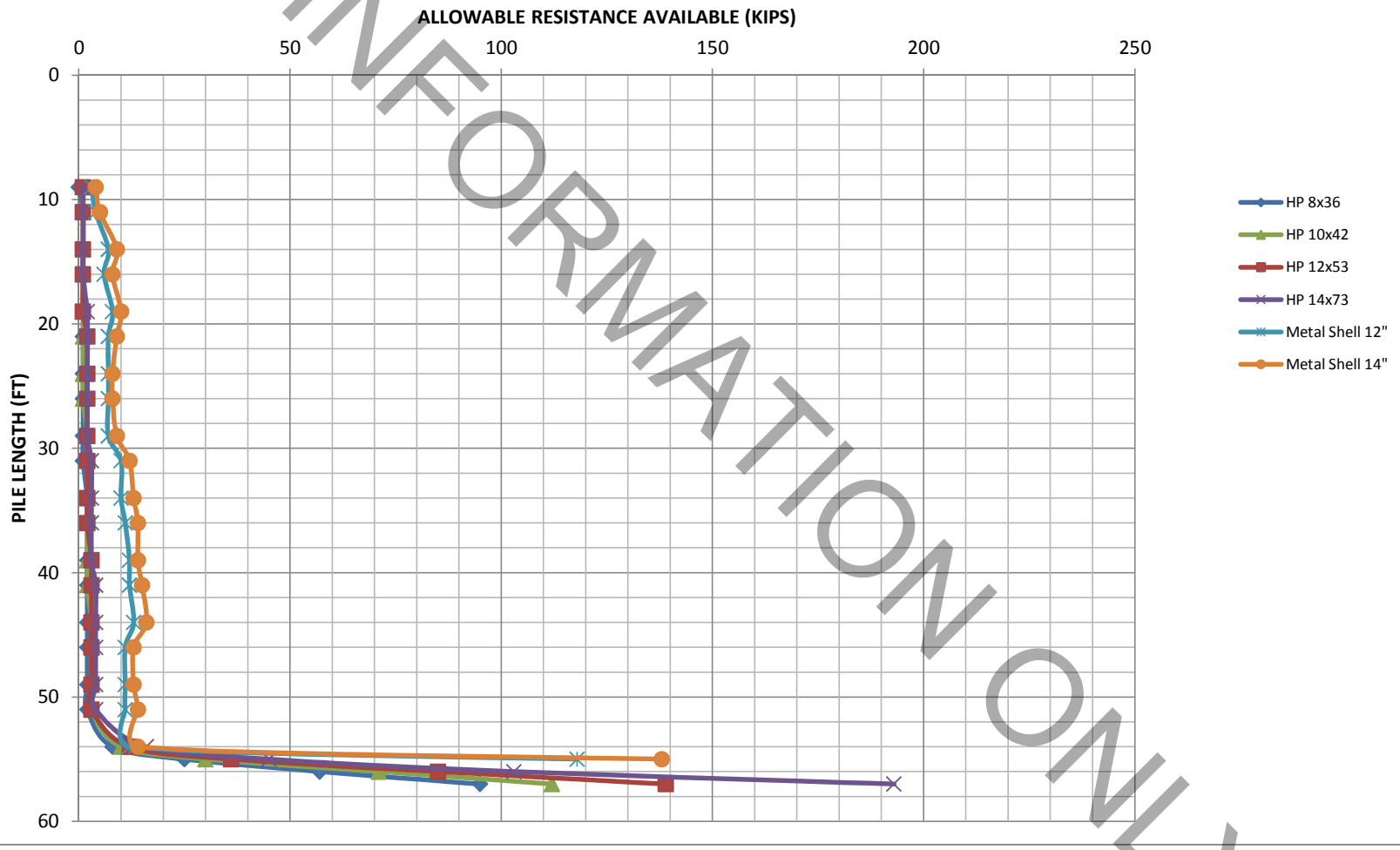
Estimated Pile Lengths and Capacities

Boring SB-46 Pier 28(Elevation 599.2 Begin Friction, 601.2 for Pile Cutoff)												
Estimated Pile Length (ft.)	HP 8x36		HP 10x42		HP 12x53		HP 14x73		Metal Shell 12"		Metal Shell 14"	
	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)
9	0	1	1	2	1	2	1	2	3	8	4	11
11	1	2	1	2	1	2	1	3	4	13	5	16
14	1	2	1	3	1	3	1	4	7	21	9	27
16	1	2	1	3	1	3	1	4	6	19	8	24
19	1	3	1	3	1	4	2	5	8	24	10	31
21	1	3	1	4	2	5	2	6	7	22	9	28
24	1	3	1	4	2	5	2	6	7	20	8	24
26	1	3	1	4	2	5	2	6	7	20	8	25
29	1	4	2	5	2	5	2	7	7	21	9	26
31	1	4	2	5	2	6	3	8	10	30	12	37
34	2	5	2	6	2	7	3	8	10	31	13	39
36	2	5	2	6	2	7	3	9	11	33	14	41
39	2	5	2	7	3	8	3	10	12	35	14	43
41	2	6	2	7	3	9	4	11	12	36	15	45
44	2	6	3	8	3	9	4	11	13	38	16	47
46	2	6	3	8	3	10	4	12	11	33	13	39
49	2	6	3	8	3	10	4	12	11	33	13	40
51	2	6	3	8	3	10	4	12	11	34	14	41
54	8	25	10	30	12	37	16	49	12	35	14	42
55	25	74	30	91	36	109	45	136	118	353	138	413
56	57	171	71	212	85	254	103	310				
57	95	286	112	335	139	418	193	578				

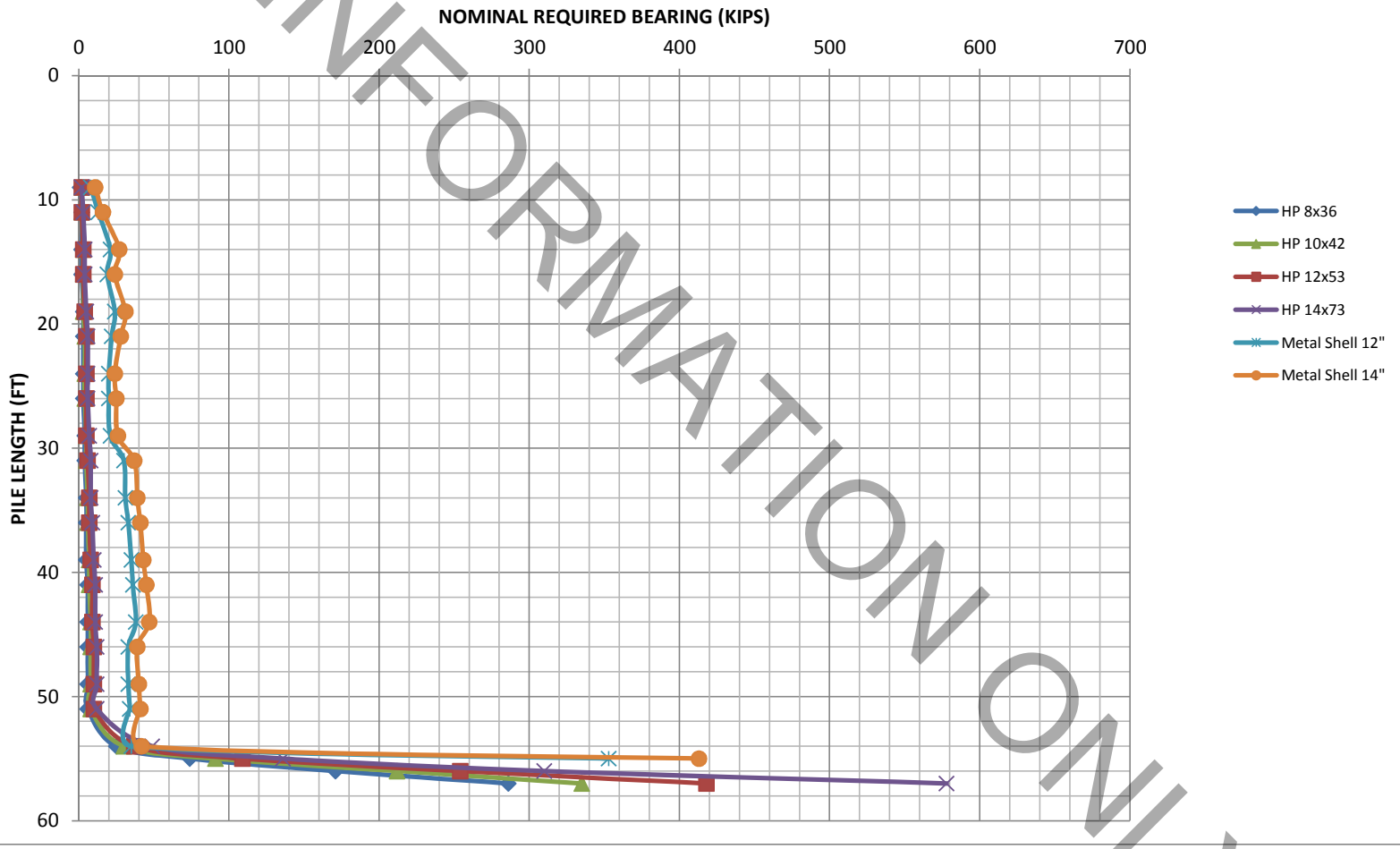
Note (1): Shell Pile data in table reflects a 0.25-inch wall thickness

Denotes pile on/in bedrock

PILE BEARING (ARA) VS. ESTIMATED PILE LENGTH
SN 016-2456 Pier 28; BORING SB-46
Elevation 599.2 Begin Friction, 601.2 for Pile Cutoff (pile length = 0.0 feet)



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
SN 016-2456 Pier 28; BORING SB-46
Elevation 599.2 Begin Friction, 601.2 for Pile Cutoff (pile length = 0.0 feet)



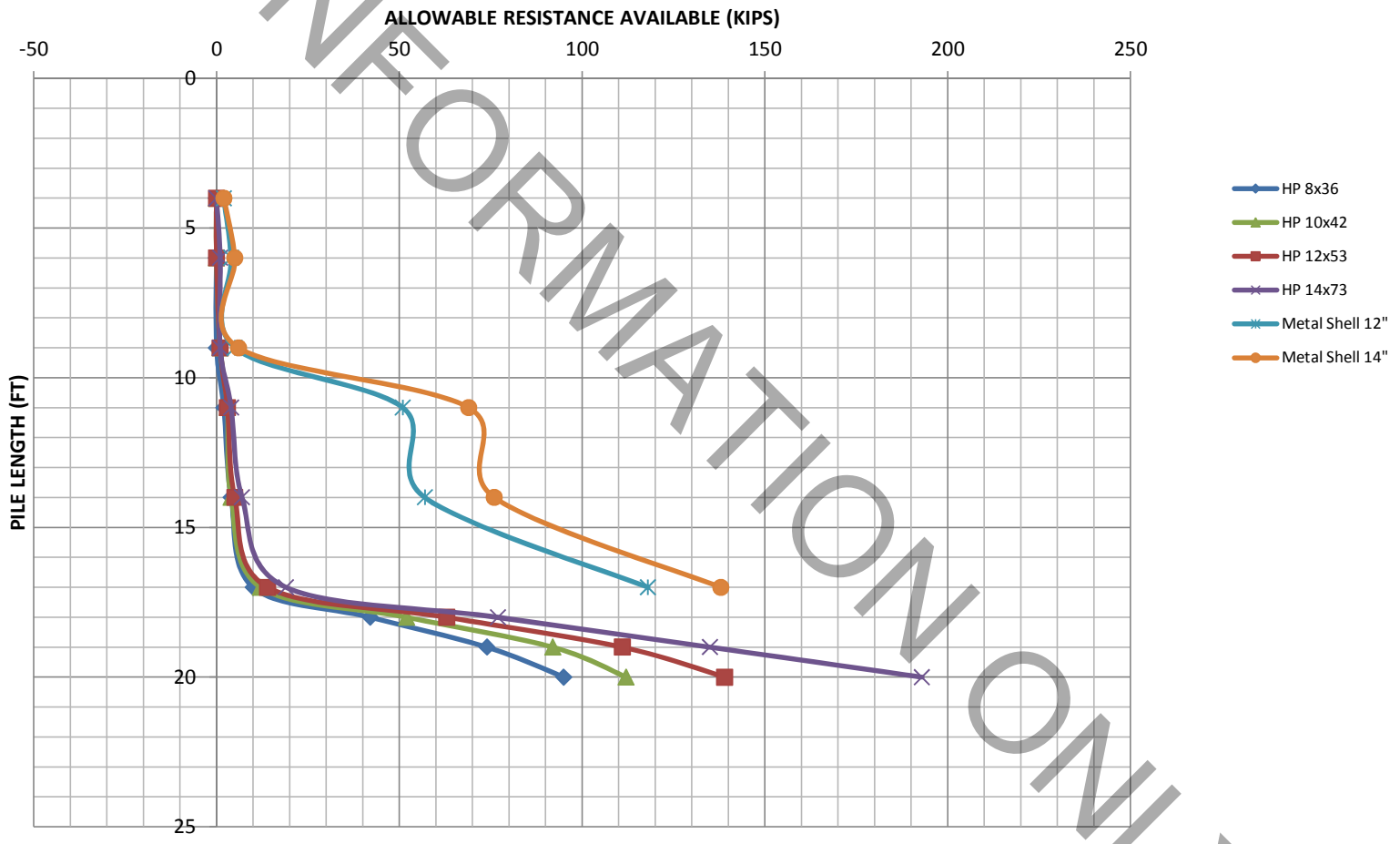
Estimated Pile Lengths and Capacities

Boring SB-22 Pier 5 (Elevation 598.5 Begin Friction, 600.5 for Pile Cutoff)												
Estimated Pile Length (ft.)	HP 8x36		HP 10x42		HP 12x53		HP 14x73		Metal Shell 12"		Metal Shell 14"	
	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)
4	0	1	0	1	0	1	0	1	2	6	2	7
6	0	1	0	1	0	1	1	2	4	12	5	14
9	0	1	1	2	1	2	1	2	5	15	6	19
11	2	7	3	8	3	10	4	13	51	153	69	207
14	4	11	4	13	5	16	7	21	57	171	76	229
17	10	29	12	35	14	43	19	57	118	353	138	413
18	42	126	52	156	63	188	77	231				
19	74	223	92	277	111	332	135	404				
20	95	286	112	335	139	418	193	578				

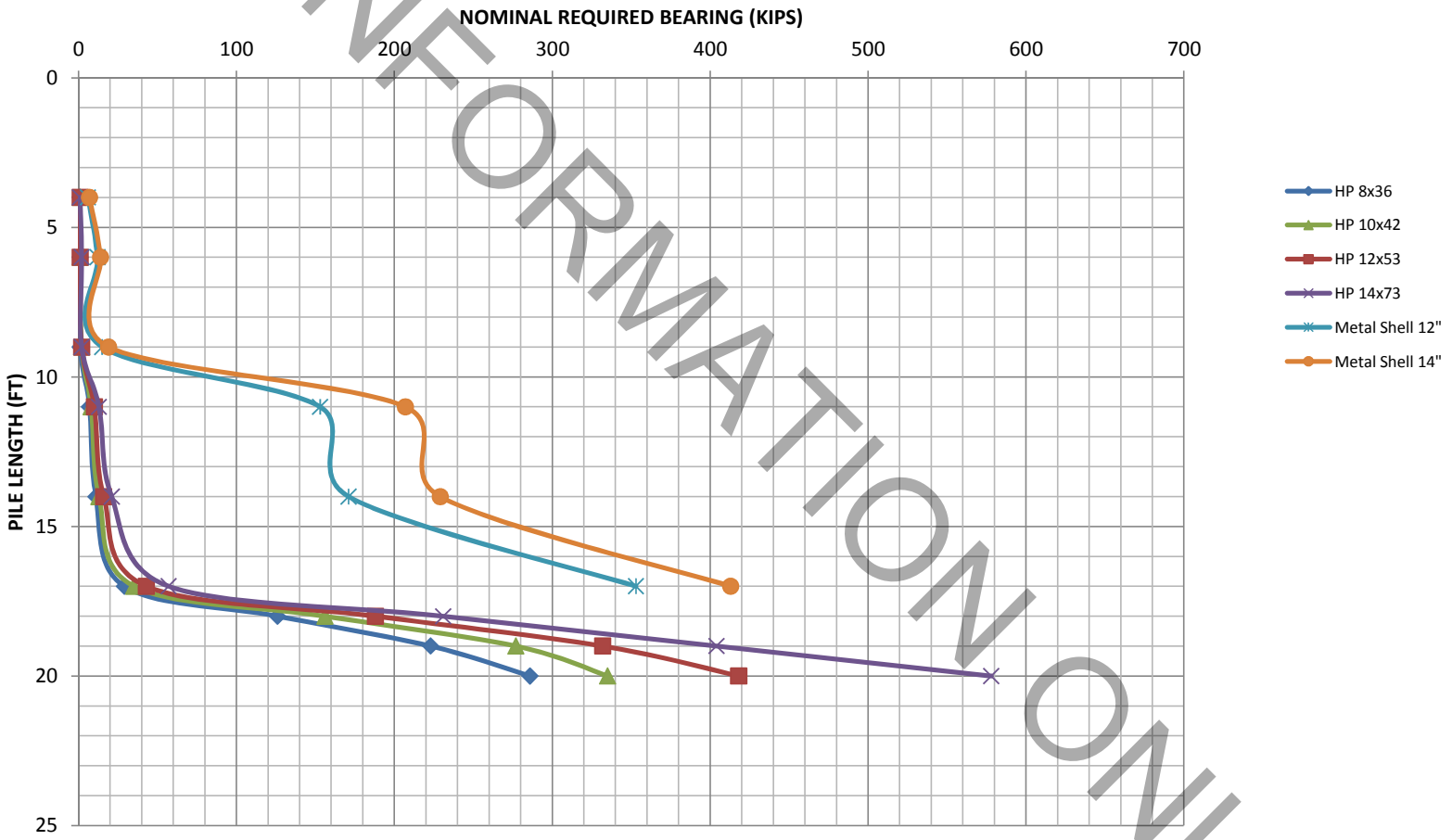
Note (1): Shell Pile data in table reflects a 0.25-inch wall thickness

Denotes pile on/in bedrock

PILE BEARING (ARA) VS. ESTIMATED PILE LENGTH
SN 016-2457 Pier 5; BORING SB-22
Elevation 598.5 Begin Friction, 600.5 for Pile Cutoff (pile length = 0.0 feet)



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
SN 016-2457 Pier 5; BORING SB-22
Elevation 598.5 Begin Friction, 600.5 for Pile Cutoff (pile length = 0.0 feet)



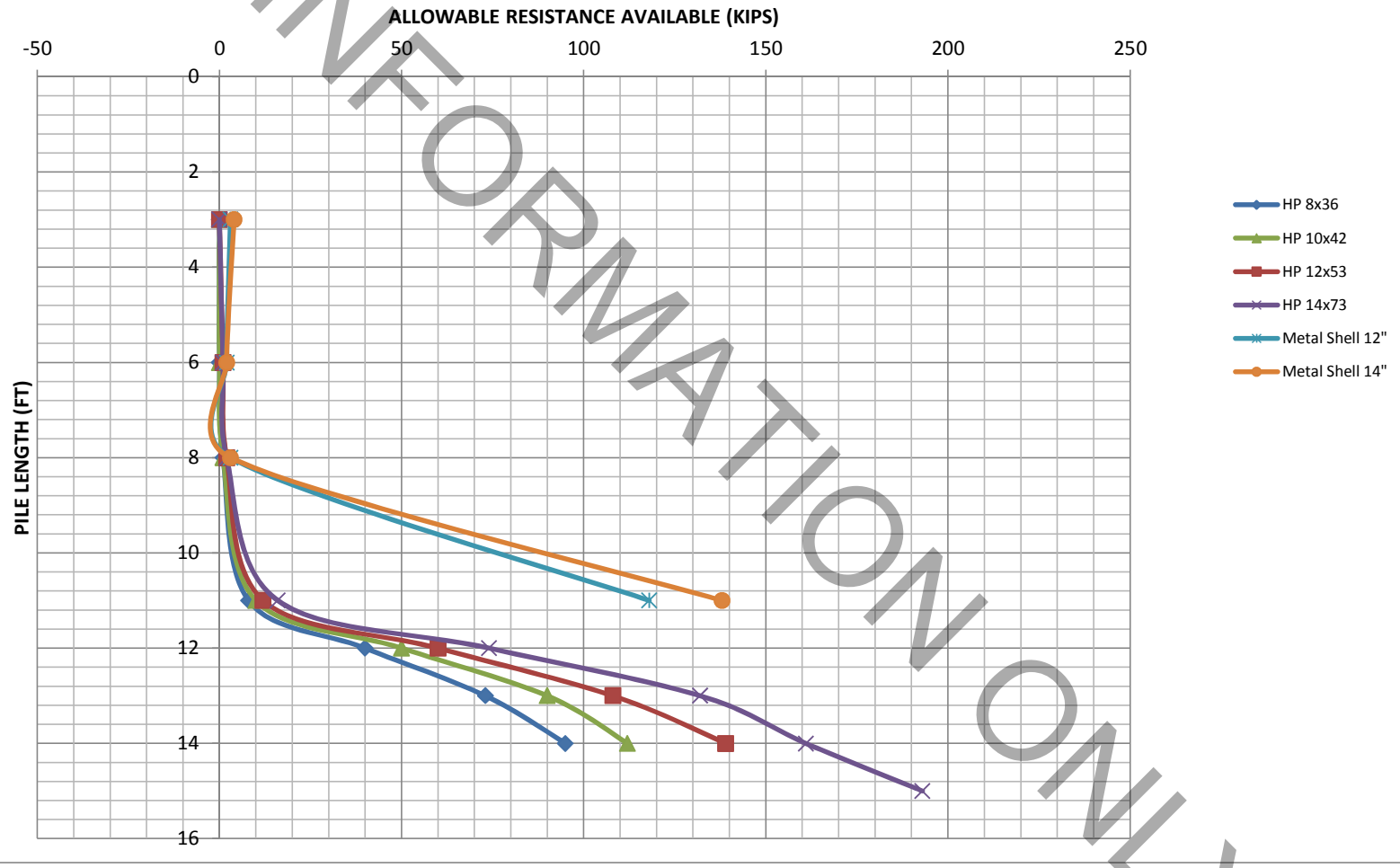
Estimated Pile Lengths and Capacities

Boring SB-23 Pier 6 (Elevation 598.7 Begin Friction, 600.7 for Pile Cutoff)												
Estimated Pile Length (ft.)	HP 8x36		HP 10x42		HP 12x53		HP 14x73		Metal Shell 12"		Metal Shell 14"	
	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)	Allowable Resistance Available, ARA (Kips)	Nominal Requred Bearing, NRB (Kips)
3	0	1	0	1	0	1	0	1	3	10	4	12
6	0	1	0	1	1	2	1	2	2	6	2	7
8	1	3	1	4	2	5	2	6	3	9	3	10
11	8	24	10	29	12	36	16	48	118	353	138	413
12	40	121	50	150	60	180	74	221				
13	73	218	90	271	108	325	132	395				
14	95	286	112	335	139	418	161	482				
15							193	578				

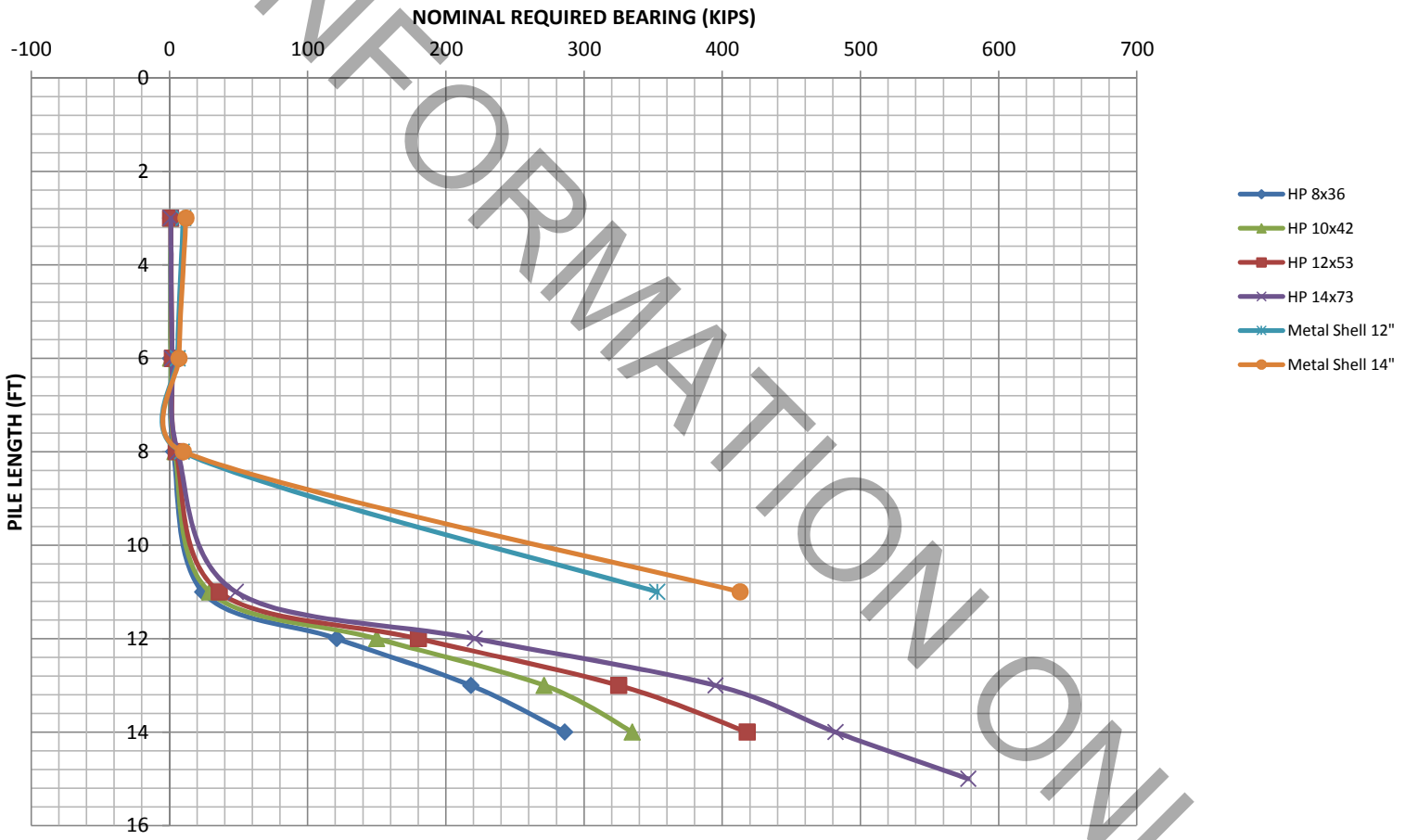
Note (1): Shell Pile data in table reflects a 0.25-inch wall thickness

Denotes pile on/in bedrock

PILE BEARING (ARA) VS. ESTIMATED PILE LENGTH
SN 016-2457 Pier 6; BORING SB-23
Elevation 598.7 Begin Friction, 600.7 for Pile Cutoff (pile length = 0.0 feet)



PILE BEARING (NRB) VS. ESTIMATED PILE LENGTH
SN 016-2457 Pier 6; BORING SB-23
Elevation 598.7 Begin Friction, 600.7 for Pile Cutoff (pile length = 0.0 feet)



APPENDIX F

LAB RESULTS

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

1235 E. DAVIS STREET
ARLINGTON HEIGHTS, IL 60005
(847) 253-3845 FAX (847) 253-0482

DETERMINATION of ORGANIC CONTENT in SOILS by LOSS on IGNITION
AASHTO T267

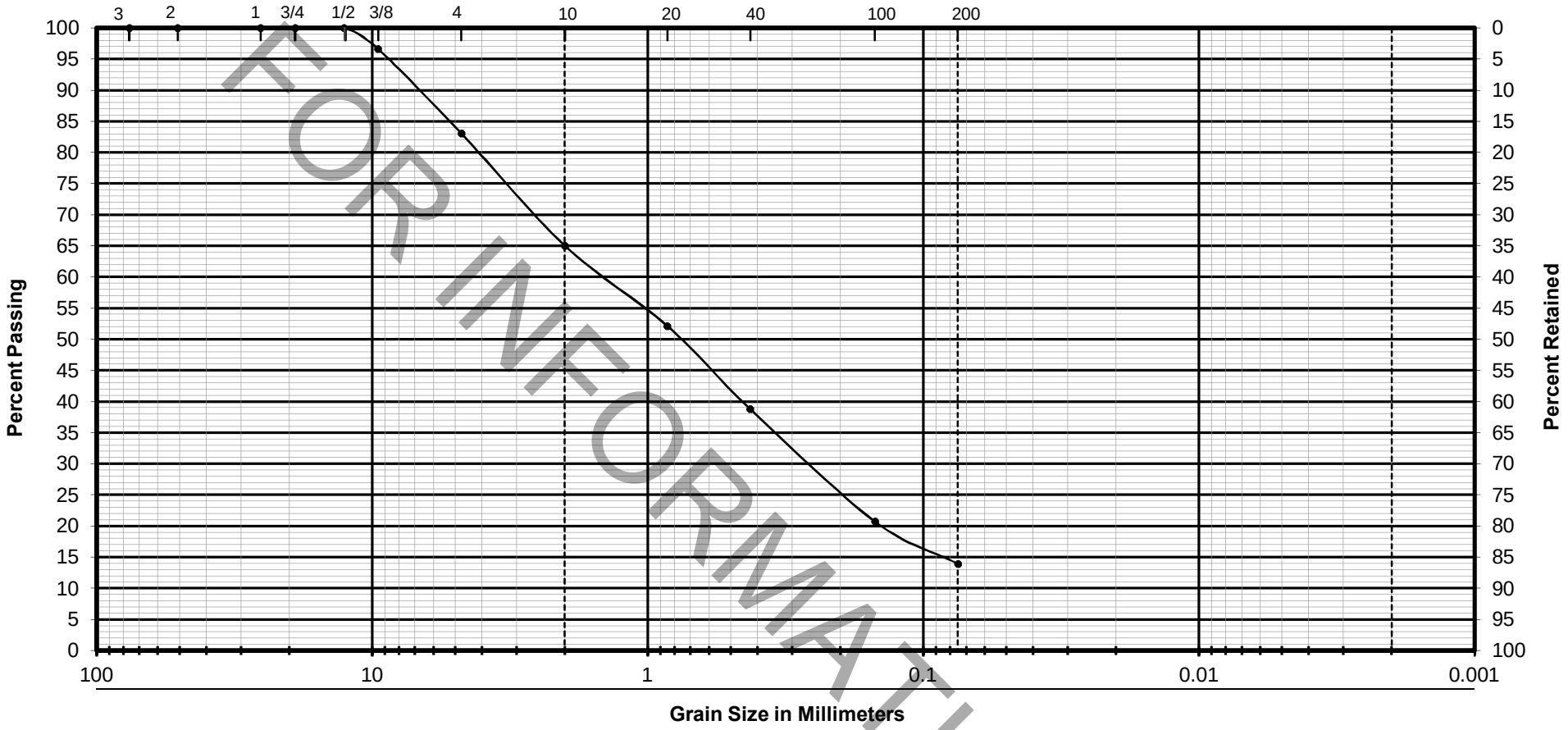
Project Name IL-171/First Ave. Bridge Rehabilitation
IDOT PTB154, Item 14
Location Cook County, Illinois

Date 1/26/13
Job No 10025

Boring No	SB-44	SB-44	SB-44	SB-45	SB-45	SB-45	SB-46	SB-46
Sample No.	3	8	13	3	6	10	4	10
Depth	3.5'-5.0'	16.0'-17.5'	28.5'-30.0'	3.5'-5.0'	11.0'-12.5'	21.0'-22.5'	6.0'-7.5'	21.0'-22.5'
% Organic Content	16.8	17.4	16.3	17.7	10.3	18.9	5.6	13.6

Boring No	SB-46
Sample No.	15
Depth	38.5'-40.0'
% Organic Content	11.0

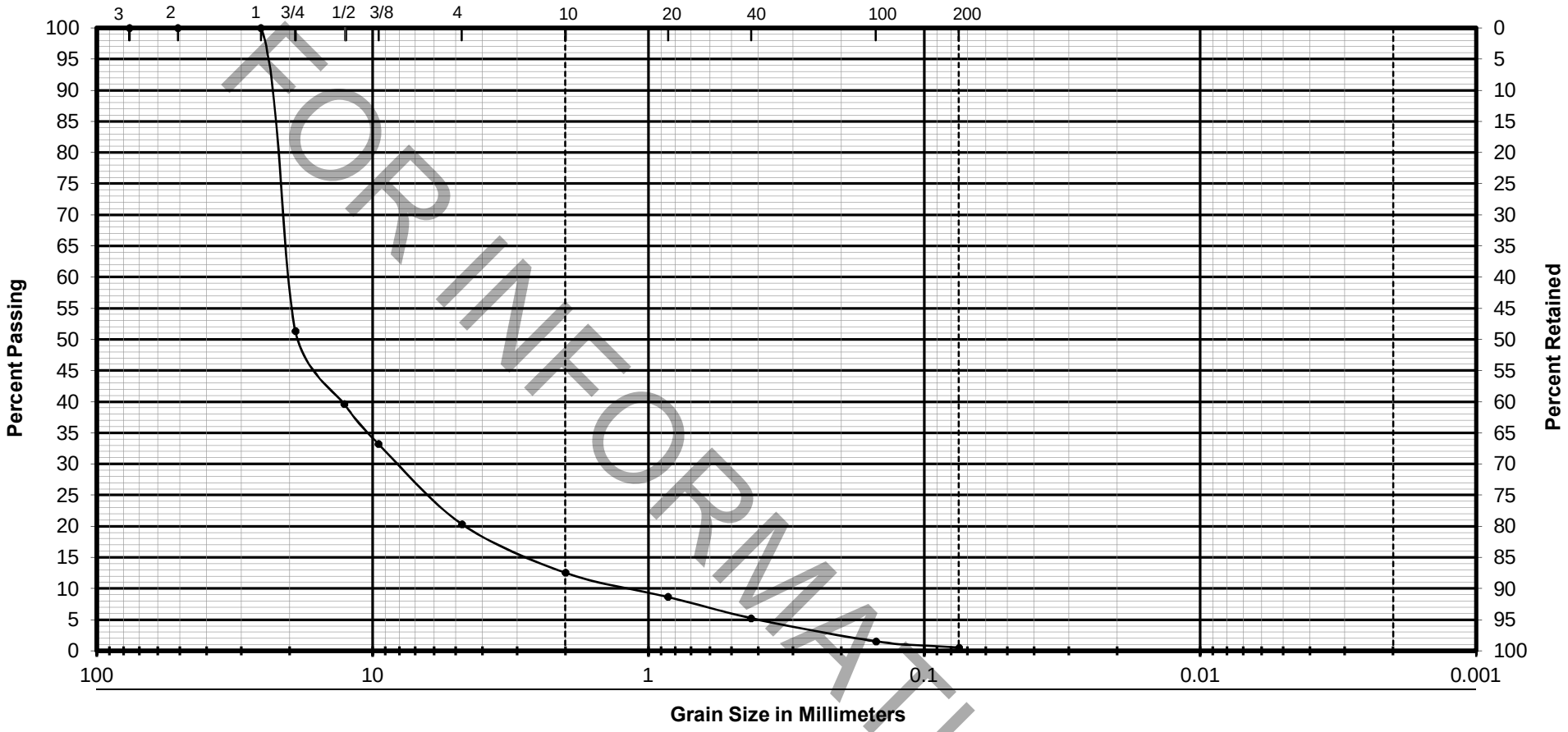
Tested By JE



GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	SB-44	CLASSIFICATION	GRAIN-SIZE ANALYSIS-AASHTO T 311
Sample No.	3		
Depth	3.5'-5.0'	SAND & GRAVEL (URBAN FILL)	IL-171/First Ave. Bridge Rehabilitation
Liquid Limit	-	A-1-b	IDOT PTB154, Item 14
Plastic Limit	-	dark brown	Cook County, Illinois
Plasticity Index	NP	Group Index 0	
Test By	JE	% Gravel 35.0	
Date	1/24/13	% Sand 51.1	
Reviewed By	AB	% Silt / Clay 13.9	
Job No	10025		

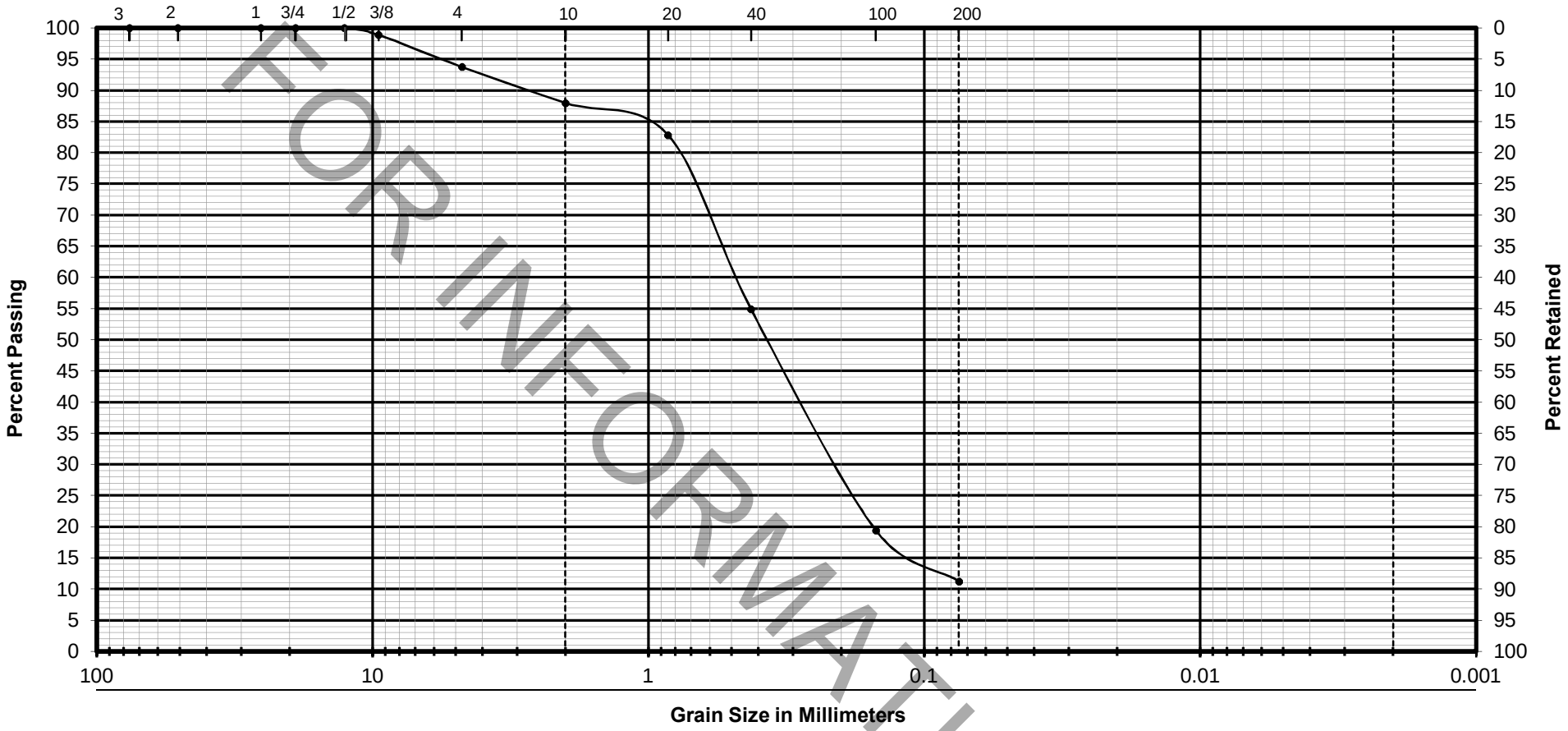
Geo Services, Inc.
Geotechnical, Environmental and Civil Engineering
An MBE - DBE Firm
1235 E. Davis St., Arlington Heights, IL 60005
Phone 847-253-3845 • Fax 847-253-0482



GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

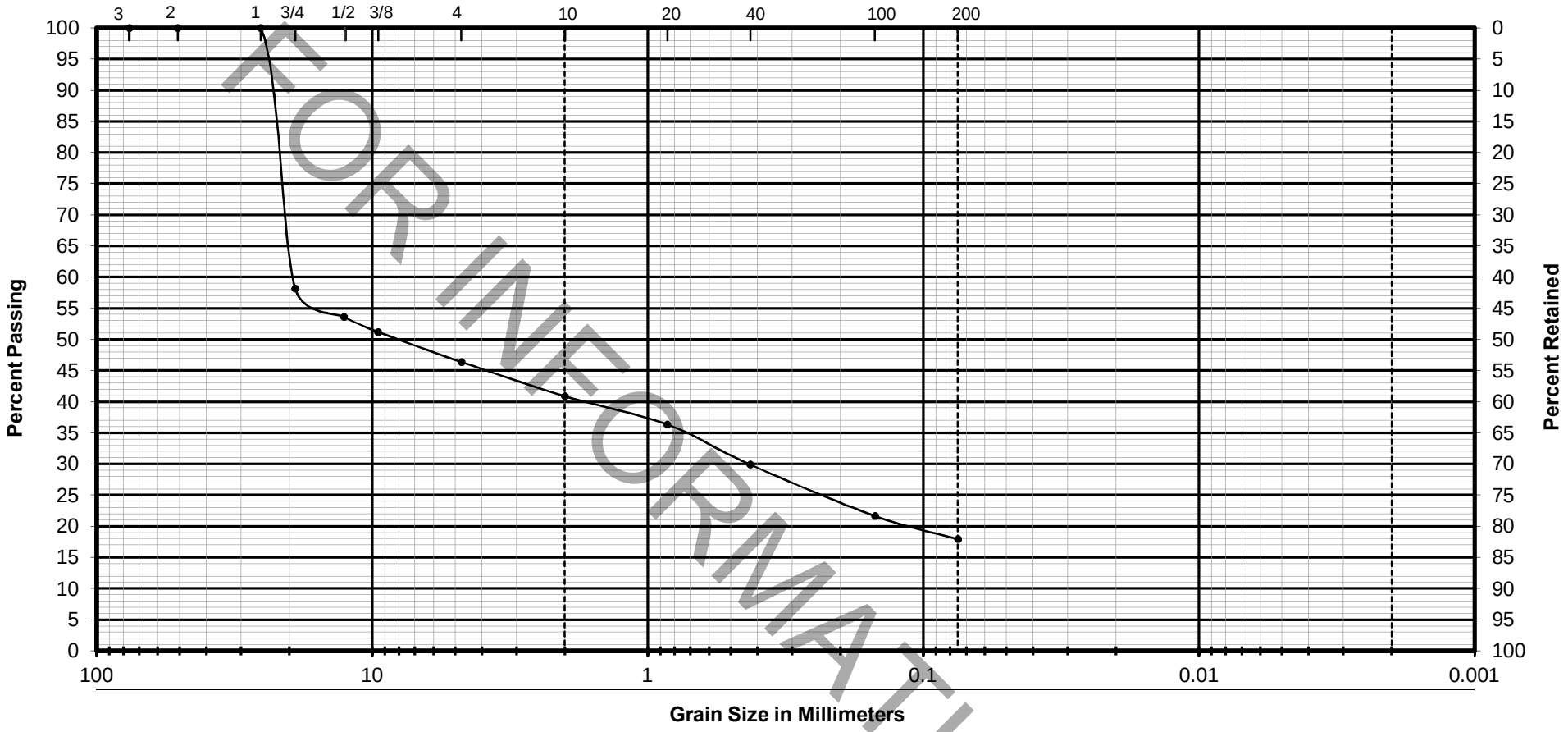
Boring No.	SB-45	CLASSIFICATION	GRAIN-SIZE ANALYSIS-AASHTO T 311
Sample No.	3		
Depth	3.5'-5.0'	SAND & GRAVEL (URBAN FILL)	IL-171/First Ave. Bridge Rehabilitation
Liquid Limit	-	A-1-a	IDOT PTB154, Item 14
Plastic Limit	-	dark brown	Cook County, Illinois
Plasticity Index	NP	Group Index 0	
Test By	JE	% Gravel 87.5	
Date	1/24/13	% Sand 12.0	
Reviewed By	AB	% Silt / Clay 0.5	
Job No	10025		

Geo Services, Inc.
Geotechnical, Environmental and Civil Engineering
An MBE - DBE Firm
1235 E. Davis St., Arlington Heights, IL 60005
Phone 847-253-3845 • Fax 847-253-0482



Boring No.	SB-46	CLASSIFICATION	GRAIN-SIZE ANALYSIS-AASHTO T 311
Sample No.	4		
Depth	6.0'-7.5'	SAND (URBAN FILL)	IL-171/First Ave. Bridge Rehabilitation
Liquid Limit	-	A-2-4	IDOT PTB154, Item 14
Plastic Limit	-	dark brown	Cook County, Illinois
Plasticity Index	NP	Group Index 0	
Test By	JE	% Gravel 12.0	
Date	1/24/13	% Sand 76.7	
Reviewed By	AB	% Silt / Clay 11.2	
Job No	10025		

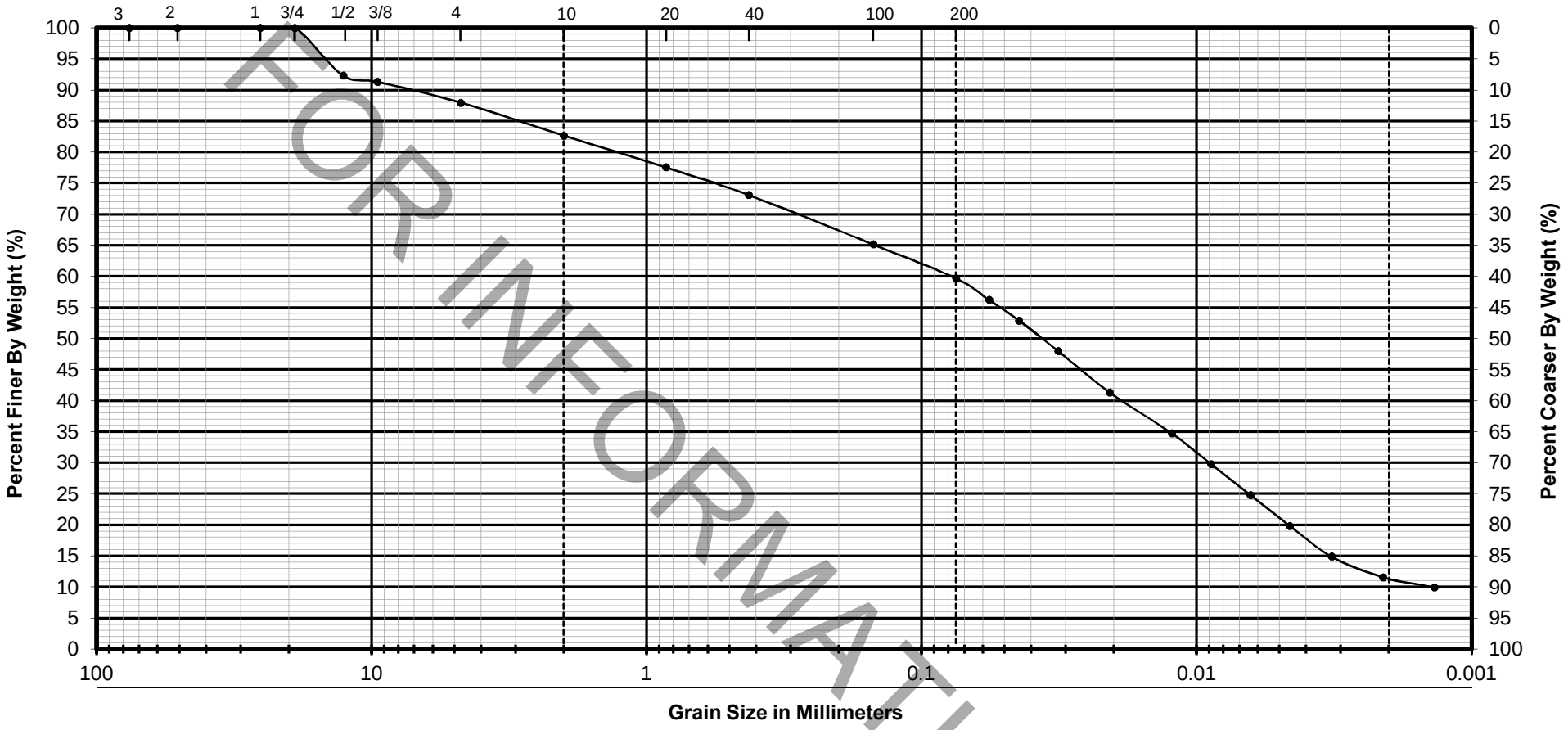
Geo Services, Inc.
Geotechnical, Environmental and Civil Engineering
An MBE - DBE Firm
1235 E. Davis St., Arlington Heights, IL 60005
Phone 847-253-3845 • Fax 847-253-0482



GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	SB-46	CLASSIFICATION	GRAIN-SIZE ANALYSIS-AASHTO T 311
Sample No.	15		
Depth	38.5'-40.0'	SAND & GRAVEL (URBAN FILL)	IL-171/First Ave. Bridge Rehabilitation
Liquid Limit	-	A-1-a	IDOT PTB154, Item 14
Plastic Limit	-	dark brown	Cook County, Illinois
Plasticity Index	NP	Group Index 0	
Test By	JE	% Gravel 59.1	
Date	1/24/13	% Sand 22.9	
Reviewed By	AB	% Silt / Clay 17.9	
Job No	10025		

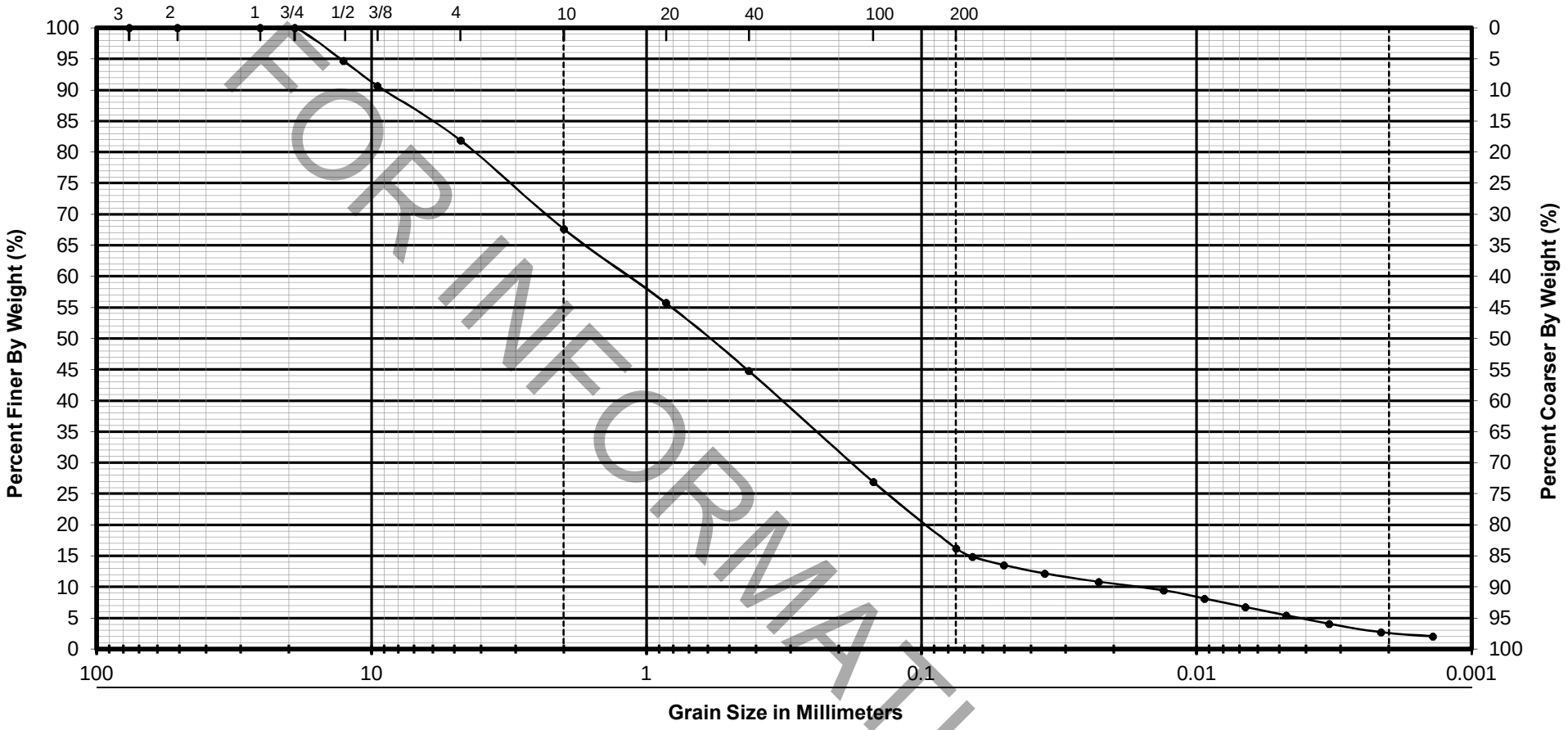
Geo Services, Inc.
Geotechnical, Environmental and Civil Engineering
An MBE - DBE Firm
1235 E. Davis St., Arlington Heights, IL 60005
Phone 847-253-3845 • Fax 847-253-0482



GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	SB-42	CLASSIFICATION		PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	5			
Depth	53.5'-55.0'	LOAM		IL-171/First Ave. Bridge Rehabilitation
Liquid Limit	20	A-4		IDOT PTB154, Item 14
Plastic Limit	16	brown		Cook County, Illinois
Plasticity Index	4	Group Index	0	
Test By	MT	% Gravel	17.3	
Date	10/16/12	% Sand	23.0	
Reviewed By	AUB	% Silt	48.1	
Job No	10025	% Clay	11.6	

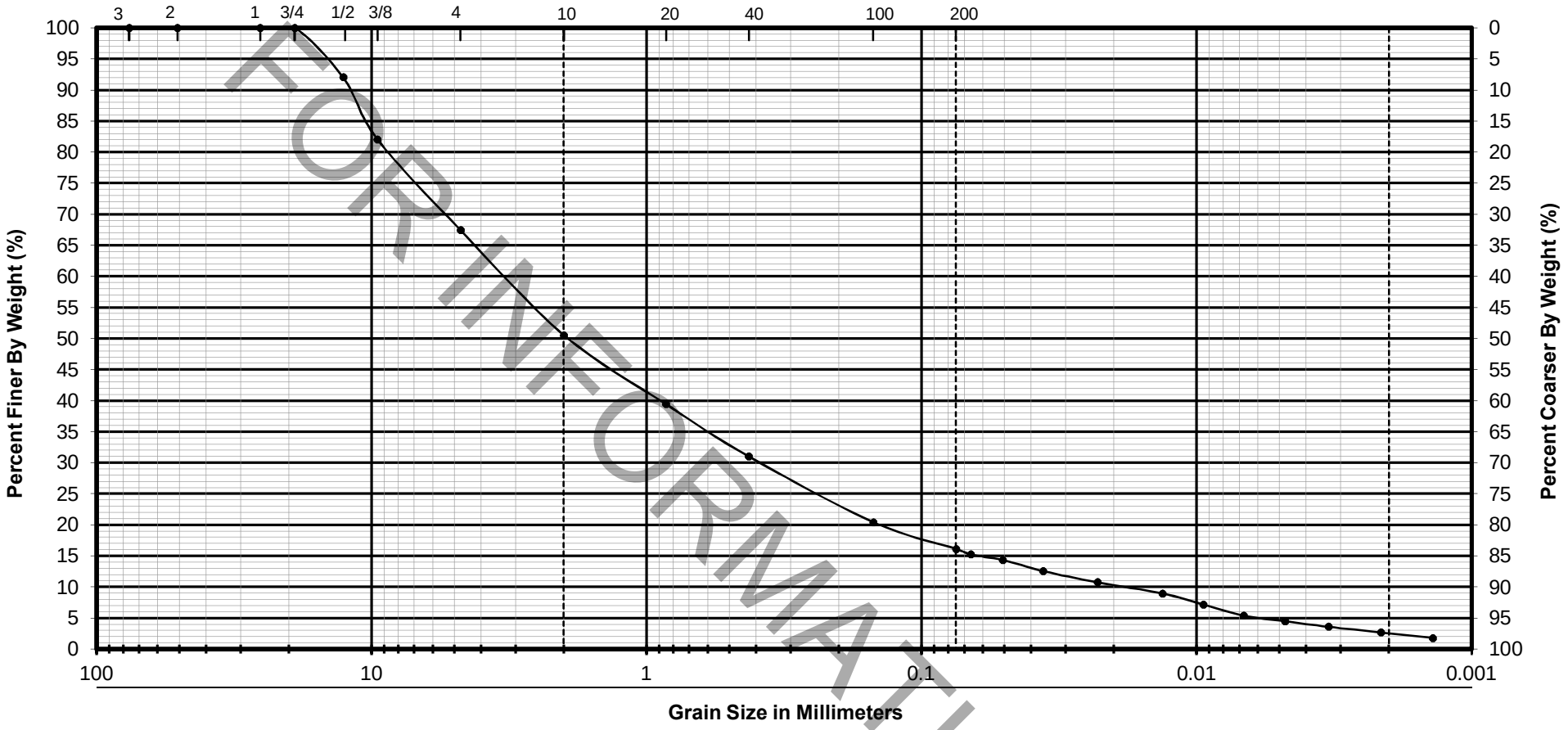
Geo Services, Inc.
Geotechnical, Environmental and Civil Engineering
An MBE - DBE Firm
1235 E. Davis St., Arlington Heights, IL 60005
Phone 847-253-3845 • Fax 847-253-0482



GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	SB-44	CLASSIFICATION		PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	8			
Depth	16.0'-17.5'	SAND & GRAVEL (URBAN FILL)		IL-171/First Ave. Bridge Rehabilitation
Liquid Limit	-	A-1-b		IDOT PTB154, Item 14
Plastic Limit	-	black		Cook County, Illinois
Plasticity Index	NP	Group Index	0	
Test By	JE/AB	% Gravel	32.4	
Date	1/24/13	% Sand	51.4	
Reviewed By	AB	% Silt	13.5	
Job No	10025	% Clay	2.7	

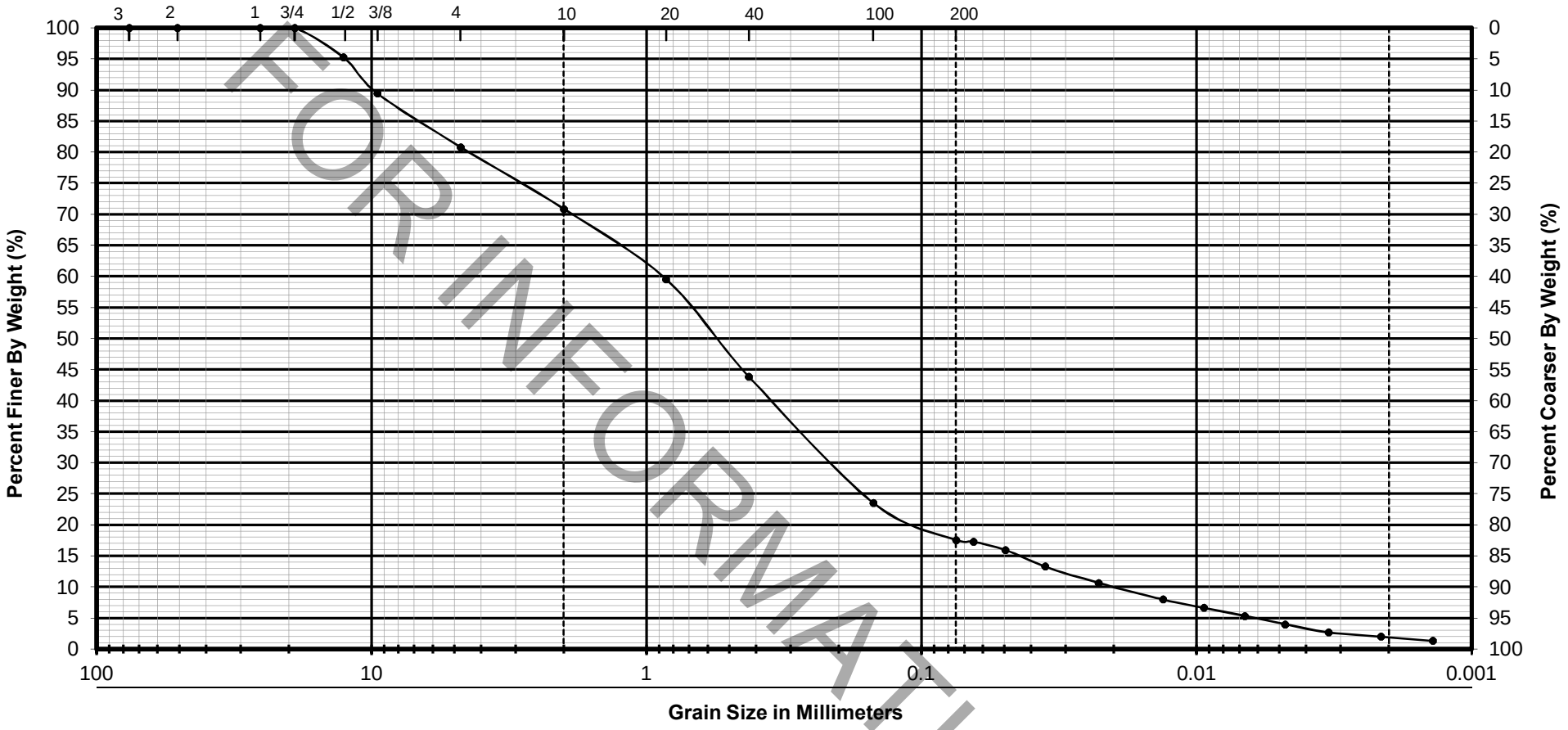
Geo Services, Inc.
Geotechnical, Environmental and Civil Engineering
An MBE - DBE Firm
1235 E. Davis St., Arlington Heights, IL 60005
Phone 847-253-3845 • Fax 847-253-0482



GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	SB-44	CLASSIFICATION		PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	13			
Depth	28.5'-30.0'	SAND & GRAVEL (URBAN FILL)		IL-171/First Ave. Bridge Rehabilitation
Liquid Limit	-	A-1-b		IDOT PTB154, Item 14
Plastic Limit	-	black		Cook County, Illinois
Plasticity Index	NP	Group Index	0	
Test By	JE/AB	% Gravel	49.5	
Date	1/24/13	% Sand	34.4	
Reviewed By	AB	% Silt	13.4	
Job No	10025	% Clay	2.7	

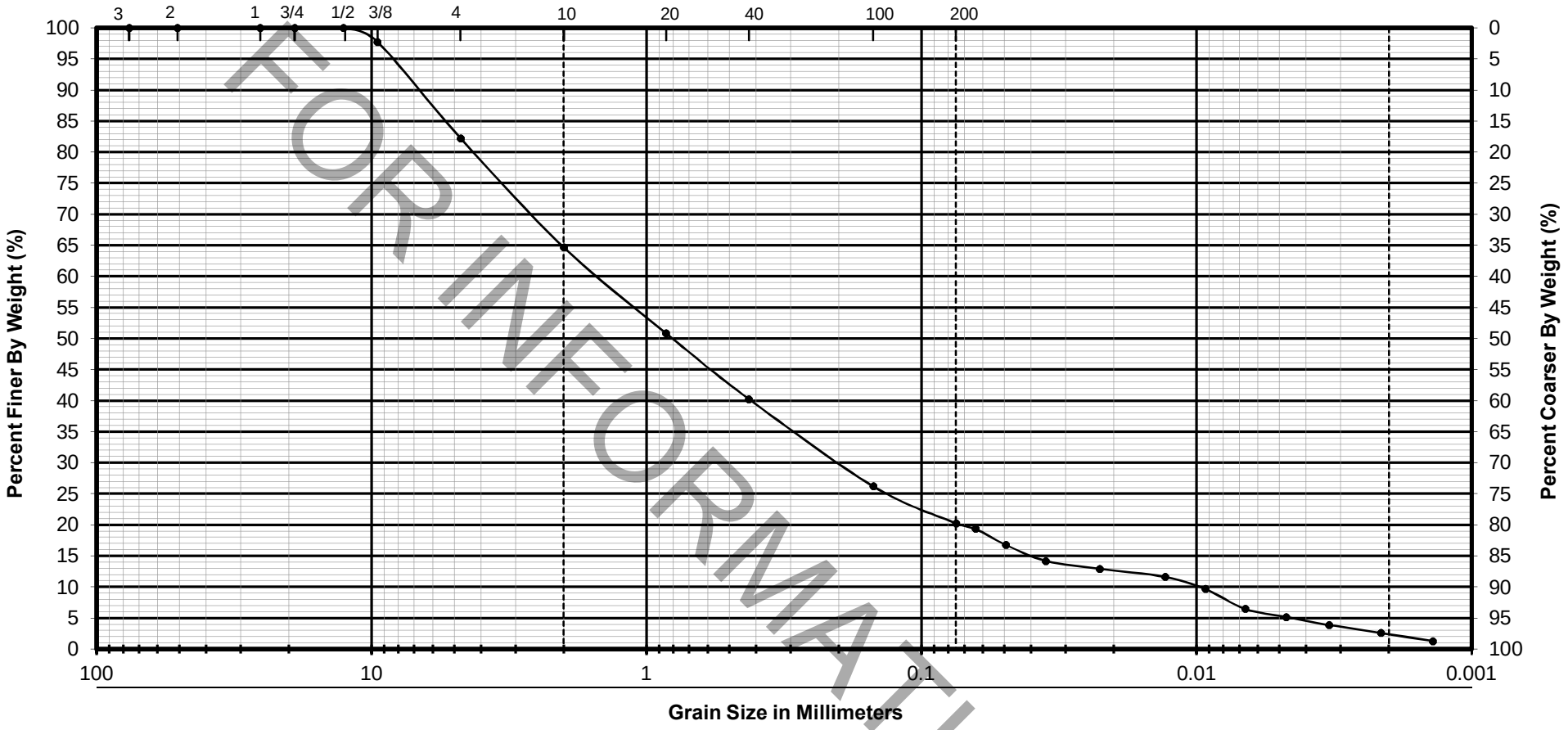
Geo Services, Inc.
Geotechnical, Environmental and Civil Engineering
An MBE - DBE Firm
1235 E. Davis St., Arlington Heights, IL 60005
Phone 847-253-3845 • Fax 847-253-0482



GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	SB-45	CLASSIFICATION		PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	6			
Depth	11.0'-12.5'	SAND & GRAVEL (URBAN FILL)		IL-171/First Ave. Bridge Rehabilitation
Liquid Limit	-	A-1-b		IDOT PTB154, Item 14
Plastic Limit	-	black		Cook County, Illinois
Plasticity Index	NP	Group Index	0	
Test By	JE/AB	% Gravel	29.1	
Date	1/24/13	% Sand	53.3	
Reviewed By	AB	% Silt	15.6	
Job No	10025	% Clay	2.0	

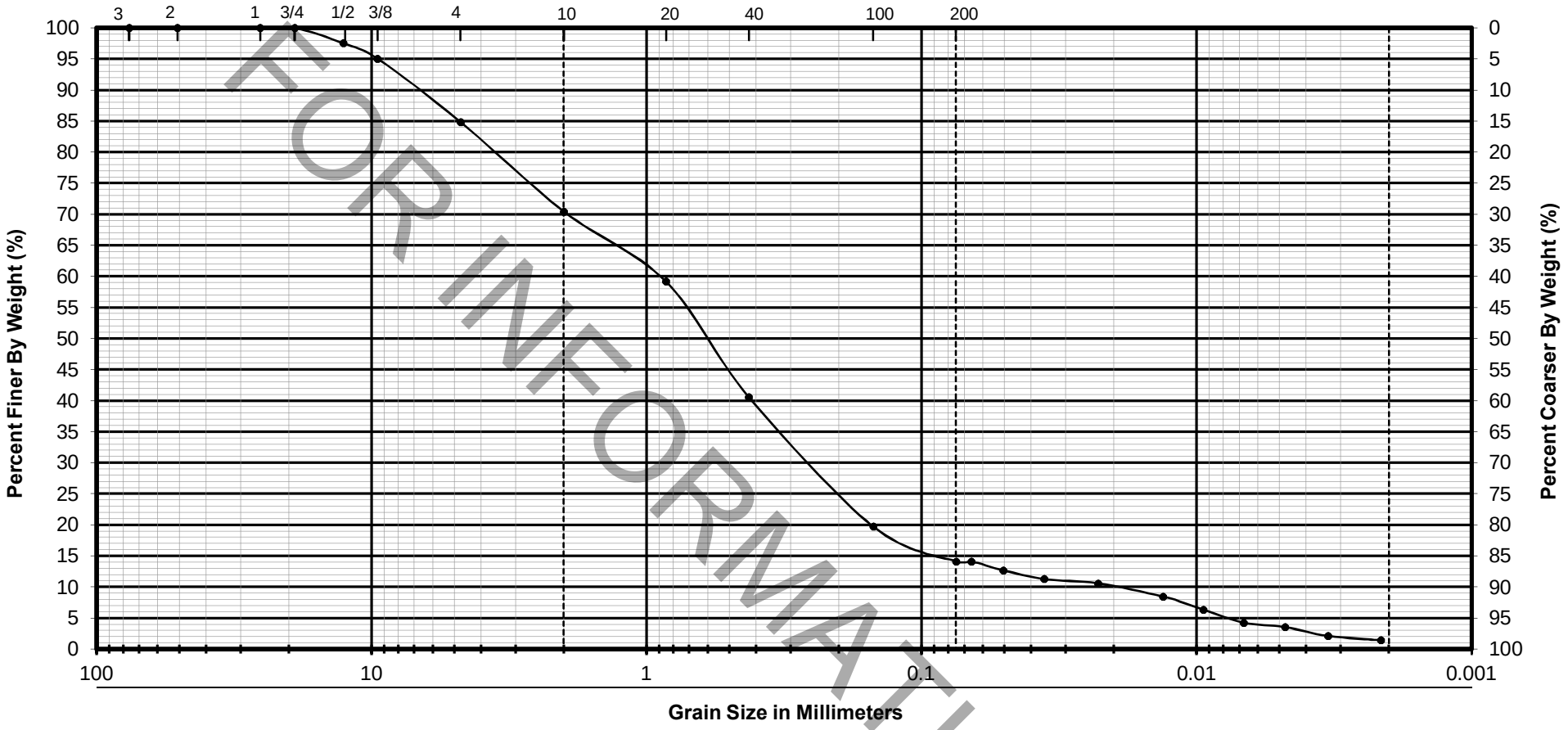
Geo Services, Inc.
Geotechnical, Environmental and Civil Engineering
An MBE - DBE Firm
1235 E. Davis St., Arlington Heights, IL 60005
Phone 847-253-3845 • Fax 847-253-0482



GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	SB-45	CLASSIFICATION		PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	10			
Depth	21.0'-22.5'	SAND & GRAVEL (URBAN FILL)		IL-171/First Ave. Bridge Rehabilitation
Liquid Limit	-	A-1-b		IDOT PTB154, Item 14
Plastic Limit	-	black		Cook County, Illinois
Plasticity Index	NP	Group Index	0	
Test By	JE/AB	% Gravel	35.4	
Date	1/24/13	% Sand	44.4	
Reviewed By	AB	% Silt	17.7	
Job No	10025	% Clay	2.6	

Geo Services, Inc.
Geotechnical, Environmental and Civil Engineering
An MBE - DBE Firm
1235 E. Davis St., Arlington Heights, IL 60005
Phone 847-253-3845 • Fax 847-253-0482



GRAVEL	SAND		SILT	CLAY
	COARSE	FINE		

Boring No.	SB-46	CLASSIFICATION		PARTICLE SIZE ANALYSIS-AASHTO T88
Sample No.	10			
Depth	21.0'-22.5'	SAND & GRAVEL (URBAN FILL)		IL-171/First Ave. Bridge Rehabilitation
Liquid Limit	-	A-1-b		IDOT PTB154, Item 14
Plastic Limit	-	black		Cook County, Illinois
Plasticity Index	NP	Group Index	0	
Test By	JE/AB	% Gravel	29.6	
Date	1/24/13	% Sand	56.3	
Reviewed By	AB	% Silt	12.7	
Job No	10025	% Clay	1.4	

Geo Services, Inc.
Geotechnical, Environmental and Civil Engineering
An MBE - DBE Firm
1235 E. Davis St., Arlington Heights, IL 60005
Phone 847-253-3845 • Fax 847-253-0482