Technical Memorandum

Zoo Interchange Reconstruction Project

DATE: November 6, 2013

FROM: Kevin Brusso, P.E. / Forward 45, LLC

SUBJECT: Summary of Data for Zoo Interchange Mainline Pavement Design (I-94/USH 45/I-894)

1.0 Introduction

The purpose of this memorandum is to summarize the results from the recent subsurface exploration program for design of the Zoo Interchange mainline pavement (I-94/USH 45/I-894). This memorandum was prepared by Forward 45 LLC (F45). The exploration scope and engineering recommendations are presented as part of the Zoo Interchange Reconstruction project. Recommendations detailing proposed subgrade soil parameters and Excavation Below Subgrade (EBS) for mainline pavement design were provided previously in separate reports.

2.0 Subsurface Exploration and Laboratory Testing Program Overview

Development of pavement subgrade recommendations involved a review of 147 soil borings drilled along the north (40 borings), south (34 borings), east (34 borings), and west (39 borings) legs of the Zoo Interchange reconstruction limits, as summarized in Tables 1 through 4 below. A total of 126 of these borings were drilled for the mainline pavement design, while the remaining 21 soil borings were originally drilled for design of other structures and used for this investigation. The borings generally alternated between northbound/southbound or eastbound/westbound lanes and were drilled to depths approximately 10 feet below the proposed pavement subgrade elevation (based on proposed pavement grades as of January, 2012). Total boring depths ranged from 10 feet to in excess of 30 feet, with shallower borings drilled in proposed fill areas and deeper borings performed where cuts are anticipated or where borings were originally drilled for design of other structures.

The borings were performed by Gestra Engineering, Inc. (Gestra) between the dates of February 2, 2011 and August 1, 2013. These borings were advanced using ATV and truck-

mounted drill rigs using both hollow-stem augers and a combination of hollow-stem augers and rotary-wash drilling techniques. General drilling and sampling information is included on the attached borings logs. General notes and a copy of the Unified Soil Classification System (USCS) are also attached.

Soil samples were obtained using a split-barrel sampler driven during Standard Penetration Tests (SPT) in accordance with ASTM D-1586 using automatic hammers. Occasional thin-walled (Shelby tube) “ST” samples were obtained in accordance with ASTM D-1587. Retained soil samples were visually classified in the laboratory by a Gestra engineer to estimate the distribution of grain sizes, plasticity, consistency, relative moisture condition, color, and presence of lenses and seams. The soils were classified in general conformance with ASTM D-2487. Laboratory testing of select soil samples was also performed by Gestra, the results of which are summarized on the attached boring logs and on the laboratory results sheets.

3.0 Site Exploration Results

The soils encountered at the proposed pavement subgrade elevations were overwhelmingly cohesive, consisting mostly of lean clay fill and/or natural lean clay. The clay soils were typically stiff to hard, with unconfined compressive strengths (based on hand-held calibrated penetrometer readings) typically ranging from 1.0 to in excess of 4.5 tons per square foot (tsf). Occasional layers of loose to dense sand, silt, and silty sand were also encountered in some of the borings.

A summary of the borings reviewed for pavement subgrade evaluation, including ground surface elevation, approximate horizontal as-drilled location, and proposed cut/fill depth to achieve top of proposed mainline pavement elevation are summarized below in Tables 1 through 4.

Table 1: Summary of North Leg Mainline Pavement Borings

Boring	Elevation	Northing	Easting	Proposed Cut/Fill	Approximate Location
NH-1	723.6	305473	569895	NA	NB / ~2000’ south of North Avenue
NH-2	723.5	305233	570052	NA	SB / ~2250’ south of North Avenue
NH-3	732.2	305155	570330	Fill 0.1’	NB / ~2325’ south of North Avenue
NH-4	731.7	304902	570420	NA	SB / ~2750’ north of Watertown Plank Rd.
NH-5	740.4	304749	570669	Fill 0.3’	NB / 2600’ north of Watertown Plank Rd.
NH-6	740.3	304480	570691	Fill 0.1’	SB / ~2325’ north of Watertown Plank Rd.
NH-7	744.5	304306	570918	Cut 0.1’	NB / ~2150’ north of Watertown Plank Rd.
NH-8	747.1	304002	570937	Fill 0.5’	SB / ~1850’ north of Watertown Plank Rd.
NH-9	746.7	303849	571144	Fill 0.9’	NB / ~1700’ north of Watertown Plank Rd.
NH-10	745.5	303574	571147	Fill 0.9’	SB / ~1425’ north of Watertown Plank Rd.
NH-11	744.1	303393	571388	Fill 0.7’	NB / ~1225’ north of Watertown Plank Rd.
NH-12	743.2	303107	571393	Fill 0.1’	SB / ~950’ north of Watertown Plank Rd.
NH-13	743.3	302948	571638	Fill 4.1’	NB / ~775’ north of Watertown Plank Rd.
NH-14	750.1	302661	571619	Fill 7.1’	SB / ~500’ north of Watertown Plank Rd.
NH-15	753.8	302512	571885	Fill 8.5’	NB / ~375’ north of Watertown Plank Rd.
NB-6	764.6	302240	571900	Fill ~1.0’	SB / ~100’ north of Watertown Plank Rd.
NH-16	765.9	301805	572191	Fill 2.8’	SB / ~275’ south of Watertown Plank Rd.
NH-17	759.2	301676	572452	Fill 11.9’	NB / ~350’ south of Watertown Plank Rd.
NH-18	756.3	301396	572490	Fill 3.4’	SB / ~600’ south of Watertown Plank Rd.
NH-19	756.1	301223	572725	Fill 2.4’	NB / ~750’ south of Watertown Plank Rd.
NH-20	754.5	300962	572734	Fill 1.2’	SB / ~1450’ north of Wisconsin Avenue
NH-21	757.5	300763	572935	Fill 0.4’	NB / ~1250’ north of Wisconsin Avenue
NR-3	766.5	300487	572815	Cut ~10.0’	SB / ~975’ north of Wisconsin Avenue
NH-22	755.8	300238	573039	Cut 0.6’	NB / ~725’ north of Wisconsin Avenue
NH-23	754.2	299985	572964	Cut 3.9’	SB / ~475’ north of Wisconsin Avenue
NH-24	752.3	299724	573063	Cut 2.1’	NB / ~225’ north of Wisconsin Avenue
NB-35	766.5	299549	572959	Cut ~10.0’	SB / along N. end of Wisc. Avenue bridge
NH-25	766.6	299215	572899	Cut 8.4’	SB / ~300’ south of Wisconsin Avenue
NB-38	757.9	298428	572897	Fill ~5.0’	NB / along N. end of Bluemnd. Rd. bridge
NH-26	764.4	297925	572860	Fill 0.2’	NB / ~450’ south of Bluemound Road
NH-27	773.8	297682	572742	Cut 5.9’	SB / ~675’ south of Bluemound Road
NH-28	778.2	297437	572897	Cut 7.2’	NB / ~950’ south of Bluemound Road
NH-29	784.4	297204	572755	Cut 11.8’	SB / ~1150’ south of Bluemound Road
NH-30	783.2	296950	572754	Cut 9.3’	NB / ~1400’ south of Bluemound Road
NH-31	763.2	296719	572612	Fill 8.6’	SB / ~1625’ south of Bluemound Road
NH-32	777.6	296446	572649	Cut 7.0’	NB / ~1900’ south of Bluemound Road
NH-33	777.1	296208	572532	Cut 7.8’	SB / ~750’ north of proposed Zoo Core
NH-34	769.0	295970	572519	Fill 2.6’	NB / ~500’ north of proposed Zoo Core
NH-35	767.7	295681	572381	Fill 8.7’	SB / ~225’ north of proposed Zoo Core
NH-38	768.6	299765	572960	Cut ~18.0’	SB / ~250’ north of Wisconsin Avenue

Table 2: Summary of South Leg Mainline Pavement Borings

Boring	Elevation	Northing	Easting	Proposed Cut/Fill	Approximate Location
SH-1	764.2	286547	571582	Fill 0.2’	NB / ~75’ north of Lincoln Avenue
SH-2	761.9	286819	571505	Fill 0.5’	SB / ~350’ north of Lincoln Avenue
SH-3	761.4	287052	571654	Cut 0.2’	NB / ~575’ north of Lincoln Avenue
SH-4	758.7	287310	571583	Fill 0.2’	SB / ~825’ north of Lincoln Avenue
SH-5	759.2	287545	571752	Cut 0.4’	NB / ~1075’ north of Lincoln Avenue
SH-6	757.9	287813	571661	Fill 2.9’	SB / ~1375’ south of UPRR RR track pair
SH-7	760.9	288052	571831	Fill 4.4’	NB / ~1125’ south of UPRR RR track pair
SH-8	764.4	288279	571739	Fill 7.2’	SB / ~900’ south of UPRR RR track pair
SH-9	771.7	288511	571905	Fill 6.6’	NB / ~675’ south of UPRR RR track pair
SH-10	779.3	288778	571823	Fill 6.4’	SB / ~400’ south of UPRR RR track pair
SR-71	778.6	288993	571998	Fill ~6.0’	NB / ~200’ south of UPRR RR track pair
SH-11	784.5	289521	572033	Fill 5.7’	NB / ~350’ north of UPRR track pair
SH-12	777.2	289788	571929	Fill 8.8’	SB / ~600’ north of UPRR track pair
SH-13	774.2	290031	572060	Fill 7.2’	NB / ~1500’ south of Greenfield Avenue
SH-14	772.4	290291	571939	Fill 4.2’	SB / ~1250’ south of Greenfield Avenue
SH-15	774.0	290546	572095	Fill 5.1’	NB / ~975’ south of Greenfield Avenue
SR-1	776.0	290770	571921	Cut ~1.0’	SB / ~750’ south of Greenfield Avenue
SH-16	776.5	291053	572105	Cut 0.6’	NB / ~475’ south of Greenfield Avenue
SR-4	779.0	291363	571936	~at grade	SB / ~150’ south of Greenfield Avenue
SH-17	781.7	291646	572061	Cut 1.7’	NB / ~125’ north of Greenfield Avenue
SR-6	782.7	291769	571929	Cut ~1.0’	SB / ~250’ north of Greenfield Avenue
SH-18	784.7	292153	572058	Cut 0.3’	NB / ~625’ north of Greenfield Avenue
SH-19	786.5	292405	571932	Fill 0.6’	SB / ~875’ north of Greenfield Avenue
SH-20	786.4	292658	572074	Fill 2.4’	NB / ~1125’ north of Greenfield Avenue
SH-21	789.4	292913	571930	Fill 1.4’	SB / ~1400’ north of Greenfield Avenue
SH-22	790.3	293167	572069	Fill 3.5’	NB / ~1025’ south of Schlinger Avenue
SH-23	792.3	293423	571928	Fill 4.9’	SB / ~750’ south of Schlinger Avenue
SH-24	793.5	293709	572067	Fill 4.3’	NB / ~475’ south of Schlinger Avenue
SH-25	795.6	293971	572000	Fill 3.7’	SB / ~225’ south of Schlinger Avenue
SH-26	798.8	294322	572101	Cut 1.8’	NB / ~125’ north of Schlinger Avenue
SB-21	793.2	294645	572044	Cut ~2.0’	SB / ~450’ north of Schlinger Avenue
CB-23	803.2	294919	572175	Cut ~15.0’	SB / ~725’ north of Schlinger Avenue
SH-28	767.0	295317	572363	Fill 17.3’	NB / ~1125’ north of Schlinger Avenue
SH-29	778.2	286648	571340	NA	Ramp LD / ~175’ north of Lincoln Avenue

Table 3: Summary of East Leg Mainline Pavement Borings

Boring	Elevation	Northing	Easting	Proposed Cut/Fill	Approximate Location
EH-1	715.1	296145	581089	Fill 2.2’	EB / ~1250’ east of 76th Street
EB-2	709.1	296086	580731	Fill ~6.0’	WB / ~900’ east of 76th Street
EH-2	713.7	295943	580515	Cut 0.2’	EB / ~675’ east of 76th Street
EH-3	711.1	295965	580241	Cut 2.8’	WB / ~400’ east of 76th Street
EH-4	713.8	295777	580037	Cut 4.1’	EB / ~200’ east of 76th Street
EH-5	708.1	295799	579751	Cut 1.4’	WB / ~75’ west of 76th Street
EH-6	713.6	295627	579541	Cut 1.3’	EB / ~300’ west of 76th Street
EH-7	710.5	295676	579258	Cut 2.4’	WB / ~575’ west of 76th Street
EH-8	715.0	295522	579030	Cut 2.9’	EB / ~800’ west of 76th Street
EH-9	709.1	295597	578752	Cut 4.3’	WB / ~1075’ west of 76th Street
EH-10	712.5	295458	578510	Cut 2.2’	EB / ~1325’ west of 76th Street
EH-11	707.1	295572	578270	Cut 0.3’	WB / ~1125’ east of 84th Street
EH-12	707.2	295423	578039	Fill 7.0’	EB / ~900’ east of 84th Street
EH-13	712.3	295529	577792	Fill 10.0’	WB / ~650’ east of 84th Street
EH-14	714.8	295448	577526	Fill 10.6’	EB / ~375’ east of 84th Street
EB-14	719.2	295564	577048	Fill ~5.0’	EB / ~100’ west of 84th Street
EH-15	702.8	295711	576817	Fill 19.0’	WB / ~325’ west of 84th Street
EH-16	707.6	295658	576542	Fill 9.9’	EB / ~600’ west of 84th Street
EH-17	712.2	295778	576302	Fill 7.2’	WB / ~850’ west of 84th Street
EH-18	711.9	295728	576047	Fill 4.1’	EB / ~1100’ west of 84th Street
EH-19	719.6	295793	575781	Fill 1.7’	WB / ~1325’ east of 92nd Street
EH-20	727.6	295716	575539	Cut 0.3’	EB / ~1075’ east of 92nd Street
EH-21	737.3	295772	575281	Cut 2.0’	WB / ~825’ east of 92nd Street
EH-22	742.3	295711	575027	Cut 5.3’	EB / ~575’ east of 92nd Street
EH-23	749.4	295782	574767	Cut 7.5’	WB / ~300’ east of 92nd Street
EB-5	748.5	295712	574412	Fill ~3.0’	EB / ~50’ west of 92nd Street
EH-24	755.9	295780	574151	Fill 1.6’	WB / ~300’ west of 92nd Street
EH-25	769.1	295721	573889	Cut 5.4’	WB / ~575’ west of 92nd Street
EH-26	778.7	295753	573634	Cut 13.9’	WB / ~825’ west of 92nd Street
EH-27	779.7	295655	573386	Cut 23.2’	EB / ~1075’ west of 92nd Street
EH-28	792.0	295693	573092	Cut 34.7’	WB / ~1375’ west of 92nd Street
EH-29	790.5	295527	572917	Cut 32.7’	EB / ~1550’ west of 92nd Street
EH-30	773.0	295568	572607	Cut 15.6’	WB / ~1850’ west of 92nd Street
EH-31	772.3	295453	572439	Cut 11.8’	EB / ~100’ east of proposed Zoo Core

Table 4: Summary of West Leg Mainline Pavement Borings

Boring	Elevation	Northing	Easting	Proposed Cut/Fill	Travel Lane / Approximate Location
WH-1	757.4	296615	565615	Fill 8.6’	EB / ~100’ east of S. Curtis Road
WH-2	753.3	296775	565382	Fill 15.5’	WB / ~350’ east of S. Curtis Road
WH-3	751.9	296736	565653	Fill 18.6’	EB / ~625’ east of S. Curtis Road
WH-4	758.1	296902	565877	Fill 17.0’	WB / ~900’ east of S. Curtis Road
WH-5	764.3	296841	566169	Fill 11.2’	EB / ~525’ west of HAST
WH-6	769.8	296990	566726	Fill 3.0’	WB / ~325’ east of HAST
WB-52	739.0	296758	567000	Fill ~18.0’	EB / ~150’ east of HAST
WH-8	756.6	296888	567238	Fill 9.1’	WB / ~650’ east of HAST
WH-9	744.8	296706	567512	Fill 13.9’	EB / ~575’ east of HAST
WH-10	753.8	296782	567741	Fill 2.2’	WB / ~1400’ west of STH 100
WH-11	750.5	296641	567964	Fill 3.1’	EB / ~1175’ west of STH 100
WB-20	749.3	296543	568233	Fill ~2.0’	EB / ~900’ west of STH 100
WH-12	749.1	296488	568485	Fill 1.2’	WB / ~650’ west of STH 100
WH-13	746.8	296330	568676	Fill 0.3’	EB / ~475’ west of STH 100
WB-10	769.3	296046	569106	Cut ~25.0’	EB / along STH 100 bridge, west side
WB-16	757.5	295954	569256	Cut ~12.0’	EB / along STH 100 bridge, east side
WB-8	745.8	296199	569071	~ at grade	WB / along STH 100 bridge, west side
WB-14	748.0	296112	569249	~ at grade	WB / STH 100 bridge, east side
WH-14	745.3	296272	568929	Fill 1.3’	WB / ~200’ west of STH 100
WH-15	746.2	295935	569374	Fill 2.5’	EB / ~200’ east of STH 100
WB-4	749.7	295784	569659	Cut ~5.0’	EB / ~150’ east of existing RR bridge
WH-16	757.8	295730	569916	Cut 2.0’	WB / ~400’ east of existing RR bridge
WH-17	742.9	295544	570105	Fill 15.1’	EB / ~550’ east of existing RR bridge
WH-18	764.9	295511	570365	Fill 0.9’	WB / ~800’ east of existing RR bridge
WH-19	768.8	295364	570662	Cut 0.2’	EB / ~75’ east of S. Zoo Access Tunnel
WH-20	774.8	295354	571030	Cut 1.9’	WB / ~450’ east of S. end Zoo Access Tnl
WH-21	762.8	295269	571247	Fill 5.0’	EB / ~700’ east of S. end Zoo Access Tul
WH-22	774.2	295394	571555	Cut 5.6’	WB / ~950’ east of center Zoo Access Tnl
WH-23	790.3	295336	571679	Cut 21.4’	EB / ~650’ west of proposed Zoo Core
WH-24	771.4	295435	571916	Cut 5.9’	WB / ~400’ west of proposed Zoo Core
WH-26	743.4	296147	562788	Cut 0.1’	WB / ~1200’ west of Underwood Pkwy S.
WH-27	740.9	296119	563161	Fill 2.0’	EB / ~850’ west of Underwood Pkwy S.
WH-28	743.7	296293	563381	Fill 3.7’	WB / ~575’ west of Underwood Pkwy S.
WH-29	746.3	296245	563658	Fill 4.4’	EB / ~325’ west of Underwood Pkwy S.
WB-46	747.8	296327	563749	Fill ~ 4.0’	EB / west side Underwood Pkwy S. brdge
WH-30	747.5	296374	564175	Fill 5.0’	EB / ~225’ east of Underwood Pkwy S.
WH-31	748.0	296540	564390	Fill 4.3’	WB / ~500’ east of Underwood Pkwy S.
WH-32	753.0	296494	564664	Fill 2.0’	EB / ~400’ west of S. Curtis Road
WH-33	757.5	296660	564880	Fill 3.7’	WB / ~125’ west of S. Curtis Road

Attachments

General Drilling and Soil Boring Log Notes

Unified Soil Classification System

Soil Boring Logs

North Leg: NH-1 to NH-38, NB-6, NR-3, NB-35, NB-38 (No NH-36, NH-37)

South Leg: SH-1 to SH-29, SR-71, SR-1, SR-4, SR-6, SB-21, (No SH-27)

East Leg: EH-1 to EH-31, EB-2, EB-14, EB-5

West Leg: WH-1 to WH-33, WB-52, WB-20, WB-10, WB-16, WB-8, WB-14, WB-4, WB-46 (No WH-7, WH-25)

Laboratory Data

North Leg

South Leg

East Leg

West Leg

Attachments

Standard Notes and Boring Logs

General Notes

Unified Soil Classification System

Boring Logs

North Leg:	NH-1 to NH-38, NB-6, NR-3, NB-35, NB-38 (No NH-36, NH-37)
South Leg:	SH-1 to SH-29, SR-71, SR-1, SR-4, SR-6, SB-21, CB-23 (No SH-27)
East Leg:	EH-1 to EH-31, EB-2, EB-14, EB-5
West Leg:	WH-1 to WH-33, WB-52, WB-20, WB-10, WB-16, WB-8, WB-14, WB-4, WB-46 (No WH-7, WH-25)

GESTRA ENGINEERING, INC. -- GENERAL NOTES

DRILLING AND SAMPLING SYMBOLS

SYMBOL	DEFINATION
HSA	3 1/4" I.D. hollow Stem Auger
RWB	Rotary Wash Boring (Mud Drilling)
_FA	4", 6" or 10" Diameter Flight Auger
_HA	2", 4" or 6" Hand Auger
_DC	2 1/2" , 4" , 5" or 6" Steel Drive Casing
_RC	Size A, B, or N Rotary Casing
PD	Pipe Drill or Cleanout Tube
CS	Continuous Split Barrel Sampling
DM	Drill Mud
JW	Jetting Water
SB	2" O.D. Split Barrel Sample
_L	2 1/2" or 3 1/2" O.D. SB Liner Sample
ST	2" or 3" Thin Walled Tube Sample
3TP	3" Thin Walled Tube (Pitcher Sampler)
_TO	2" or 3" Thin Walled Tube (Osterberg Sampler)
W	Wash Sample
B	Bag Sample
P	Test Pit Sample
_Q	BQ, NQ, or PQ Wireline System
_X	AX, BX, or NX Double Tube Barrel
CR	Core Recovery – Percent
NSR	No Sample Recovered, classification based on action of drilling, equipment and/or material noted in drilling fluid or on sampling bit.
NMR	No Measurement Recorded, primarily due to presence of drilling or coring fluid.
▼	Water Level Symbol

TEST SYMBOLS

SYMBOL	DEFINATION
WC	Water Content - % of Dry Wt. – ASTM D 2216
OC	Organic Content - % of Dry Wt. – ASTM D 2974
DD	Dry Density – Pounds Per Cubic Foot
LL, PL	Liquid and Plastic Limit – ASTM D 4318

Additional Insertions in Last Column

Qu	Unconfined Comp. Strength-psf – ASTM D 2166
Qp	Penetrometer Reading – Tons/Square Foot
Ts	Torvane Reading – Tons/Square Foot
G	Specific Gravity – ASTM D 854
SL	Shrinkage Limits – ASTM D 427
OC	Organic Content – Combustion Method
SP	Swell Pressure - Tons/Square Foot
PS	Percent Swell
FS	Free Swell – Percent
pH	Hydrogen Ion Content. Meter Method
SC	Sulfate Content – Parts/ Million, same as mg/L
CC	Chloride Content - Parts/ Million, same as mg/L
C*	One Dimensional Consolidation – ASTM D 2453
Qc*	Triaxial Compression
D.S.*	Direct Shear – ASTM D 3080
K*	Coefficient of Permeability – cm/sec
D*	Dispersion test
DH*	Double Hydrometer – ASTM D 4221
MA*	Particle Size Analysis – ASTM D 422
R	Laboratory Receptivity, in ohm – cm – ASTM G 57
E*	Pressuremeter Deformation Modulus – TSF
PM*	Pressuremeter Test
VS*	Field Vane Shear – ASTM D 2573
IR*	Infiltrometer Test – ASTM D 3385
RQD	Rock Quality Designation – Percent

*See attached data sheet or graph

WATER LEVEL

Water levels shown on the boring logs are the levels measured in the borings at the time and under the conditions indicated. In sand, the indicated levels may be considered reliable ground water levels. In clay soil, it may not be possible to determine the ground water level within the normal time required for test borings, except where lenses or layers of more pervious waterbearing soil are present. Even then, an extended period of time may be necessary to reach equilibrium. Therefore, the position of the water level symbol for cohesive or mixed texture soils may not indicate the true level of the ground water table. Perched water refers to water above an impervious layer, thus impeded in reaching the water table. The available water level information is given at the bottom of the log sheet.

DESCRIPTIVE TERMINOLOGY

DENSITY TERM	"N" VALUE
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	Over 50

CONSISTENCY TERM	qu /qp VALUE (tsf)	"N" VALUE
		0-2
Very Soft	<0.25	2-4
Soft	0.25 - 0.49	4-8
Medium Stiff	0.5 - 0.99	8-16
Stiff	1.0 - 1.99	16-30
Very Stiff	2.0 - 3.99	Over 30
Hard	4.0+	

Standard "N" Penetration: per ASTM D1586

Consistency term based in relative order on Qu result, Qp result, and lastly "N" value.

Lamination	Up to 1/2" thick stratum
Layer	1/2" to 6" thick stratum
Lens	1/2" to 6" discontinuous stratum
Varved	Alternating laminations
Dry	Powdery, no noticeable water
Moist	Below saturation
Wet	Saturated, above liquid limit
Water bearing	Pervious soil below water

RELATIVE GRAVEL PROPORTIONS

CONDITION	TERM	RANGE
Coarse Grained Soils	trace of gravel	2-14%
	with gravel	15-49%
Fine Grained Soils		
15-29% + No. 200	trace of gravel	2-14%
15-29% + No. 200	with gravel	15-29%
30% + No. 200	trace of gravel	2-14%
30% + No. 200	with gravel	15-24%
30% + No. 200	gravelly	25-49%

RELATIVE SIZES

Boulder	Over 12"
Cobble	3" - 12"
Gravel	
Coarse	3/4" - 3"
Fine	#4 – 3/4"
Sand	
Coarse	#4 - #10
Medium	#10 - #40
Fine	#40- #200
Silt & Clay	- # 200, Based on Plasticity

Unified Soil Classification System (USCS)

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)		
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)	
	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
	GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	
	GM	Silty gravels, gravel-sand-silt mixtures
	GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	
	SW	Well-graded sands, gravelly sands, little or no fines
	SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	
	SM	Silty sands, sand-silt mixtures
	SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)		
SILTS AND CLAYS Liquid limit less than 50%	ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS	PT	Peat and other highly organic soils

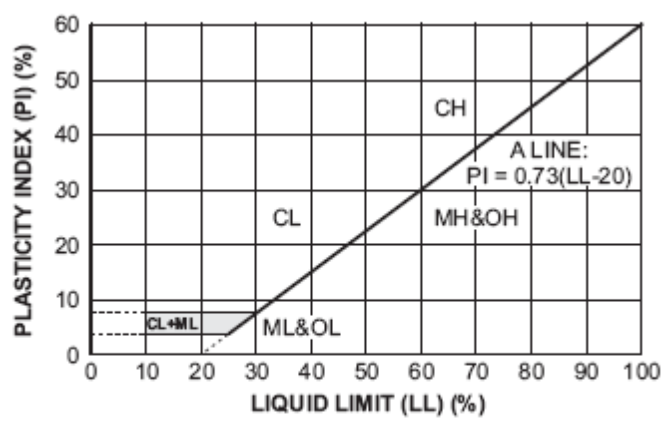
LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent ---------- GW, GP, SW, SP
More than 12 percent ---------- GM, GC, SM, SC
5 to 12 percent ---------- Borderline cases requiring dual symbols

PLASTICITY CHART



BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-1
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/09/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 11/09/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 305473
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 569895
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 723.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						POORLY GRADED GRAVEL WITH SAND, light gray, moist, ROAD SHOULDER GRAVEL (4") 0.3 (723.3)									
1 SS	11	10 8 4	12			POORLY GRADED GRAVEL WITH SAND, brown, moist, medium dense, with clay seams, (FILL) 2.7 (720.9)	gp-gc								
					720	LEAN CLAY, brown, moist, stiff, trace sand and gravel, (FILL) 5.2 (718.4)	cl								
2 SS	11	5 2 4	6	5							1.50			13	
						CLAYEY SAND WITH GRAVEL, brown and black, moist, medium dense, (FILL) 7.7 (715.9)	sc								
3 SS	12	5 5 6	11												
					715	LEAN CLAY WITH SAND, brown, moist, very stiff, trace gravel, (FILL) 10 (713.6)	cl								
4 SS	15	2 4 4	8	10							2.50			13	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-2
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/24/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/24/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: North Leg Main	NORTHING: 305233
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION: / OFFSET:	EASTING: 570052
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 723.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (6.7") 0.6 (722.9)									
						BASE COURSE, (6") 1.1 (722.4)									
1 SS		9 10 18	28			LEAN CLAY, dark brown, moist, hard, trace gravel (FILL) 3 (720.5)	cl				4.5+			11	Recovery not recorded on field log
					720	POORLY GRADED SAND, brown, moist, very dense, trace to few gravel (POSSIBLE FILL) 5.5 (718)	sp								
2 SS		20 31 43	74	5											
						LEAN CLAY WITH SAND, red brown, moist, hard, trace gravel (POSSIBLE FILL) 8 (715.5)	cl				4.5+			12	
					715	POORLY GRADED SAND, brown, moist, loose, trace silt 10 (713.5)	sp								
3 SS		18 35 38	73												
4 SS		6 4 4	8	10											

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-3
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/09/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/09/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 305155
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 570330
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 732.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE (7 ½") 0.6 (731.6)									
						POORLY GRADED GRAVEL WITH SAND, light gray, moist, BASE COURSE (4") 1 (731.2)									
1 SS	10	7 4 4	8		730	LEAN CLAY WITH SAND AND GRAVEL, gray, moist, very stiff to hard								10	Sample SS-1 disturbed, unable to get Q_p
2 SS	11	4 3 6	9	5			cl				3.00			15	
3 SS	18	4 7 8	15		725						4.5+			14	
4 SS	18	4 9 12	21	10		10 (722.2)					4.5+			18	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-4
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/23/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/23/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼" HSA	ROADWAY NAME: Roadway	NORTHING: 304902
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 570420
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 731.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (8") 0.7 (731)									
1 SS	16	5 6 5	11		730	POORLY GRADED SAND, brown, moist, medium dense, trace to little gravel (FILL) 2.9 (728.8)	sp								
2 SS	18	3 5 5	10	5		LEAN CLAY, gray, moist, stiff to hard, trace to little sand, trace gravel					1.00			13	
3 SS	18	4 8 11	19		725		cl				3.00-4.50			12	
4 SS	18	6 12 14	26	10		With sand seams at the bottom of SS-4 10 (721.7)					4.50			21	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-5
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/09/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 11/09/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 304749
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 570669
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 740.4 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					740	CONCRETE (8") 0.7 (739.7)									Bulk sample obtained from 0'-5'
						POORLY GRADED GRAVEL WITH SAND, light gray, moist, BASE COURSE (3½") 1 (739.4)									
1 SS	14	24 18 17	35			POORLY GRADED GRAVEL WITH SAND, brown, moist, medium dense to dense, (FILL)	gp								
2 SS	15	16 7 8	15			4.5 (735.9)								13	
				5	735	LEAN CLAY WITH SAND AND GRAVEL, brown and gray, moist, very stiff to hard					4.5+				
3 SS	18	3 3 10	13			8 (732.4)	cl				2.50			29	
						LEAN CLAY WITH SAND AND GRAVEL, gray, moist, hard									
4 SS	18	7 7 10	17	10		10 (730.4)	cl				4.5+			11	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-6
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/23/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/23/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼" HSA	ROADWAY NAME: Roadway	NORTHING: 304480
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 570691
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 740.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					740	CONCRETE, (8") 0.7 (739.6)									
1 SS	18	11 11 10	21			POORLY GRADED SAND, brown, moist, loose to medium dense, trace to little gravel, (FILL)	sp								
2 SS	18	3 6 2	8	5		4.8 (735.5)									
					735	LEAN CLAY, grayish brown, moist, very stiff	cl								
3 SS	18	1 3 3	6								2.25			25	
4 SS	18	2 5 6	11	10		With silt lenses in sample SS-4 10 (730.3)				2.25-2.75				29	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-7
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/09/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/09/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 304306
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 570918
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 744.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE (7") 0.6 (743.9)									
						POORLY GRADED GRAVEL WITH SAND, light gray, moist, BASE COURSE (5") 1 (743.5)									
1 SS	6	3 2 3	5			LEAN CLAY WITH SAND, brown, moist, stiff, (FILL)	cl				1.00			19	
2 SS	11	2 3 3	6	5	740	5.5 (739)					1.50			25	
						SILT, brown, moist to wet, medium dense									
3 SS	18	4 5 6	11			8 (736.5)	ml							19	
						SILTY CLAY, gray, moist to wet, medium stiff									
4 SS	18	4 4 5	9	10	735	10 (734.5)	cl-ml				0.50			22	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-8
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 1/30/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 1/30/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: Roadway	NORTHING: 304002
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 570937
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 747.1 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE (8") 0.7 (746.4)									
						POORLY GRADED SAND WITH GRAVEL, brown, moist, BASE COURSE (7") 1.3 (745.8)									
1 SS	15	13 15 16	31		745	Fracture gravel pieces in SS-1					4.5+			12	
						SANDY SILTY CLAY WITH GRAVEL, brown to dark brown, moist, hard, (FILL)	cl-ml								
2 SS	15	14 15 17	32	5							4.00			9	
						5.5 (741.6)									
						LEAN CLAY, brown, moist, very stiff, with gray mottling Silt lamination in sample SS-3									
3 SS	15	5 4 4	8		740						2.75			26	
							cl								
4 SS	15	4 3 5	8	10		10 (737.1)					2.75			28	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-9
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/09/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 11/09/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 303849
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571144
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 746.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE (6") 0.5 (746.2)									
1 SS	3	14 4 4	8		745	POORLY GRADED GRAVEL WITH SAND, light gray, moist, BASE COURSE (3½") 0.8 (745.9)									
						SANDY SILT, brown, moist, medium dense	ml								Poor recovery in sample SS-1, sample obtained looks like possible cave-in of the base course material.
2 SS	18	4 6 5	11	5											
						5.5 (741.2) SILTY SAND, brown, wet, medium dense									
3 SS	18	4 5 7	12		740		sm								
4 SS	18	5 6 8	14	10		10 (736.7)									

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: N/A		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-10
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/23/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/23/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼" HSA	ROADWAY NAME: Roadway	NORTHING: 303574
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571147
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 745.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					745	CONCRETE, (8") 0.7 (744.8)									
						BASE COURSE, (6") 1.2 (744.3)									
1 SS	12	3 5 4	9			LEAN CLAY, brown and dark gray, moist, very stiff, trace sand and gravel, trace organics in sample SS-2 (POSSIBLE FILL)					3.50			12	
							cl								
2 SS	18	3 3 5	8	5						2.00-2.50				27	
					740	5.5 (740)									
						LEAN CLAY, red brown mottled gray, moist, very stiff to hard									
3 SS	18	2 4 6	10								3.00			20	
							cl								
4 SS	18	4 6 8	14	10		10 (735.5)					4.50			24	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-11
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/09/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/09/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 303393
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571388
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 744.1 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE (8") 0.7 (743.4)									
						POORLY GRADED GRAVEL WITH SAND, light gray, moist, BASE COURSE (4") 1 (743.1)									
1 SS	13	8 4 9	13			LEAN CLAY, brown with gray, moist, very stiff to hard					4.25			17	
2 SS	18	3 7 10	17	5	740		cl				4.5+			21	
3 SS	18	4 5 7	12								3.00			23	
4 SS	18	2 4 7	11	10	735	10 (734.1)					4.00			22	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-12
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 1/30/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 1/30/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼" HSA	ROADWAY NAME: Roadway	NORTHING: 303107
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571393
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 743.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT (5") 0.4 (742.8)									
						CONCRETE (7") 1 (742.2)									
1 SS	15	4 7 12	19			POORLY GRADED SAND WITH GRAVEL, light gray, moist BASE COURSE (6") 1.5 (741.7)	cl-ml				3.50			17	
					740	SILTY CLAY, brown, moist, very stiff, with gray mottling 3 (740.2)									
2 SS	15	4 9 14	23	5		SANDY SILT, brown, moist to very moist, medium dense								18	
3 SS	16	6 9 12	21			Very moist below 6'	ml							17	
					735										
4 SS	17	7 11 13	24	10		10 (733.2)								19	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-13
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/09/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/09/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 302948
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571638
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 743.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE (7 ½") 0.7 (742.6)									
						POORLY GRADED GRAVEL WITH SAND, light gray, moist, BASE COURSE (3") 1 (742.3)									
1 SS	12	5 6 8	14			LEAN CLAY, brown and gray, moist, very stiff to hard, some sand and gravel (FILL)					2.75			21	
					740										
2 SS	11	4 7 6	13	5		Sand seam in sample SS-2					4.50			17	
						5.5 (737.8) LEAN CLAY, brown with gray, moist, hard									
3 SS	18	3 7 10	17								4.5+			19	
					735										
4 SS	18	5 7 10	17	10		10 (733.3)					4.5+			20	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-14
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 1/30/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 1/30/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼" HSA	ROADWAY NAME: Roadway	NORTHING: 302661
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571619
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 750.1 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE (8") 0.7 (749.4)									
						BASE COURSE (6") 1.2 (748.9)									
1 SS	12	3 5 6	11			LEAN CLAY, gray to dark gray, moist, stiff, trace gravel, (FILL) 3 (747.1)	cl				1.50			16	
2 SS	14	3 4 7	11	5	745	LEAN CLAY, gray, moist, (POSSIBLE FILL) 5.5 (744.6)	cl							11	Sample disturbed unable to get Qp
3 SS	14	3 4 8	12			LEAN CLAY, gray, moist, very stiff	cl				2.50			20	
4 SS	14	3 5 8	13	10		10 (740.1)					2.50			19	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-15
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/02/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/02/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼" HSA	ROADWAY NAME: Roadway	NORTHING: 302512
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571885
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 753.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (4") 0.3 (753.5)									
						CONCRETE, (8.1") 1 (752.8)									
1 SS	12	5 7 9	16			LEAN CLAY, brown, black and dark gray, moist, medium stiff to very stiff, trace to little sand, trace gravel and organics					3.00			13	
					750	Color change to brownish gray in sample SS-2									
2 SS	12	4 4 5	9	5			cl				3.25			13	
						Sand seam in sample SS-3									
3 SS	15	3 1 3	4								0.75			19	
						7.9 (745.9)									
					745	POORLY GRADED SAND, black, moist, medium dense, possible foundry sand, with slag pieces and gravel									
4 SS	10	2 7 4	11	10		10 (743.8)	sp								

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NB-6
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 5
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 8/08/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 8/08/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: BR-46	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 4¼" HSA w/ RWB	ROADWAY NAME: 45 SB / Watertown Plank	NORTHING: 302240
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571900
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 764.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Moisture Content (%)	Notes
						ASPHALT 0.33 (764.27)				
						CONCRETE 1.08 (763.52)		4.00	12	
						BASE COURSE 2.08 (762.52)				
1 SS	12	5 4 5	9			LEAN CLAY, dark gray, moist, hard, (FILL)				Sampling depth not recorded down accurately
2 SS	18	4 5 8	13	5	760		cl		11	
						5.5 (759.1) SILTY SAND WITH GRAVEL, brown, moist, medium dense, trace clay, (FILL)				
3 SS	18	4 7 12	19				sm		13	
4 SS	18	2 3 4	7	10	755				17	
						10.5 (754.1) POORLY GRADED SAND WITH CLAY, brown, moist, very stiff, (FILL)				
5 SS	18	3 5 6	11				sp-sc		27	
						13 (751.6) SANDY LEAN CLAY, brown, moist, stiff, (FILL)				
6 SS	10	2 5 7	12	15	750				11	Sample disturbed unable to get Q_p
							cl			
7 SS	18	3 5 8	13						17	Sample disturbed unable to get Q_p
						18 (746.6) LEAN CLAY, brown, moist, very stiff to hard				
8 SS	14	3 5 7	12	20	745		cl	3.00	12	Driller converted to mud rotary at 18.5 ft

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 2/21/12

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45 LLC	Gestra	A. Woerpel	B. Brown	R. Haque	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-11	CME 75 (International)	4¼" HSA w/ RWB	Auto	(6/2011) 85.1%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
8/08/11	8/08/11	BR-46	45 SB / Watertown Plank		

BORING No NB-6

PAGE No 2 of 5

HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
WISCRS (2006)	NAVD 88			302240	571900	764.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, brown, moist, very stiff to hard						
9 SS	15	4 9 12	21	25	740		cl	4.00			21	
10 SS	18	6 10 16	26	30	735	Silt seam in sampe SS-10		3.50			21	
						31.8 (732.8)						
						SANDY SILTY CLAY, brown, moist, stiff						
11 SS	18	6 7 6	13	35	730		cl-ml				17	
						36.8 (727.8)						
						SANDY LEAN CLAY WITH GRAVEL, gray, moist, stiff to very stiff						
12 SS	18	8 13 17	30	40	725	Gravel in sample SS-12	cl				9	Sample disturbed unable to get Q_p

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 2/21/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No NB-6**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 3 of 5
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 8/08/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 8/08/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: BR-46	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 4¼" HSA w/ RWB	ROADWAY NAME: 45 SB / Watertown Plank	NORTHING: 302240
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 571900
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 764.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SANDY LEAN CLAY WITH GRAVEL, gray, moist, stiff to very stiff	cl								
13 SS	18	6 10 13	23	45	720									11	Sample disturbed unable to get Q_p
						46.8 (717.8)									
						POORLY GRADED SAND WITH CLAY AND GRAVEL, gray, moist, very dense	sp-sc								
14 SS	4	50		50	715									9	
						51.8 (712.8)									
						LEAN CLAY, gray, moist, hard	cl								
15 SS	18	11 27 49	76	55	710									13	Sample disturbed unable to get Q_p
						56.8 (707.8)									
						SILTY SAND, gray, wet, very dense	sm								
16 SS	10	41 50/5"	R	60	705										

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 2/21/12

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45 LLC	Gestra	A. Woerpel	B. Brown	R. Haque	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-11	CME 75 (International)	4¼" HSA w/ RWB	Auto	(6/2011) 85.1%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
8/08/11	8/08/11	BR-46	45 SB / Watertown Plank		

BORING No NB-6

PAGE No 4 of 5

HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
WISCRS (2006)	NAVD 88			302240	571900	764.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SILTY SAND, gray, wet, very dense									
17 SS	12	34 48 50	98	65	700										
							sm								
18 SS	15	32 40 50	90	70	695										
19 SS	12	30 37 36	73	75	690										
						76.5 (688.1)									
						LEAN CLAY WITH GRAVEL, gray, very stiff to hard									
							cl								
20 SS	18	37 40 38	78	80	685	Silt seam at the bottom of sample SS-20					4.00			19	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 2/21/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No NB-6**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 5 of 5
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 8/08/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 8/08/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: BR-46	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 4¼" HSA w/ RWB	ROADWAY NAME: 45 SB / Watertown Plank	NORTHING: 302240
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571900
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 764.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY WITH GRAVEL, gray, very stiff to hard									
21 SS	18	16 15 18	33	85	680						3.50			23	
							cl								
22 SS	18	18 40 48	88	90	675	Rock pieces at the bottom of sample SS-22					2.75			13	
23 SS	18	21 39 47	86	95	670	95 (669.6)					2.50			14	
						BOULDER/ COBBLES 96 (668.6)									Rig Chatter at 95 ft
24 SS	0	50/0"	R			End of Boring at 96.0 ft.									Roller bit refusal at 96 ft. Driller observation, boulder/ cobbles at 95 ft

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 2/21/12

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-16
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/01/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/01/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼" HSA	ROADWAY NAME: Roadway	NORTHING: 301805
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572191
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 765.9 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					765	ASPHALT, (3.5") 0.3 (765.6)									
						CONCRETE, (7") 0.9 (765)									
1 SS	13	3 6 6	12			BASE COURSE, (3") 1.1 (764.8)					4.25			13	
						LEAN CLAY, grayish brown, moist, very stiff to hard, trace to little sand, with occasional silt lenses (FILL)	cl								
2 SS	12	4 4 6	10	5		5.3 (760.6)					3.00			16	
					760	LEAN CLAY, grayish brown, moist, stiff to very stiff, trace to little sand									
3 SS	18	4 4 5	9				cl				1.50-2.50			15	
4 SS	18	4 4 4	8	10		10 (755.9)					1.50-2.00			16	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-17
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 11/18/11	LATITUDE:
CREW CHIEF: R. Jackson	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Sargent	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 301676
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION: / OFFSET:	EASTING: 572452
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 759.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL (4") 0.3 (758.9)									
1 SS	9	2 2 3	5			LEAN CLAY WITH SAND AND GRAVEL, brown, moist, hard, (FILL) 2.6 (756.6)	cl				4.50			18	
2 SS	10	2 4 4	8	5	755	LEAN CLAY, brown then dark gray, moist, stiff to very stiff, (FILL)					1.50			22	
3 SS	13	2 4 4	8				cl				1.50			20	
4 SS	13	3 5 5	10	10	750	Color change to gray at 8.5' 10 (749.2)					2.50			26	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: N/A		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-18
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/01/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/01/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼" HSA	ROADWAY NAME: Roadway	NORTHING: 301396
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572490
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 756.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (3.5") 0.3 (756)									
					755	CONCRETE, (5.3") 0.7 (755.6)									
1 SS	18	5 6 7	13			BASE COURSE, (2.5") 0.9 (755.4)					4.5+			10	
						LEAN CLAY, brown, black and gray, moist, hard, with sand lenses (FILL)	cl								
2 SS	18	4 6 11	17	5							4.5+			19	LOI = 3.8%
						5.5 (750.8)									Bottom 1" of SS-2 possible buried topsoil
					750	LEAN CLAY, brown, moist, hard With silt lenses, gray mottling in sample SS-3									
3 SS	18	4 9 11	20								4.5+			16	
							cl								
4 SS	18	4 11 15	26	10		10 (746.3)					4.5+			18	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-19
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/18/11	LATITUDE:
CREW CHIEF: R. Jackson	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Sargent	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 301223
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION / OFFSET	EASTING: 572725
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 756.1 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL (4") 0.3 (755.8)									Recovery not recorded on field log.
1 SS		5 4 3	7		755	LEAN CLAY WITH GRAVEL, brown, moist, with sand seams (FILL) 3 (753.1)	cl							19	
2 SS		5 13 16	29	5		LEAN CLAY, brown, moist, hard					4.50			20	
3 SS		3 8 10	18		750		cl				4.00			21	
4 SS		3 6 11	17	10		10 (746.1)					4.00			21	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-20
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 1/30/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 1/30/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: Roadway	NORTHING: 300962
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572734
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 754.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE (8") 0.7 (753.8)									
						SILTY SAND WITH GRAVEL, brown, wet BASE COURSE (7") 1.3 (753.2)									
1 SS	18	4 5 5	10			LEAN CLAY, grayish brown to gray, moist, stiff to hard, trace gavel					4.5+			20	
2 SS	18	4 7 10	17	5	750						4.5+			20	
3 SS		5 5 7	12			Color changed to gray at 6'	cl				1.75			20	No recovery was recorded
4 SS	18	6 5 8	13	10	745	10 (744.5)								21	Pushed stone during sampling, sample disturbed unable to get Qp

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 0.7ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-21
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 1/30/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 1/30/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: Roadway	NORTHING: 300763
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572935
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 757.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT (3") 0.3 (757.2)									
						CONCRETE (6") 0.8 (756.7)									
1 SS	18	4 5 5	10		755	CLAYEY SAND WITH GRAVEL, brown, moist BASE COURSE (6") 1.3 (756.2)					4.50			19	
						LEAN CLAY, gray, moist, very stiff to hard									
2 SS	18	4 5 9	14	5			cl				4.50			18	
3 SS	18	3 3 4	7		750						3.75			21	
4 SS	18	3 4 5	9	10		10 (747.5)					3.75			21	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-80	Forward 45 LLC	Gestra	B. Sargent	D. Ashford	R. Haque	40-Milwaukee

BORING LOG

zoo interchange

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM
NR-3	1 of 3	WISCRS (2006)	NAVD 88

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-11	CME 550 ATV	4¼" HSA w/ RWB	Auto	(11/2011) 71.0%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
10/06/11	10/07/11	R-40-560	USH 45 SB on ramp, W of USH 45		

LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
		300487	572815	766.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL 0.5 (766)									
1 SS	16	5 9 12	21		765	LEAN CLAY, brown to grayish brown, moist to very moist, very stiff to hard					4.50			20	
2 SS	15	3 5 7	12	5							4.50			20	
3 SS	17	4 7 17	24		760						4.25			21	
4 SS	18	4 9 11	20	10			CL				3.50	36	20	22	
5 SS	18	3 5 7	12		755						4.00			23	
6 SS	18	6 12 16	28	15							4.00			19	Driller converted to mud rotary at 15.0 ft, dry to 15.0 ft
7 SS	18	5 7 8	15		750	Trace to few gravel, color change to grayish brown in sample SS-7					4.00			16	
						18 (748.5) LEAN CLAY, grayish brown to gray, very moist to moist, stiff to very stiff									
8 SS	18	5 4 5	9	20			cl				2.00-3.50			24	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-80	Forward 45 LLC	Gestra	B. Sargent	D. Ashford	R. Haque	40-Milwaukee

BORING LOG

zoo interchange

BORING No NR-3

PAGE No 2 of 3

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-11	CME 550 ATV	4¼" HSA w/ RWB	Auto	(11/2011) 71.0%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
10/06/11	10/07/11	R-40-560	USH 45 SB on ramp, W of USH 45		

HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
WISCRS (2006)	NAVD 88			300487	572815	766.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					745	LEAN CLAY, grayish brown to gray, very moist to moist, stiff to very stiff									End of drilling at 20.0 ft on 10/06/2011 and continued on 10/07/2011
9 SS	18	3 4 6	10	25							1.50-3.50			24	
					740										
10 SS	18	8 10 14	24	30			cl				1.25-3.50			23	
					735										
11 SS	18	9 14 17	31	35		Color change to gray in sample SS-11					1.50-2.50			21	
					730										
12 SS	18	7 13 20	33	40							2.00-3.00			25	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-80	Forward 45 LLC	Gestra	B. Sargent	D. Ashford	R. Haque	40-Milwaukee

BORING LOG

zoo interchange

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM
NR-3	3 of 3	WISCRS (2006)	NAVD 88

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-11	CME 550 ATV	4¼" HSA w/ RWB	Auto	(11/2011) 71.0%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
10/06/11	10/07/11	R-40-560	USH 45 SB on ramp, W of USH 45		

LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
		300487	572815	766.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					725	LEAN CLAY, grayish brown to gray, very moist to moist, stiff to very stiff									
13 SS	18	10 20 25	45	45			cl				2.50			26	
					720	46.8 (719.7)									
						SANDY LEAN CLAY, gray, moist, very stiff to hard, trace gravel									
14 SS	18	6 5 7	12	50										11	Poor sample, no Qp possible
					715		cl								
15 SS		50/4"	R							3.50-4.00				12	Driller did not record recovery of sample SS-15 and SS-16
				55											
					710	56.8 (709.7)									
						CLAYEY SAND, gray, wet, very dense, trace gravel	sc								
16 SS		39 50/5"	R			59.4 (707.1)								15	

End of Boring at 59.4 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-22
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 1/30/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 1/30/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼" HSA	ROADWAY NAME: Roadway	NORTHING: 300238
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 573039
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 755.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					755	CONCRETE (8") 0.7 (755.1)									
1 SS	16	2 3 4	7			POORLY GRADED SAND WITH GRAVEL, gray, moist BASE COURSE (7") 1.3 (754.5) LEAN CLAY, gray, moist, stiff to very stiff					1.25			21	
2 SS	16	2 4 4	8	5							1.25			20	
					750		cl								
3 SS		3 5 5	10								2.50			19	No recovery was recorded for samples SS-3 and SS-4
4 SS		3 5 6	11	10		10 (745.8)					2.50			18	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-23
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 12/01/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 12/01/11	LATITUDE:
CREW CHIEF: R. Jackson	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Naughton	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 299985
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION: / OFFSET:	EASTING: 572964
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 754.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE (9½") 0.8 (753.4)									
						LEAN CLAY, gray, moist, stiff to very stiff, trace gravel									
1 SS	9	1 1 1	2								1.00			23	
2 SS	18	2 4 4	8	5	750						2.50			23	
3 SS	18	2 4 5	9				cl				2.50			20	
4 SS	18	1 4 6	10	10	745						2.50			19	
5 SS	18	3 4 6	10								2.50			15	
6 SS	18	4 6 7	13	15	740	Sand seam at the bottom of sample SS-6 15 (739.2)					2.50			22	

End of Boring at 15.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-24
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 12/07/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 12/07/11	LATITUDE:
CREW CHIEF: R. Jackson	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Naughton	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 299724
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION / OFFSET	EASTING: 573063
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 752.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE (8.8") 0.7 (751.6)									
1 SS	18	28 45 27	72		750	LEAN CLAY, brown, moist, very stiff to hard, trace gravel, (FILL) 1.8 (750.5)	cl				2.25-4.5+			16	Sample SS-1A Sample SS-1B Driller did not note break in strata change
						POORLY GRADED SAND WITH SILT AND GRAVEL, gray, moist, very dense, (FILL) 3 (749.3)	sp-sm								
2 SS	18	1 3 4	7	5		LEAN CLAY, gray, moist, stiff to very stiff					1.5-2.0			18	
3 SS	18	3 5 5	10		745		cl				1.50			25	
4 SS	18	2 6 5	11	10		10 (742.3)					2.50			14	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NB-35
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 5
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 9/08/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 9/08/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-867 (BR-51)	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 4¼" HSA w/ RWB	ROADWAY NAME: Wisconsin Ave. / USH 45	NORTHING: 299549
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572959
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 766.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (8") 0.7 (765.8)									Boring drilled at staked location
						BASE COURSE, (8") 1.3 (765.2)									
1 SS	9	1 3 8	11		765	LEAN CLAY, black, moist, stiff, trace organic matter and sand, (FILL)	cl				1.25			14	
2 SS	18	1 2 3	5	5		5.5 (761)					1.50			28	
3 SS	8	2 3 4	7		760	LEAN CLAY, brown and gray, moist, very stiff to hard, (FILL)	cl				2.75			18	
4 SS	18	3 8 12	20	10		10.5 (756)					4.50			19	Driller converted to RWB at 10', dry to 10'
5 SS	18	3 9 11	20		755	LEAN CLAY, light brown to red brown, moist, very stiff to hard, trace sand					3.50			19	
6 SS	18	6 6 8	14	15			cl				2.50-3.75			29	
7 SS	18	5 9 10	19		750	Oxidation mark on sample SS-7					4.25			19	
						18 (748.5)									
8 SS	18	1 2 4	6	20		LEAN CLAY, gray, moist to wet, medium stiff to very stiff	CL				0.75-1.25			25	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 6/14/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No NB-35**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 2 of 5
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 9/08/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 9/08/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-867 (BR-51)	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 4¼" HSA w/ RWB	ROADWAY NAME: Wisconsin Ave. / USH 45	NORTHING: 299549
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572959
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 766.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					745	LEAN CLAY, gray, moist to wet, medium stiff to very stiff									
9 SH	16			25											
					740										
10 SS	18	3 5 7	12	30			CL				1.5-2.0	39	23	22	
					735										
11 SS	18	2 3 5	8	35							1.5-2.0			27	
					730										
12 SS	18	2 4 3	7	40							1.25-1.75			23	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 6/14/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No NB-35**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 3 of 5
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 9/08/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 9/08/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-867 (BR-51)	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 4¼" HSA w/ RWB	ROADWAY NAME: Wisconsin Ave. / USH 45	NORTHING: 299549
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 572959
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 766.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					725	LEAN CLAY, gray, moist to wet, medium stiff to very stiff	CL								
						41.8 (724.7)									
						CLAYEY SAND, gray, wet, loose, trace gravel	SC								
13 SS	18	3 3 3	6	45										11	Fines = 46%
					720										
14 SS	18	1 2 3	5	50										13	
					715										
						51.8 (714.7)									
						LEAN CLAY WITH GRAVEL, gray, moist to wet, hard, with boulders, cobbles or gravels	cl								
15 SS	10	10 16 18	34	55							4.50			15	
					710										
						56.8 (709.7)									
						LEAN CLAY, gray, moist to wet, hard	CL								
16 SS	15	18 23 17	40	60							4.00			15	Fines = 88% Pushed stone, sample

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 6/14/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No NB-35**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 4 of 5
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 9/08/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 9/08/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-867 (BR-51)	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 4¼" HSA w/ RWB	ROADWAY NAME: Wisconsin Ave. / USH 45	NORTHING: 299549
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 572959
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 766.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					705	LEAN CLAY, gray, moist to wet, hard	CL								disturbed unable to get Q_p
						61.8 (704.7)									
						CLAYEY SAND, gray, wet, medium dense to dense, with silt, trace gravel	SC								
17 SS	15	14 21 26	47	65										22	
					700										
18 SS	18	6 7 6	13	70										11	Fines = 48%
					695										
						71.8 (694.7)									
						SANDY LEAN CLAY WITH GRAVEL, gray, moist to wet, hard									
19 SS	4	16 20 20	40	75		Cobble and/ or boulder fragments in sample SS-19								12	
					690		cl								
20 SS	18	23 39 48	87	80							4.50			9	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 6/14/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No NB-35**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 5 of 5
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 9/08/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 9/08/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-867 (BR-51)	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 4¼" HSA w/ RWB	ROADWAY NAME: Wisconsin Ave. / USH 45	NORTHING: 299549
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572959
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 766.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					685	SANDY LEAN CLAY WITH GRAVEL, gray, moist to wet, hard						
21 SS	12	14 43 50	93	85				4.50			10	
					680		cl					
22 SS	16	23 34 48	82	90				4.00			11	
					675	91.4 (675.1)						
						POORLY GRADED SAND, gray, wet, very dense						
23 SS	18	28 36 34	70	95								
					670		sp					
24 SS	18	24 32 42	74	100		100 (666.5)						
						End of Boring at 100.0 ft.						

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 6/14/12

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-80	Forward 45 LLC	Gestra	B. Sargent	D. Ashford	L. Gliniecki	40-Milwaukee

BORING LOG

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM
NH-25	1 of 2	WISCRS (2006)	NAVD 88

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-11	CME 550 ATV	4¼" HSA	Auto	(11/2011) 71.2%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
12/01/11	12/01/11	Roadway	North Leg Mainline		

LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
		299215	572899	766.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY WITH SAND, brown and dark brown, moist, very stiff, trace gravel, (FILL)									
1 SS	12	5 5 7	12		765		cl				2.75			17	
2 SS	18	7 6 8	14	5							3.00			15	
						5.5 (761.1)									
						LEAN CLAY, brown and dark brown, moist, stiff to very stiff, trace sand, (FILL)									
3 SS	13	5 5 7	12		760						3.75			19	
4 SH	17			10		With gray coloring in sample SH-4	cl				3.25 (1.8)			16	Dry Wt = 118 pcf
5 SS	18	4 3 11	14		755	With sand laminations in sample SS-5					2.25			16	
						13 (753.6)									
						LEAN CLAY, brown mottled gray, moist, hard, trace gravel, with sand laminations With sand laminations in sample SS-6									
6 SS	15	6 4 7	11	15							4.5+			19	
							cl								
7 SS	18	7 9 15	24		750						4.5+			19	
						18 (748.6)									
						LEAN CLAY, brown then gray, moist, hard									
8 SS	18	8 11 12	23	20			cl				4.5+			21	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 27ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-80	Forward 45 LLC	Gestra	B. Sargent	D. Ashford	L. Gliniecki	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-11	CME 550 ATV	4¼" HSA	Auto	(11/2011) 71.2%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
12/01/11	12/01/11	Roadway	North Leg Mainline		

BORING No NH-25

PAGE No 2 of 2

HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
WISCRS (2006)	NAVD 88			299215	572899	766.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					745	LEAN CLAY, brown then gray, moist, hard									
9 SS	18	5 7 9	16	25		Color change to gray at 23.5'	cl				1.50			23	
					740	27 (739.6)									
						POORLY GRADED SAND, gray, wet, medium dense, trace gravel									
10 SS	15	32 24 26	50	30			sp								
					735	31.6 (735)									
						SILT, gray, very moist, medium dense									
11 SS	16	8 8 10	18	35		35 (731.6)	ml								

End of Boring at 35.0 ft.

WATER & CAVE-IN OBSERVATION DATA

▽	WATER ENCOUNTERED DURING DRILLING: 27ft.	CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
▼	WATER LEVEL AT COMPLETION: NMR	CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
▼	WATER LEVEL AFTER 0 HOURS: NMR	NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No NB-38**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 5
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/26/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/26/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-866 (BR-52)	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 4¼" HSA w/ RWB	ROADWAY NAME: Blue Mound Rd. over USH-45	NORTHING: 298428
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 572897
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 757.9 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (3") 0.3 (757.6)						Boring drilled at staked location
						CONCRETE, (6") 0.8 (757.1)						
						BASE COURSE, (5") 1.2 (756.7)						
1 SS	14	5 8 3	11			LEAN CLAY, brownish gray, moist, very stiff, with sand lenses (FILL)		2.00			16	
					755							
2 SS	10	2 3 5	8	5				2.50	34	20	18	
							CL					
3 SS	18	2 4 7	11					3.50			18	
					750							
4 SS	18	2 6 6	12	10				2.50			15	
						10.5 (747.4)						
						POORLY GRADED SAND, black, brown and gray, wet, medium dense, trace gravel, (FILL)						
5 SS	18	6 12 16	28				sp					
					745	13 (744.9)						
						LEAN CLAY WITH SAND, brownish gray, moist, stiff, little to with sand, trace gravel						
6 SS	18	2 4 6	10	15			cl	1.75			9	
						15.5 (742.4)						
						SILT, gray, wet, loose, with occassional sand seams						
7 SS	18	3 4 5	9				ml					
					740	18 (739.9)						
						SANDY SILT, gray, wet, medium dense						Driller converted to mud rotary at 18.5'
8 SS	18	6 11 12	23	20			ML					Fines = 68%

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 3/13/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No NB-38**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 2 of 5
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/26/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/26/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-866 (BR-52)	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 4¼" HSA w/ RWB	ROADWAY NAME: Blue Mound Rd. over USH-45	NORTHING: 298428
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 572897
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 757.9 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SANDY SILT, gray, wet, medium dense	ML								
						21.8 (736.1)									
					735	SILT, gray, wet, loose, with occassional sand seams									
9 SS	18	3 3 4	7	25			ml								
						26.8 (731.1)									
					730	SILT, gray, wet, dense, with clay seams									
10 SS	18	9 13 24	37	30			ml				4.50				
						31.8 (726.1)									
					725	SILTY SAND, gray, wet, medium dense									
11 SS	18	11 13 16	29	35			SM								Fines = 30%
						36.8 (721.1)									
					720	SILT, gray, wet, medium dense, with occassional sand seam									
12 SS	18	9 11 13	24	40			ml								

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 3/13/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No NB-38**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 3 of 5
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/26/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/26/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-866 (BR-52)	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 4¼" HSA w/ RWB	ROADWAY NAME: Blue Mound Rd. over USH-45	NORTHING: 298428
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 572897
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 757.9 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SILT, gray, wet, medium dense, with occassional sand seam	ml								
						41.8 (716.1)									
						SANDY SILT, gray, wet, dense									
					715										
13 SS	18	12 20 21	41	45			ML								Fines = 62%
						46.8 (711.1)									
						SILT, gray, wet, very dense, with occassional sand seams									
					710										
14 SS	18	20 24 26	50	50											
					705										
15 SS	9	36 50/3"	R			With sand in sample SS-15	ML								Fines = 74%
				55											
					700										
16 SS	11	40 50/5"	R												
				60											

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 3/13/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No NB-38**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 4 of 5
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/26/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/26/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-866 (BR-52)	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 4¼" HSA w/ RWB	ROADWAY NAME: Blue Mound Rd. over USH-45	NORTHING: 298428
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572897
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 757.9 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SILT, gray, wet, very dense, with occassional sand seams	ML								
						61.8 (696.1)									
						LEAN CLAY, gray, moist, hard, with silt lenses									
					695										
17 SS	8	31 49 40	89	65							4.50			15	
					690										
18 SS	18	17 16 38	54	70			CL				4.25	40	25	22	
					685										
19 SS	18	20 32 34	66	75										15	
						76.8 (681.1)									
						LEAN CLAY, gray, moist, very stiff to hard, little sand, trace gravel									
					680		cl								
20 SS	18	11 16 21	37	80							3.00			15	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 3/13/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No NB-38**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 5 of 5
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No	DATE STARTED: 10/26/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/26/11	LATITUDE
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-866 (BR-52)	LONGITUDE
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 4¼" HSA w/ RWB	ROADWAY NAME: Blue Mound Rd. over USH-45	NORTHING: 298428
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 572897
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 757.9 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					675	LEAN CLAY, gray, moist, very stiff to hard, little sand, trace gravel						driller noted cobbles at 81.5' to 82'
21 SS	18	21 33 32	65	85			cl	4.50			15	
					670							
22 SS	18	16 37 39	76	90				4.5+			14	
						91.8 (666.1)						
					665	POORLY GRADED SAND, gray, wet, very dense, trace to little gravel, trace clay						
23 SS	18	24 35 32	67	95			sp					
					660							
24 SS	18	29 39 40	79	100		With clay seams						
						100 (657.9)						
						End of Boring at 100.0 ft.						

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 3/13/12

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-26
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/26/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/26/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 297925
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION: / OFFSET:	EASTING: 572860
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 764.4 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (6.5") 0.6 (763.8)									
						BASE COURSE, (4") 0.9 (763.5)									
1 SS	10	12 7 8	15			LEAN CLAY, brown and dark gray, moist, very stiff, with silt seam (FILL) 2.7 (761.7)	cl				2.00			17	
2 SS	18	4 6 7	13	5	760	LEAN CLAY, brownish gray, moist, stiff to very stiff				2.00-2.75				28	
3 SS	18	3 5 8	13				cl			1.50-2.50				25	
4 SS	18	3 7 11	18	10	755						3.50			19	
5 SS	18	3 6 10	16			12.5 (751.9)					3.50			20	

End of Boring at 12.5 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-80	Forward 45 LLC	Gestra	A. Woerpel	B. Brown	R. Haque	40-Milwaukee

BORING LOG

zoo interchange

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM
NH-27	1 of 1	WISCRS (2006)	NAVD 88

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	CME 75 (International)	3¼" HSA	Auto	(6/2011) 85.1%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
10/23/11	10/23/11	North Leg Mainline	Roadway		

LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
		297682	572742	773.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (9") 0.8 (773)									
1 SS	18	2 4 6	10			LEAN CLAY, brown, moist, very stiff, trace to with sand, with silty sand and gravel seam at the bottom of sample SS-1 (FILL) 3 (770.8)	cl				2.75			22	
2 SS	18	3 4 6	10	5	770	LEAN CLAY, brown to brownish gray, moist, very stiff to hard					2.75			22	
3 SS	18	4 5 6	11			Color change to grayish brown					3.50			20	
4 SS	18	3 5 8	13	10	765	With silt lenses only in sample SS-4					4.00			18	
5 SS	18	2 4 5	9			Color change to brownish gray in sample SS-5	cl				3.00			17	
6 SS	18	3 4 6	10	15	760						2.50			19	
7 SS	18	2 4 6	10								2.50-3.00			20	
8 SS	18	3 5 6	11	20	755	20 (753.8)					2.50-3.00			19	
						End of Boring at 20.0 ft.									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-28
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/26/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/26/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 297437
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION: / OFFSET:	EASTING: 572897
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 778.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (3.2") 0.3 (777.9)									
						CONCRETE, (5.6") 0.7 (777.5)									
1 SS	12	2 4 8	12			BASE COURSE, (5.5") 1.1 (777.1)	cl				1.50			16	
					775	LEAN CLAY, brown, moist, stiff, trace to little sand, trace gravel with silt lenses 2.8 (775.4)									
2 SS	18	2 5 9	14	5		LEAN CLAY, brownish gray, moist, very stiff to hard, trace gravel					2.50			21	
3 SS	18	4 8 11	19								2.50			21	
					770										
4 SS	18	3 8 10	18	10							2.50-3.50			20	
5 SS	18	4 9 12	21				cl				3.50-4.00			19	
					765										
6 SS	18	4 7 14	21	15							3.50-4.25			19	
7 SS	18	5 9 11	20								4.00			19	
					760										
8 SS	18	8 15 17	32	20		20 (758.2)					4.00			20	
						End of Boring at 20.0 ft.									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-29
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 2
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 1/30/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 1/30/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: Roadway	NORTHING: 297204
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572755
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 784.4 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE (8") 0.7 (783.7)									
						POORLY GRADED SAND WITH GRAVEL, brown, moist, BASE COURSE (8") 1.3 (783.1)									
1 SS	18	3 5 5	10			LEAN CLAY, brown, moist, very stiff					3.50			24	
2 SS	18	3 5 7	12	5	780		cl				3.50			22	
						5.5 (778.9) CLAYEY SAND, brown, moist, medium dense, with clayey seams									
3 SS	18	6 8 8	16				sc								
						8 (776.4) LEAN CLAY, gray, moist, very stiff									
4 SS	18	6 9 8	17	10	775						2.00			16	
5 SS	18	4 8 9	17								2.75			21	
6 SS	18	4 7 10	17	15	770		cl				2.75			21	
7 SS	18	3 4 4	8								3.00			22	
8 SS	18	3 3 5	8	20	765						3.00			23	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-29
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 2 of 2
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 1/30/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 1/30/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: Roadway	NORTHING: 297204
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572755
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 784.4 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, gray, moist, very stiff	cl								
						21.8 (762.6)									
						SILT, brown, moist, medium dense	ml								
9 SS	18	8 10 10	20	25	760	25 (759.4)								21	

End of Boring at 25.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-30
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 1/30/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 1/30/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: Roadway	NORTHING: 296950
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572754
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 783.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE (7") 0.6 (782.6)									
						POORLY GRADED SAND WITH GRAVEL, gray, moist BASE COURSE (5") 1 (782.2)									
1 SS	13	2 3 4	7			LEAN CLAY, brown, moist, stiff to very stiff, (FILL)					1.50			15	
					780										
2 SS	13	2 3 6	9	5			cl				1.50			18	
3 SS	18	4 5 9	14			with sand in sample SS-3					2.50			14	
					775	8 (775.2) SILTY CLAY, brown, moist, very stiff, with gray mottling									
4 SS	18	4 6 9	15	10			cl-ml				2.50			19	
						10.5 (772.7) LEAN CLAY, brown to gray, moist to very moist, medium stiff to very stiff, trace sand and gravel									
5 SS	18	4 7 9	16								2.00			16	
					770										
6 SS	18	4 9 10	19	15							2.00			15	
							cl								
7 SS	10	3 3 3	6			Very moist, wet at 16'				0.5-1.25				14	
					765										
8 SS	13	3 4 6	10	20		20 (763.2)								14	Pushed stone during sampling, sample disturbed unable to get Qp
						End of Boring at 20.0 ft.									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-31
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/18/11	LATITUDE:
CREW CHIEF: R. Jackson	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Sargent	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 296719
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION: / OFFSET:	EASTING: 572612
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 763.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL (2") 0.2 (763)									
						LEAN CLAY, brown, moist, very stiff to hard									
1 SS	18	2 6 8	14								3.50			16	
					760		cl								
						½" thick silt seam in sample SS-2									
2 SS	18	5 7 12	19	5							4.5+			19	
						5.5 (757.7)									
						SILT WITH SAND, brown, moist, medium dense									
3 SS	16	3 9 11	20				ml							21	
						8 (755.2)									
					755	LEAN CLAY, brown, moist, very stiff									
4 SS	18	3 6 8	14	10		10 (753.2)	cl				3.50			22	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-80	Forward 45 LLC	Gestra	A. Woerpel	B. Brown	R. Haque	40-Milwaukee

BORING LOG

zoo interchange

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM
NH-32	1 of 1	WISCRS (2006)	NAVD 88

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	CME 75 (International)	3¼" HSA	Auto	(6/2011) 85.1%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
10/23/11	10/23/11	North Leg Mainline	Roadway		

LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
		296446	572649	777.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (11.7") 1.1 (776.5)									
1 SS	18	2 4 5	9		775	LEAN CLAY, red brown, moist, very stiff to hard, trace to little sand, trace gravel (FILL) 3 (774.6)	cl				2.00-4.00			14	
2 SS	18	4 4 3	7	5		LEAN CLAY, brown, moist, stiff to hard, trace to little sand, trace gravel with occassional silt lenses (POSSIBLE FILL)					3.00-4.50			15	
3 SS	18	2 2 3	5		770						1.50			17	
4 SS	18	2 4 9	13	10							2.75			17	
5 SS	18	3 5 8	13		765		cl				2.75			15	
6 SS	18	3 5 7	12	15							2.75			15	
7 SS	18	9 6 6	12		760						2.75			22	
8 SS	18	3 6 8	14	20		20 (757.6)					3.00			14	
						End of Boring at 20.0 ft.									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-33
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/23/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/23/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼" HSA	ROADWAY NAME: Roadway	NORTHING: 296208
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572532
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 777.1 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (9") 0.8 (776.3)									
1 SS	14	3 3 7	10		775	LEAN CLAY, brown and dark gray, moist, very stiff to hard, little sand, trace gravel, with occassional organic lenses (FILL)					4.5+			14	
2 SS	18	3 4 6	10	5			cl				2.75-3.25			17	
3 SS	18	4 4 9	13		770	8 (769.1)					3.00			19	
4 SS	18	3 5 6	11	10		LEAN CLAY, brown and black, moist, very stiff, trace to little sand, trace gravel, with occassional silt lenses (POSSIBLE FILL)					2.75			20	
5 SS	18	5 5 8	13		765						2.75			12	
6 SS	18	4 8 14	22	15		With silty sand seams in sample SS-6	cl				3.50			16	
7 SS	18	7 11 16	27		760	With sand seams in sample SS-6 & SS-7					3.75			14	
8 SS	18	5 12 12	24	20		20 (757.1)					3.50			13	
						End of Boring at 20.0 ft.									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-34
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/18/11	LATITUDE:
CREW CHIEF: R. Jackson	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Sargent	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295970
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION / OFFSET	EASTING: 572519
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 769 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL (4") 0.3 (768.7)									
1 SS	18	3 5 9	14			SILT WITH SAND, brown, moist, medium dense, trace gravel (FILL) 3 (766)	ml								
2 SS	15	4 7 9	16	5	765	POORLY GRADED SAND, brown, moist, medium dense, with clayey seams, some gravel (FILL) 5.5 (763.5)	sp								
3 SS	18	3 4 8	12			LEAN CLAY, brown, moist, very stiff to hard, trace gravel	cl				3.00			24	
4 SS	18	3 7 10	17	10	760	10 (759)					4.50			18	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-35
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/18/11	LATITUDE:
CREW CHIEF: R. Jackson	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: North Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Sargent	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295681
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION / OFFSET	EASTING: 572381
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 767.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL (3") 0.3 (767.4)									
						LEAN CLAY, brownish gray, moist, hard, (FILL)									
1 SS	10	4 7 10	17		765						4.5+			18	
2 SS	16	4 9 13	22	5			cl				4.5+			20	
3 SS	15	4 12 15	27		760						4.5+			19	
4 SS	18	4 8 13	21	10		10 (757.7)					4.5+			13	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: NH-38
WisDOT PROJECT ID No: 1060-33-80			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 12/08/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 12/08/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 550 ATV	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 4¼" HSA	ROADWAY NAME: SB 45 Off-Ramp to Wisc. Ave	NORTHING: 299765
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (11/2011) 71.2%	STATION / OFFSET	EASTING: 572960
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 768.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, brown, moist, very stiff to hard, with gray mottling									Driller recorded no frost Bulk sample obtained from 0'-5'
1 SS	18	7 8 16	24								2.50			17	
					765										
2 SS	18	6 12 17	29	5							4.5+			17	
						Color change to brown at 6'									
3 SS	18	6 11 18	29								4.5+			19	
					760										
4 SS	17	5 9 12	21	10			cl				4.5+			21	
5 SS	18	4 7 11	18								3.00			20	
					755	Color change to gray at 13.5'									
6 SS	18	6 9 12	21	15							2.50			23	
7 SH	20										1.75 (2.2)			20	Dry Wt = 116 pcf
					750										
8 SS	18	5 6 12	18	20		20 (748.6)					2.25			18	
						End of Boring at 20.0 ft.									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-1
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/18/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 286547
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571582
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 764.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (6") 0.5 (763.7)									
						BASE COURSE, (12") 1.5 (762.7)									
1 SS	18	4 3 2	5			LEAN CLAY, brown, moist, stiff, (FILL) 3 (761.2)	cl				1.75			17	
2 SS	18	2 2 3	5	5	760	LEAN CLAY, grayish brown, moist, medium stiff to stiff, trace sand with occassional sand seams	cl				1.75			19	
3 SS	18	2 3 5	8								1.50			20	
4 SS	18	3 3 4	7	10	755	10 (754.2)					0.75			18	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-2
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/24/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/24/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 286819
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571505
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 761.9 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Moisture Content (%)	Notes
						ASPHALT, (4.5") 0.3 (761.6)				
						CONCRETE, (8.5") 1.1 (760.8)				
1 SS	14	4 5 2	7		760	BASE COURSE, (13") 2.1 (759.8)				
						LEAN CLAY, brown, moist, hard, trace sand			16	
2 SS	18	4 4 6	10	5			cl	4.00	19	
						5.5 (756.4)				
						POORLY GRADED SAND, brown to gray, wet, loose, with silt and clay seams				
3 SS	18	2 3 4	7		755		sp			
						8 (753.9)				
						LEAN CLAY, gray, moist, hard, with silt lenses				
4 SS	18	3 3 7	10	10		10 (751.9)	cl	4.00	21	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-3
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/18/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 287052
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571654
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 761.4 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (3") 0.3 (761.1)									
					760	CONCRETE, (6") 0.8 (760.6)									
1 SS	18	4 3 3	6			BASE COURSE, (9") 1.5 (759.9)	sp								
						POORLY GRADED SAND, brown, moist, loose, little gravel (FILL) 2.5 (758.9)									
2 SS	18	3 3 5	8	5		LEAN CLAY, brown, moist, stiff to very stiff, trace sand and gravel, with occassional silt seams					2.50			21	
					755		cl								
3 SS	18	2 2 4	6								1.75			20	
4 SS	18	2 3 4	7	10		10 (751.4)					1.50			18	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-4
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/24/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/24/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 287310
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571583
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 758.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT (6.9") 0.6 (758.1)									Bulk sample obtained from 0'-5'
						CONCRETE (7.4") 1.2 (757.5)									
1 SS	12	2 6 6	12			BASE COURSE (12") 2.2 (756.5)									
						POORLY GRADED GRAVEL WITH SAND, Recycled materials (FILL) 2.8 (755.9)									
2 SS	18	2 2 3	5	5	755	LEAN CLAY, brown to gray, moist to very moist, stiff to very stiff With silt lenses in sample SS-2					1.50			20	
3 SS	18	2 3 5	8			Trace sand in sample SS-3	cl				2.25			18	
4 SS	18	2 5 7	12	10	750	10 (748.7)					3.25			18	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-5
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/18/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 287545
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571752
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 759.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, brown, moist, very stiff, with root markings in soil, with sand seam at the bottom of SS-1, (FILL)									
1 SS	18	4 4 5	9				cl				2.25			16	
						3 (756.2)									
						LEAN CLAY, grayish brown, moist, very stiff, trace to little sand, trace gravel									
2 SS	18	3 4 6	10	5	755						2.00			16	
3 SS	18	2 4 5	9				cl				2.25			18	
4 SS	18	4 6 8	14	10	750						2.50			15	
5 SS	18	6 9 8	17			12.5 (746.7)					2.50			17	

End of Boring at 12.5 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-6
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/24/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/24/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 287813
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571661
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 757.9 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (6.2") 0.5 (757.4)									
						BASE COURSE, (16") 1.8 (756.1)									
1 SS	16	23 34 22	56			LEAN CLAY, gray, moist, stiff to very stiff								7	
					755										
2 SS	18	3 4 6	10	5		With silt lenses in sample SS-2				1.50-2.50				19	
							cl								
3 SS	18	5 6 7	13			Little sand in sample SS-3					2.50			18	
					750										
4 SS	18	3 4 5	9	10		10 (747.9)				1.75-3.75				17	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-7
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/18/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 288052
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571831
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 760.9 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (6") 0.5 (760.4)									
					760	POORLY GRADED GRAVEL WITH SAND, (3") 0.8 (760.1)	gp								
1 SS	12	6 8 6	14			ASPHALT, pulverized recycled asphalt materials (3"), (FILL) 1 (759.9)	gp								
						BASE COURSE, (9") 1.8 (759.1)									
2 SS	18	2 3 4	7			POORLY GRADED GRAVEL WITH SAND, dark brown and black, moist, medium dense, recycled pavement materials, with clay seams at the bottom of sample SS-1, (FILL) 2.5 (758.4)					1.50			16	
				5		LEAN CLAY, grayish brown, moist, stiff to hard, trace sand, gravel and organics, (FILL)									
					755										
3 SS	18	3 4 6	10				cl				4.00			13	
4 SS	18	3 3 4	7	10		Color change to olive green at the bottom of SS-4 10 (750.9)					2.50			14	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-77	Forward 45 LLC	Gestra	A. Woerpel	B. Brown	R. Haque	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-11	CME 75 (International)	3¼ HSA	Auto	(6/2011) 85.1%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
10/24/11	10/24/11	Roadway	South Leg Mainline		

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
SH-8	1 of 1	WISCRS (2006)	NAVD 88			288279	571739	764.4 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (6.7") 0.6 (763.8)									
1 SS	15	29 36 22	58			BASE COURSE, (15") 1.9 (762.5)									
						LEAN CLAY WITH SAND, brown, moist, little gravel (FILL) 2.9 (761.5)	cl							8	
2 SS	15	7 7 9	16	5	760	LEAN CLAY, brown, moist, hard, little sand, trace gravel (POSSIBLE FILL) 5.4 (759)	cl				4.50			11	
3 SS	16	3 7 9	16			LEAN CLAY, brown, moist, very stiff to hard, trace to few sand	cl				4.50			15	
4 SS	16	5 5 7	12	10	755	With silt lenses 10 (754.4)					2.75			15	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-9
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/18/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 288511
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571905
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 771.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Moisture Content (%)
						ASPHALT, (6") 0.5 (771.2)			
						POORLY GRADED GRAVEL WITH SAND, (3") 0.8 (770.9)	gp		
1 SS	12	10 11 8	19		770	ASPHALT, pulverized asphalt materials (3") 1 (770.7)			
						BASE COURSE, (9") 1.8 (769.9)	sp		
						POORLY GRADED SAND WITH GRAVEL, dark brown and gray, moist, medium dense, recycled asphalt materials 2.5 (769.2)			
2 SS	18	4 5 6	11	5		LEAN CLAY, brownish gray to gray, moist, very stiff to hard, trace to little sand, trace gravel		4.50	15
3 SS	18	4 5 5	10		765		cl	3.50	16
4 SS	18	4 4 6	10	10		10 (761.7)		2.75	18

End of Boring at 10.0 ft.

Graphic | Well Diagram | PID / FID | Liquid Limit (%) | Plasticity Index (%) | Notes

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-10
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/24/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/24/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 288778
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571823
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 779.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (1.1") 0.1 (779.2)									
						CONCRETE, (6.3") 0.6 (778.7)									
1 SS	12	9 11 8	19			BASE COURSE, (12") 1.6 (777.7)									
						POORLY GRADED SAND WITH GRAVEL, brown, dry, medium dense, trace clay (FILL) 2.8 (776.5)	sp								
2 SS	14	4 6 8	14	5	775	LEAN CLAY, red brown, moist, very stiff to hard, trace sand					4.00			13	
3 SS	15	4 4 6	10				cl				3.00			20	
4 SS	16	4 3 5	8	10	770	With silt seams in sample SS-4 10 (769.3)					2.75			16	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-77	Forward 45 LLC	Gestra	R. Jackson	D. Harris	E. Jeske	40-Milwaukee

BORING LOG

zoo interchange

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM
SR-71	1 of 4	WISCRS (2006)	NAVD 88

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	Diedrich D50 ATV	4¼ HSA, w/ RWB	Auto	(7/2012) 80.9%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
5/14/13	5/14/13	R-40-534	I-894 btwn UPRR & Lincoln Ave.		

LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
		288993	571998	778.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, brown and gray, moist, very stiff to hard, (FILL)									Boring was drilled at the staked location on a benchcut. Driller did not note elevation from previous existing ground to bench out surface.
1 SS	14	4 5 8	13								4.5+			14	
					775										
2 SS	13	4 5 6	11	5							3.25-4.5+			15	
3 SS	15	2 4 7	11								2.5-4.0			18	
					770										
4 SS	14	2 5 5	10	10			CL				2.25-3.0			15	
5 SS	15	3 8 8	16								3.0-4.5+			14	
					765	Thin dark gray sandy clay seam in sample SS-6									
6 SS	18	3 5 7	12	15							3.0-4.5	27	15	12	
7 SS	18	4 5 7	12								3.5-4.5+ (3.1)	25	12	14	Dry Wt = 117 pcf
					760										
8 SS	18	3 6 9	15	20							2.0-4.5 (4.3)	33	18	18	Dry Wt = 109 pcf

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	CONSULTANT PROJECT No	DATE STARTED	HORIZONTAL DATUM	VERTICAL DATUM
Zoo Interchange	1060-33-77	Forward 45 LLC		5/14/13	WISCRS (2006)	NAVD 88

BORING LOG

BORING No	PAGE No
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DRILLING CONTRACTOR	DRILLING CONTRACTOR PROJECT No	DATE COMPLETED	LATITUDE
Gestra	11039-10	5/14/13	

CREW CHIEF	DRILLING RIG	WisDOT STRUCTURE ID No	LONGITUDE
R. Jackson	Diedrich D50 ATV	R-40-534	

FIELD LOG BY	DRILLING METHOD / HOLE SIZE	ROADWAY NAME	NORTHING
D. Harris	4¼ HSA, w/ RWB	I-894 btwn UPRR & Lincoln Ave.	288993

LOG QC BY	HAMMER TYPE	EFFICIENCY	STATION	OFFSET	EASTING
E. Jeske	Auto	(7/2012) 80.9%			571998

COUNTY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION	SURFACE ELEVATION
40-Milwaukee						778.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, brown and gray, moist, very stiff to hard, (FILL)	CL								Driller converted to mud rotary drilling at 20'. Dry to 20'
						21.8 (756.8)									
						LEAN CLAY, brown to grayish brown, moist, stiff to very stiff, (FILL)									
					755										
9 SS	18	3 5 7	12	25							2.00			19	
							CL								
					750										
10 SH	16			30		Trace gravel in sample SH-10					1.0-2.5 (1.1)	30	16	20	Consolidation performed Dry Wt = 112 pcf
						31.4 (747.2)									
						LEAN CLAY, gray, moist, stiff to hard, trace to with sand									
					745										
11 SS	18	3 5 6	11	35		3" wet sand layer in sample SS-11					1.5-2.25			15	
							CL								
						With sand seams and trace gravel in sample SH-12									
					740										
12 SH	18			40		Sand with silt seam from 39.3' to 39.5'					2.25 (0.8)	21	9	18	Dry Wt = 117 pcf

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-77	Forward 45 LLC	Gestra	R. Jackson	D. Harris	E. Jeske	40-Milwaukee

BORING LOG

zoo interchange

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM
SR-71	3 of 4	WISCRS (2006)	NAVD 88

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	Diedrich D50 ATV	4¼ HSA, w/ RWB	Auto	(7/2012) 80.9%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
5/14/13	5/14/13	R-40-534	I-894 btwn UPRR & Lincoln Ave.		

LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
		288993	571998	778.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, gray, moist, stiff to hard, trace to with sand									
					735										
13 SS	18	4 6 8	14	45							2.25-3.5			17	
					730										
14 SS	18	4 7 9	16	50			CL				1.75-2.5			17	
					725										
15 SH	13			55							4.50 (3.8)	25	12	16	Dry Wt = 119 pcf
					720										
16 SS	18	5 9 9	18	60							2.0-3.5			17	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-77	Forward 45 LLC	Gestra	R. Jackson	D. Harris	E. Jeske	40-Milwaukee

BORING LOG

zoo interchange

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM
SR-71	4 of 4	WISCRS (2006)	NAVD 88

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	Diedrich D50 ATV	4¼ HSA, w/ RWB	Auto	(7/2012) 80.9%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
5/14/13	5/14/13	R-40-534	I-894 btwn UPRR & Lincoln Ave.		

LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
		288993	571998	778.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, gray, moist, stiff to hard, trace to with sand									
					715										
17 SS	18	4 7 10	17	65							2.5-3.0			21	
							CL								
					710										
18 SS	18	6 9 11	20	70							2.0-3.0			15	
						71.8 (706.8)									
						SANDY SILT, gray, moist, stiff to very stiff									
					705										
19 SS	18	9 15 13	28	75							2.5-4.0	14	2	17	
							ML								
					700										
20 SS	15	10 14 16	30	80		80 (698.6)					1.00	15	3	19	
						End of Boring at 80.0 ft.									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-11
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/18/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 289521
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572033
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 784.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (2") 0.2 (784.3)									
						CONCRETE, (4") 0.5 (784)									
1 SS	18	4 7 9	16			LEAN CLAY, grayish brown, black and gray, moist, very stiff to hard, trace to little sand, trace gravel and organics, trace possible foundry sand (FILL)					3.50			10	
2 SS	18	6 7 9	16	5	780		cl				4.00			13	
3 SS	18	4 5 5	10								3.00			11	
4 SS	18	4 5 8	13	10	775	10 (774.5)					2.75			13	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-12
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/24/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/24/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 289788
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571929
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 777.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (3.7") 0.3 (776.9)									
						CONCRETE, (8.3") 1 (776.2)									
1 SS	16	4 7 7	14		775	BASE COURSE, (16") 2.3 (774.9)									
						POORLY GRADED SAND, brown and gray, dry to moist, little gravel, with clay seams (FILL) 2.9 (774.3)	sp								
2 SS	18	4 5 6	11	5		LEAN CLAY, gray, moist, very stiff to hard, trace to little sand, trace gravel, with occassional silt seams (POSSIBLE FILL) Color changes to gray in sample SS-2	cl				2.50			20	
3 SS	18	9 11 10	21		770						4.50			13	
4 SS	18	7 12 14	26	10		10 (767.2)					4.50			11	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-13
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/18/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 290031
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572060
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 774.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (2") 0.2 (774)									
						CONCRETE, (4") 0.5 (773.7)									
1 SS	18	3 4 5	9			LEAN CLAY, brown, black and gray, moist, stiff to very stiff, trace to little sand, trace gravel and organics, with silt lenses (FILL)	cl				1.75			16	
2 SS	18	4 6 12	18	5	770						2.50			17	
						5.5 (768.7) LEAN CLAY, black, moist, stiff to very stiff, little sand with silt lenses									
3 SS	18	3 3 6	9				cl				1.75			14	
4 SS	18	5 5 7	12	10	765	10 (764.2)					2.50			10	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-14
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/24/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/24/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 290291
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571939
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 772.4 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT (2.3") 0.2 (772.2)									
						CONCRETE (10") 1 (771.4)									
1 SS	15	4 7 6	13			BASE COURSE (15") 2.3 (770.1)									
					770	POORLY GRADED SAND WITH GRAVEL, light brown, dry to moist, medium dense, trace clay (FILL) 2.9 (769.5)	sp								
2 SS	18	5 5 6	11	5		LEAN CLAY, olive green and dark brown, moist, very stiff to hard				2.00-4.50				24	
3 SS	18	8 11 6	17		765		cl			2.75-4.50				25	
4 SS	18	4 9 9	18	10		10 (762.4)				2.75-4.50				27	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-15
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/18/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 290546
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572095
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 774 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL (thickness not recorded)									
1 SS	14	3 3 4	7			1.8 (772.2) LEAN CLAY, dark brown, moist, stiff to very stiff, with roots in sample, (POSSIBLE FILL)					2.50			26	Topsoil at top of sample SS-1
2 SS	5	2 2 3	5	5	770		cl				1.75			29	
3 SS	18	2 6 6	12			5.5 (768.5) LEAN CLAY, brown to gray, moist to very moist, stiff to very stiff					2.50			17	
4 SS	18	2 4 6	10	10	765	Color change to gray and very moist in sample SS-4	cl				1.0-2.5			18	
5 SS	18	2 5 17	22								3.50			27	
6 SS	18	2 3 4	7	15	760	Very moist in sample SS-6 15 (759)					1.5-2.5			23	

End of Boring at 15.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SR-1
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 2
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 8/16/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 8/16/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: Diedrich D50 ATV	WisDOT STRUCTURE ID No: R-40-469 (R-203)	LONGITUDE:
FIELD LOG BY: R. Jackson	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: Greenfield / 45 NB & SB	NORTHING: 290770
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011)78.9%	STATION / OFFSET	EASTING: 571921
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 776 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL, (4") 0.3 (775.7)									
					775	LEAN CLAY, grayish brown, moist, stiff to hard, trace clayey sand with gravel in sample SS-1, presence of black and brown silty sand seam in SS-2 & SS-3 (FILL)									
1 SS	18	3 3 4	7								1.50			10	
2 SS	18	4 5 5	10	5			cl				1.50			18	LOI= 1%
					770										
3 SS	18	4 8 7	15								4.00			12	
						8 (768)									
						LEAN CLAY, grayish brown, moist, very stiff to hard, trace gravel									
4 SS	18	4 7 9	16	10							4.00			18	
					765										
5 SS		4 7 7	14								3.50			27	Recovery not reported for SS-5 Sand seam at sample top SS-5
6 SS	18	3 6 8	14	15			cl				2.50			27	
					760										
7 SS	18	3 7 8	15								2.50			26	
8 SH	10			20		With coarse gravel in sample SH-8					3.50-4.00			14	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 5/17/12

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	CONSULTANT PROJECT No	DATE STARTED	HORIZONTAL DATUM	VERTICAL DATUM
Zoo Interchange	1060-33-77	Forward 45 LLC		8/16/11	WISCRS (2006)	NAVD 88

BORING LOG

BORING No SR-1

PAGE No 2 of 2

DRILLING CONTRACTOR	DRILLING CONTRACTOR PROJECT No	DATE COMPLETED	LATITUDE
Gestra	11039-10	8/16/11	

CREW CHIEF	DRILLING RIG	WisDOT STRUCTURE ID No	LONGITUDE
R. Johnson	Diedrich D50 ATV	R-40-469 (R-203)	

FIELD LOG BY	DRILLING METHOD / HOLE SIZE	ROADWAY NAME	NORTHING
R. Jackson	3¼ HSA	Greenfield / 45 NB & SB	290770

LOG QC BY	HAMMER TYPE	EFFICIENCY	STATION	OFFSET	EASTING
R. Haque	Auto	(6/2011)78.9%			571921

COUNTY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION	SURFACE ELEVATION
40-Milwaukee						776 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					755	LEAN CLAY, grayish brown, moist, very stiff to hard, trace gravel	cl								
9 SS	18	6 12 14	26	25		25 (751)					3.00			15	

End of Boring at 25.0 ft.

Wet at tip of spoon

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 5/17/12

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-16
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 3/07/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 3/07/12	LATITUDE:
CREW CHIEF: B. Brown	DRILLING RIG: CME 550 ATV	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: R. Jackson	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 291053
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (11/2011) 71.2%	STATION: / OFFSET:	EASTING: 572105
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 776.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL (3") 0.3 (776.2)									No frost, standing water at boring location
1 SS	15	3 5 5	10		775	LEAN CLAY, brown to gray, moist, medium stiff to very stiff					0.75-1.0			17	
2 SS	18	7 10 15	25	5		Color change to gray at 3.5'	cl				3.0-3.75			20	
3 SS	18	3 8 9	17		770						2.00			21	
4 SS	18	8 8 10	18	10		10 (766.5)					2.0-2.5			25	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SR-4
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 3
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 8/17/11	HORIZONTAL DATUM / VERTICAL DATUM
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 8/17/11	LATITUDE
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: R-40-469(R-203)	LONGITUDE
FIELD LOG BY: K. Gorenschek	DRILLING METHOD / HOLE SIZE: 4¼" HSA	ROADWAY NAME: Greenfield / 45 NB & SB	NORTHING: 291363
LOG QC BY: R. Haque	HAMMER TYPE: Auto; EFFICIENCY: (6/2011) 61.3%	STATION / OFFSET	EASTING: 571936
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 779 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SILTY CLAY WITH SAND, dark brown, dry to moist, trace gravel (FILL)	cl-ml								
						0.5 (778.5)									
1 SS	11	7 7 8	15			LEAN CLAY, grayish brown, moist, very stiff to hard, trace sand (FILL)	cl				3.00-4.50			13	
						2.7 (776.3)									
						SILTY SAND, brown, very moist to wet, medium dense, (FILL)									
2 SS	13	8 8 11	19		775		sm								
				5											
						5.3 (773.7)									
						LEAN CLAY, grayish brown, very moist to wet, medium stiff to very stiff									
3 SS	16.5	1 5 8	13								2.25-2.75			17	
4 SS	18	3 6 7	13		770						1.25-2.25			16	
				10											
5 SS	8	4 4 6	10				cl							18	Pushed stone during sampling SS-5. Sample disturbed, no Qp possible
6 SS	18	3 7 9	16		765						1.25-2.25			15	
				15											
7 SS	18	6 10 11	21			Presence of sand lenses at 16.3 '-16.5' With sand, little gravel in sample SS-7					1.50			16	
8 SS	18	3 4 4	8		760						0.50-0.75			18	
				20											

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 4.6ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 11/8/11

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No SR-4**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 2 of 3
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 8/17/11	HORIZONTAL DATUM / VERTICAL DATUM
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 8/17/11	LATITUDE
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: R-40-469(R-203)	LONGITUDE
FIELD LOG BY: K. Gorenschek	DRILLING METHOD / HOLE SIZE: 4¼" HSA	ROADWAY NAME: Greenfield / 45 NB & SB	NORTHING: 291363
LOG QC BY: R. Haque	HAMMER TYPE: Auto; EFFICIENCY: (6/2011) 61.3%	STATION / OFFSET	EASTING: 571936
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 779 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, grayish brown, very moist to wet, medium stiff to very stiff	cl								
9 SS	18	4 7 9	16	25	755						3.50			24	
						26.8 (752.2) CLAYEY SAND WITH GRAVEL, grayish brown, wet, very dense, presence of whitish gray gravel, boulder and/ or cobble pieces in sample SS-10	sc								
10 SS	18	10 35 32	67	30	750										
						31.8 (747.2) SANDY LEAN CLAY, gray, moist to very moist, very stiff to hard	cl								
11 SS	18	7 11 15	26	35	745	Trace gravel in sample SS-11					3.50			11	
12 SS	18	12 16 18	34	40	740	Saturated 3" sand layer at the bottom of sample SS-12									Sample disturbed, no Qp possible

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 4.6ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 11/8/11

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No SR-4**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 3 of 3
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 8/17/11	HORIZONTAL DATUM / VERTICAL DATUM
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 8/17/11	LATITUDE
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: R-40-469(R-203)	LONGITUDE
FIELD LOG BY: K. Gorenschek	DRILLING METHOD / HOLE SIZE: 4¼" HSA	ROADWAY NAME: Greenfield / 45 NB & SB	NORTHING: 291363
LOG QC BY: R. Haque	HAMMER TYPE: Auto; EFFICIENCY: (6/2011) 61.3%	STATION / OFFSET	EASTING: 571936
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 779 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SANDY LEAN CLAY, gray, moist to very moist, very stiff to hard	cl								
13 SS	15	29 39 50/3"	R		735	44.8 (734.2)					4.5+			8	

End of Boring at 44.8 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 4.6ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 11/8/11

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-17
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/18/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 291646
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572061
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 781.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (4.8") 0.4 (781.3)									
						CONCRETE, (6.2") 0.9 (780.8)									
1 SS	18	2 2 3	5		780	LEAN CLAY, brown to grayish brown, moist, very stiff to hard, trace sand and gravel, (FILL)	cl				4.50			12	
2 SS	18	4 4 6	10	5		5.5 (776.2)					2.50			18	
3 SS	18	3 4 8	12		775	LEAN CLAY, brownish gray, moist, very stiff, trace gravel, with sand seams	cl				2.50			22	
4 SS	18	3 5 6	11	10		10 (771.7)					2.75			10	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SR-6
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 2
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 8/15/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 8/15/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: Diedrich D50 ATV	WisDOT STRUCTURE ID No: R-40-469 (R-203)	LONGITUDE:
FIELD LOG BY: R. Jackson	DRILLING METHOD / HOLE SIZE: 4¼" HSA	ROADWAY NAME: Greenfield / 45 NB & SB	NORTHING: 291769
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011)78.9%	STATION / OFFSET	EASTING: 571929
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 782.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL, (6") 0.5 (782.2)									
1 SS	15	5 6 7	13		780	LEAN CLAY, dark brown to gray, moist, stiff to hard, trace sand, with sand seam in sample SS-2 (FILL)					4.00			11	
2 SS	15	6 5 6	11	5			cl				1.50			17	
3 SS	18	4 7 8	15		775	8 (774.7)					3.50			16	
4 SS	18	4 8 8	16	10		LEAN CLAY, grayish brown to gray, moist, very stiff					3.00			17	
5 SS	18	5 7 8	15		770		cl				3.00			16	
6 SS	18	4 5 6	11	15							3.00			18	
7 SS	18	5 5 6	11		765	18 (764.7)				2.50-3.00				18	
8 SS	18	4 6 7	13	20		LEAN CLAY, gray, moist, very stiff, with sand lamination	cl				2.00			19	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 5/17/12

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	CONSULTANT PROJECT No	DATE STARTED	HORIZONTAL DATUM	VERTICAL DATUM
Zoo Interchange	1060-33-77	Forward 45 LLC		8/15/11	WISCRS (2006)	NAVD 88

BORING LOG

BORING No	PAGE No	DRILLING CONTRACTOR	DRILLING CONTRACTOR PROJECT No	DATE COMPLETED	LATITUDE
SR-6	2 of 2	Gestra	11039-10	8/15/11	

CREW CHIEF	DRILLING RIG	WisDOT STRUCTURE ID No	LONGITUDE
R. Johnson	Diedrich D50 ATV	R-40-469 (R-203)	

FIELD LOG BY	DRILLING METHOD / HOLE SIZE	ROADWAY NAME	NORTHING
R. Jackson	4¼" HSA	Greenfield / 45 NB & SB	291769

LOG QC BY	HAMMER TYPE	EFFICIENCY	STATION	OFFSET	EASTING
R. Haque	Auto	(6/2011)78.9%			571929

COUNTY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION	SURFACE ELEVATION
40-Milwaukee						782.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					760	LEAN CLAY, gray, moist, very stiff, with sand lamination									
				25											
9 SH	23.5					With silt lenses in sample SH-9	cl				3.50-4.00 (4.3)			15	Dry Wt = 121 pcf
					755										
9A NR	0										2.50				Attempted shelby tube, tube lost
10 SS	18	4 6 10	16	30										14	
						31.8 (750.9)									
					750	LEAN CLAY, grayish brown, moist, very stiff									
11 SS	18	6 6 13	19	35							2.00			15	
					745		cl								
12 SS	18	6 10 13	23	40		40 (742.7)					2.00			15	
						End of Boring at 40.0 ft.									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 5/17/12

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-18
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/18/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 292153
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572058
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 784.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (2") 0.2 (784.5)									
						CONCRETE, (5") 0.6 (784.1)									
1 SS	18	4 3 4	7			LEAN CLAY, brown to grayish brown, moist, trace sand and gravel, (FILL)	cl								
						3 (781.7)									
2 SS	18	4 6 7	13	5	780	LEAN CLAY, brownish gray, moist, very stiff, trace gravel, with sand seams					2.50			13	
3 SS	18	3 5 8	13				cl				2.50			23	
4 SS	18	6 6 4	10	10	775	10 (774.7)					2.25			23	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-19
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/24/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/24/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 292405
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571932
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 786.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (3.9") 0.3 (786.2)									
						CONCRETE, (8.7") 1.1 (785.4)									
1 SS	18	6 11 7	18		785	BASE COURSE, (5") 1.5 (785)					2.50			12	
						LEAN CLAY, brown, moist, very stiff, trace sand, with silt lenses, (FILL) 3 (783.5)	cl								
2 SS	18	3 6 14	20	5		LEAN CLAY, dark gray to black, moist, very stiff, trace sand and organics (FILL) 5.5 (781)	cl				3.00			14	
3 SS	18	5 7 7	14		780	LEAN CLAY, dark gray and red brown, moist, very stiff, trace to little sand, with silt lenses	cl				3.25			15	
4 SS	18	6 6 7	13	10		10 (776.5)					2.00			17	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-20
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/21/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/21/11	LATITUDE:
CREW CHIEF: R. Jackson	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 292658
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION: / OFFSET:	EASTING: 572074
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 786.4 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, brown, moist, very stiff to hard, with sandy and gravelly layers, with gray mottling, (FILL)									
1 SS	11	5 3 7	10		785						4.00			14	
2 SS	15	3 4 8	12	5			cl				3.75-4.5+			12	
3 SS	8	5 9 8	17		780						3.75			15	
						8 (778.4)									
						SANDY LEAN CLAY, black, moist, stiff, with roots, few organic matter, (FILL)									
4 SS	15	3 5 5	10	10		10 (776.4)	cl				1.25			31	LOI = 4.7%

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-21
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/24/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/24/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 292913
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571930
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 789.4 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (4") 0.3 (789.1)									
						BASE COURSE, (13") 1.5 (787.9)									
1 SS	15	2 4 3	7			POORLY GRADED SAND WITH GRAVEL, light brown, moist, loose, with clay seams (FILL) 2.9 (786.5)	sp								
2 SS	18	3 5 7	12	5	785	LEAN CLAY, red brown to grayish brown, moist, stiff to very stiff, with occassional silt seams	cl				3.50			16	
3 SS	18	3 4 6	10								3.00			18	
4 SS	18	2 2 4	6	10	780	10 (779.4)					1.00			19	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-22
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/21/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/21/11	LATITUDE:
CREW CHIEF: R. Jackson	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 293167
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION: / OFFSET:	EASTING: 572069
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 790.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					790	LEAN CLAY WITH SAND, dark brown, moist, medium stiff, with brown sand seam and roots, (FILL)									
1 SS	6	3 2 2	4				cl				0.75			22	
						3 (787.3)									
						LEAN CLAY WITH SAND AND GRAVEL, brown, moist to wet, medium stiff to very stiff, with silt lamination, (FILL)									
2 SS	8	3 4 6	10	5							2.50			13	
					785										
3 SS	13	2 5 6	11				cl				1.50			17	
4 SS	18	2 2 3	5			Very moist in sample SS-4					0.75			26	
				10	780										
						10.5 (779.8)									
						LEAN CLAY, brown, moist, very stiff, with gray mottling									
5 SS		2 5 9	14				cl				3.50			16	Recovery not recorded.
						12.5 (777.8)									

End of Boring at 12.5 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-23
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 10/24/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-11	DATE COMPLETED: 10/24/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 293423
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571928
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 792.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (3.1") 0.3 (792)									
						CONCRETE, (8.8") 1 (791.3)									
1 SS	18	14 16 12	28		790	BASE COURSE, (18") 2.5 (789.8)									
						LEAN CLAY, brown, gray and black, moist, very stiff to hard, trace to little sand, trace organics, with silt seams (FILL)									
2 SS	18	5 5 7	12	5							4.50			11	
3 SS	18	4 6 9	15		785		cl				2.75			12	
4 SS	18	4 6 6	12	10		10 (782.3)					2.00			12	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-24
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/21/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/21/11	LATITUDE:
CREW CHIEF: R. Jackson	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 293709
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION: / OFFSET:	EASTING: 572067
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 793.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY WITH SAND, brown to dark brown, moist, very stiff to hard, (FILL)									
1 SS	12	5 5 8	13				cl				4.50			12	
					790										
2 SS	15	2 5 5	10	5		Color change to dark brown at 3.5' Brown and gray mottled silt at bottom of sample SS-2					3.00			21	
						5.5 (788)									
3 SS	13	4 7 12	19			LEAN CLAY WITH SAND, gray and dark brown, moist, hard, some gray, (FILL)	cl				4.50			20	
						8 (785.5)									
					785	LEAN CLAY, grayish brown, moist, hard, (FILL)									
4 SS	15	3 6 17	23	10		10 (783.5)	cl				4.00			15	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-25
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 6/21/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/21/12	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: K. Gorenschek	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 293971
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION: / OFFSET:	EASTING: 572000
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 795.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					795	ASPHALT (6") 0.5 (795.1)									
						Base Course (12"), gravel 1.5 (794.1)									
1 SS	11	2 3 6	9			LEAN CLAY, brown and gray, moist, stiff to hard, (FILL)					2.5-4.25			12	
2 SS	18	3 4 4	8	5							1.50			18	
					790		cl								
3 SS	16	2 3 9	12								2.25			12	
4 SS	18	5 6 7	13			9 (786.6)									
						POORLY GRADED SAND WITH SILT, black, moist, (FILL)	sp-sm								
				10		9.6 (786)	cl				2.50			14	LOI = 1.3%
						LEAN CLAY, brown, moist, very stiff, (FILL) 10 (785.6)									

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-26
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 2/02/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 2/02/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: K. Gorenschek	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 294322
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572101
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 798.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE (10") 0.8 (798)									
						POORLY GRADED SAND WITH GRAVEL, gray, moist, trace clay BASE COURSE (5") 1.3 (797.5)									
1 SS	14	3 4 6	10			SANDY SILTY CLAY, brown and gray, moist, stiff to very stiff, trace gravel					1.25			14	
					795		cl-ml								
2 SS	17	6 5 5	10	5							2.25			14	
						5.5 (793.3) LEAN CLAY, dark brown to brown, moist, very stiff									
3 SS	15	5 4 4	8								2.75			23	
							cl								
					790	Color change to brown at 8.5'									
4 SS	13	3 3 4	7	10		10 (788.8)					3.25			18	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-77	Forward 45 LLC	RVT	J. Broennimann	H. Schoelk	E. Jeske	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	Diedrich D120 ATV	3¼ HSA, w/ RWB	Auto	(6/2011) 58.3%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
2/13/12	2/13/12	B-40-788 (BR-16)	45 NB / HAST		

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
SB-21	1 of 5	WISCRS (2006)	NAVD 88			294645	572044	793.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, dark brown, moist, medium stiff, trace roots, (FILL)									
1 SS	10	1 2 4	6				cl				0.50			18	
					790										
2 SS	10	4 5 6	11			4.1 (789.1)									
				5		POORLY GRADED SAND WITH GRAVEL, light brown, moist, medium dense, (FILL) 5.2 (788)	sp				2.75			15	
						LEAN CLAY, brown, moist, very stiff, (FILL)									
3 SS	11	4 4 6	10								2.75			23	
					785		cl								
4 SS	13	4 4 6	10								3.00			25	
				10		10.2 (783)									
						LEAN CLAY, brown, moist, very stiff to hard, with gray mottling									
5 SS	17	6 9 13	22								4.50			18	
					780										
6 SS	18	11 12 15	27								4.50			18	
				15			CL								
7 SH	17										4.5+ (5.3)	40	24	20	Dry Wt = 111 pcf
					775										
8 SH	17.5										3.25 (6.1)	39	24	19	Dry Wt = 113 pcf
				20											

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	CONSULTANT PROJECT No	DATE STARTED	HORIZONTAL DATUM	VERTICAL DATUM
Zoo Interchange	1060-33-77	Forward 45 LLC		2/13/12	WISCRS (2006)	NAVD 88

BORING LOG

BORING No	PAGE No
SB-21	2 of 5

DRILLING CONTRACTOR	DRILLING CONTRACTOR PROJECT No	DATE COMPLETED	LATITUDE
RVT	11039-10	2/13/12	

CREW CHIEF	DRILLING RIG	WisDOT STRUCTURE ID No	LONGITUDE
J. Broennimann	Diedrich D120 ATV	B-40-788 (BR-16)	

FIELD LOG BY	DRILLING METHOD / HOLE SIZE	ROADWAY NAME	NORTHING
H. Schoelk	3¼ HSA, w/ RWB	45 NB / HAST	294645

LOG QC BY	HAMMER TYPE	EFFICIENCY	STATION	OFFSET	EASTING
E. Jeske	Auto	(6/2011) 58.3%			572044

COUNTY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION	SURFACE ELEVATION
40-Milwaukee						793.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					770	LEAN CLAY, brown, moist, very stiff to hard, with gray mottling	CL							25	Driller converted to mud rotary at 20'. Dry to 20'
9 SS	18	4 6 7	13	25							3.75				
						26.8 (766.4)									
					765	LEAN CLAY, gray, moist, medium stiff to very stiff	cl								
10 SS	18	3 3 4	7	30							0.75			17	
					760										
11 SS	18	3 5 6	11	35							1.50			15	
					755										
12 SS	18	3 5 6	11	40							1.25			16	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-77	Forward 45 LLC	RVT	J. Broennimann	H. Schoelk	E. Jeske	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	Diedrich D120 ATV	3¼ HSA, w/ RWB	Auto	(6/2011) 58.3%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
2/13/12	2/13/12	B-40-788 (BR-16)	45 NB / HAST		

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
SB-21	3 of 5	WISCRS (2006)	NAVD 88			294645	572044	793.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					750	LEAN CLAY, gray, moist, medium stiff to very stiff									
13 SS	18	4 5 6	11	45							1.50			15	
					745										
14 SS	18	5 6 6	12	50			cl				2.25			18	
					740										
15 SS	18	5 6 6	12	55							2.25			25	
					735										
16 SS	18	4 6 6	12	60							1.75			14	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	CONSULTANT PROJECT No	DATE STARTED	HORIZONTAL DATUM	VERTICAL DATUM
Zoo Interchange	1060-33-77	Forward 45 LLC		2/13/12	WISCRS (2006)	NAVD 88

BORING LOG

BORING No	PAGE No
SB-21	4 of 5

DRILLING CONTRACTOR	DRILLING CONTRACTOR PROJECT No	DATE COMPLETED	LATITUDE
RVT	11039-10	2/13/12	

CREW CHIEF	DRILLING RIG	WisDOT STRUCTURE ID No	LONGITUDE
J. Broennimann	Diedrich D120 ATV	B-40-788 (BR-16)	

FIELD LOG BY	DRILLING METHOD / HOLE SIZE	ROADWAY NAME	NORTHING
H. Schoelk	3¼ HSA, w/ RWB	45 NB / HAST	294645

LOG QC BY	HAMMER TYPE	EFFICIENCY	STATION	OFFSET	EASTING
E. Jeske	Auto	(6/2011) 58.3%			572044

COUNTY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION	SURFACE ELEVATION
40-Milwaukee						793.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					730	LEAN CLAY, gray, moist, medium stiff to very stiff	cl								
17 SS	18	4 5 5	10	65							1.25			14	
						66.8 (726.4)									
					725	SANDY SILTY CLAY, gray, moist, stiff	cl								
18 SS	18	3 4 5	9	70							1.00			13	
					720										
19 SS	0	6 9 13	22	75		74.3 (718.9)									
						LEAN CLAY, gray, moist, stiff to very stiff	cl								
					715										
20 SS	8	8 12 16	28	80							1.75			19	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-77	Forward 45 LLC	RVT	J. Broennimann	H. Schoelk	E. Jeske	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	Diedrich D120 ATV	3¼ HSA, w/ RWB	Auto	(6/2011) 58.3%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
2/13/12	2/13/12	B-40-788 (BR-16)	45 NB / HAST		

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
SB-21	5 of 5	WISCRS (2006)	NAVD 88			294645	572044	793.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					710	LEAN CLAY, gray, moist, stiff to very stiff									Cobbles and/or boulder at 83'
21 SS	7	9 13 18	31	85							1.25			16	
					705		cl								
22 SS	18	6 10 15	25	90							2.25			22	
					700										
23 SS	18	7 9 11	20	95							2.25			26	
						96.8 (696.4)									
					695	POORLY GRADED SAND, gray, wet, dense, trace gravel	sp								
24 SS	12	24 38 44	82	100		100 (693.2)									
						End of Boring at 100.0 ft.									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45 LLC	RVT	J. Broennimann	H. Scheelk	E. Jeske	40-Milwaukee

BORING LOG

zoo interchange

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM
CB-23	1 of 5	WISCRS (2006)	NAVD 88

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	Diedrich D120 ATV	3¼" HSA w/ RWB	Auto	(8/2011) 58.3%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
3/28/12	3/28/12	B-40-855 (BR-07)	S-W Ramp (System)		

LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
		294919	572175	803.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SILTY SAND WITH GRAVEL, brown, moist, medium dense, (FILL)									
1 SS	15	4 6 9	15				sm								
					800										
						4.1 (799.1)									
2 SS	15	3 5 8	13	5		LEAN CLAY WITH SAND, brown, moist, stiff, (FILL)	cl				1.25			16	
						5.5 (797.7)									
3 SS	16	3 7 9	16			LEAN CLAY, brown and gray, moist, stiff to very stiff, (FILL) <1/8" thick silt seam in sample SS-3					2.25			14	
					795										
4 SS	13	2 4 5	9	10		Color change to grayish brown at 8.5'					1.50			16	
							CL								Driller converted to mud rotary at 10', dry to 10'
5 SH	9										2.50 (2.5)	33	19	19	Dry Wt = 117 pcf
					790										
6 SS	5	8 8 7	15	15		Sandy seam in sample SS-6								31	
						15.5 (787.7)									
7 SS	16	5 8 12	20			LEAN CLAY, brown, moist, very stiff to hard, with gray mottling					3.00			17	
					785		CL								
8 SS	17	9 13 16	29	20							4.50			20	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45 LLC	RVT	J. Broennimann	H. Scheelk	E. Jeske	40-Milwaukee

BORING LOG

zoo interchange

BORING No CB-23

PAGE No 2 of 5

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	Diedrich D120 ATV	3¼" HSA w/ RWB	Auto	(8/2011) 58.3%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
3/28/12	3/28/12	B-40-855 (BR-07)	S-W Ramp (System)		

HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
WISCRS (2006)	NAVD 88			294919	572175	803.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, brown, moist, very stiff to hard, with gray mottling									
					780										
9 SS	18	6 8 11	19	25		Color change to brown at 23.5'					4.50			21	
					775		CL								
10 SH	11			30							3.0-3.75 (3)	41	26	21	Dry Wt = 109 pcf
					770										
11 SS	18	4 5 8	13	35		Color change to grayish brown at 33.5'					2.50			23	
						36.8 (766.4)									
					765	LEAN CLAY, gray, moist, very stiff	cl								Driller attempted Shelby tube from 38' to 40'. No recovery
				40											

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45 LLC	RVT	J. Broennimann	H. Scheelk	E. Jeske	40-Milwaukee

BORING LOG

zoo interchange

BORING No CB-23

PAGE No: 3 of 5

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	Diedrich D120 ATV	3¼" HSA w/ RWB	Auto	(8/2011) 58.3%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
3/28/12	3/28/12	B-40-855 (BR-07)	S-W Ramp (System)		

HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
WISCRS (2006)	NAVD 88			294919	572175	803.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
12 SS	18	3 6 8	14			LEAN CLAY, gray, moist, very stiff					2.00			21	
					760										
13 SS	18	3 4 8	12	45							2.00			22	
					755										
14 SS	18	3 5 8	13	50			cl				2.00			22	
					750										
15 SS	18	4 6 8	14	55							2.00			22	
					745										
16 SS		4 5 8	13	60							2.00			21	Recovery not recorded on field log

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45 LLC	RVT	J. Broennimann	H. Scheelk	E. Jeske	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	Diedrich D120 ATV	3¼" HSA w/ RWB	Auto	(8/2011) 58.3%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
3/28/12	3/28/12	B-40-855 (BR-07)	S-W Ramp (System)		

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
CB-23	4 of 5	WISCRS (2006)	NAVD 88			294919	572175	803.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					740	LEAN CLAY, gray, moist, very stiff									
17 SS	18	4 6 9	15	65							2.25			18	
					735										
18 SS	18	4 6 8	14	70			cl				2.00			16	
					730										
19 SS	18	6 8 12	20	75							2.25			23	
					725										
20 SS	18	6 8 11	19	80							2.25			23	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45 LLC	RVT	J. Broennimann	H. Scheelk	E. Jeske	40-Milwaukee

BORING LOG

zoo interchange

BORING No CB-23

PAGE No 5 of 5

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	Diedrich D120 ATV	3¼" HSA w/ RWB	Auto	(8/2011) 58.3%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
3/28/12	3/28/12	B-40-855 (BR-07)	S-W Ramp (System)		

HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
WISCRS (2006)	NAVD 88			294919	572175	803.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, gray, moist, very stiff									
					720										
21 SS	18	6 9 11	20	85							2.75			22	
					715		cl								
22 SS	18	6 8 11	19	90							2.75			23	
					710										Driller notes cobbles and/ or boulder from 92' to 92.8'
23 SS	0	50/1"	R	95											
						96.8 (706.4)									
						POORLY GRADED SAND, gray, wet, medium dense									
					705		sp								
24 SS	13	13 13 15	28	100		100 (703.2)									
						End of Boring at 100.0 ft.									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-28
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 6/07/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/07/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: A. Woerpel	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: South Leg Mainline	NORTHING: 295317
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572363
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 767 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL 0.5 (766.5)									Topsoil thickness was not recorded
1 SS	18	4 7 11	18		765	LEAN CLAY, brown, moist, hard					4.50			18	
2 SS	18	4 6 9	15	5			cl				4.00			16	
3 SS	18	4 7 5	12		760	6.5 (760.5) SILT, gray, moist, medium dense 6.7 (760.3)	ml				2.0-3.0			16	
4 SS	18	3 4 7	11	10		LEAN CLAY, gray, moist, very stiff 10 (757)	cl				3.00			20	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: SH-29
WisDOT PROJECT ID No: 1060-33-77			PAGE No: 1 of 1
CONSULTANT: Forward 45 LLC	CONSULTANT PROJECT No:	DATE STARTED: 11/21/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/21/11	LATITUDE:
CREW CHIEF: R. Jackson	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: SB I-94 off-ramp to Lincoln Ave.	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 286648
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION / OFFSET	EASTING: 571340
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 778.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY WITH SAND, dark brown to brown, moist, very stiff, (FILL)									
1 SS	8	3 4 4	8				cl				3.00			18	
					775	3 (775.2) SILTY CLAY, brown, moist, very stiff, (FILL)									
2 SS	14	3 6 6	12	5			cl-ml				2.50			14	
						5.5 (772.7) LEAN CLAY, brown, moist, hard, with gray mottling, (FILL)									
3 SS	18	5 8 12	20				cl				4.00			17	
					770	8 (770.2) LEAN CLAY WITH SAND, olive and black, moist, very stiff, trace organic matter, (FILL)									
4 SS	12	3 6 9	15	10		10 (768.2)	cl				3.25			19	LOI = 2.7%

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-1
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/03/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/03/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 296145
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 581089
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 715.1 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (7.4") 0.6 (714.5)									
						BASE COURSE, (3") 0.8 (714.3)									
1 SS	14	2 5 7	12			LEAN CLAY, red brown, moist, hard, with occasional silt lenses					4.5+			16	
2 SS	18	4 9 13	22	5	710		cl				4.5+			17	
3 SS	18	4 6 10	16								4.50			18	
4 SS	18	4 6 10	16	10		10 (705.1)					4.50			18	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No EB-2**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 4
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/10/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: RVT	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/10/11	LATITUDE:
CREW CHIEF: J. Broennimann	DRILLING RIG: Diedrich D120 ATV	WisDOT STRUCTURE ID No: B-40-865 (BR-31)	LONGITUDE:
FIELD LOG BY: J. Smotucha	DRILLING METHOD / HOLE SIZE: 3¼ HSA, w/ RWB	ROADWAY NAME: 73rd / I-94	NORTHING: 296086
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (8/2011) 58.3%	STATION / OFFSET	EASTING: 580731
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 709.1 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT (6") 0.5 (708.6)									
						BASE COURE (thickness not recorded)									
1 SS	7	3 2 6	8			POORLY GRADED GRAVEL WITH SAND, brown, moist to very moist, loose, (FILL)	gp								
						3 (706.1)									
						LEAN CLAY, brown to gray, moist, stiff to very stiff									
2 SS	12	4 4 6	10	5	705						2.75			20	
3 SS	18	4 4 6	10								2.50			19	
4 SH	13			10	700		CL				2.75-3.50 (2.6)	33	19	19	Dry Wt = 116 pcf
5 SS	18	3 3 5	8								2.00			22	
6 SS	15	8 8 8	16	15	695	Sand seam in sample SS-6					1.25			18	
						15.5 (693.6)									
						SILTY SAND, gray, wet, loose to medium dense									
7 SS	14	8 8 9	17				sm								
8 SS	16	2 3 3	6	20	690										

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 1/20/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No EB-2**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 2 of 4
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/10/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: RVT	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/10/11	LATITUDE:
CREW CHIEF: J. Broennimann	DRILLING RIG: Diedrich D120 ATV	WisDOT STRUCTURE ID No: B-40-865 (BR-31)	LONGITUDE:
FIELD LOG BY: J. Smotucha	DRILLING METHOD / HOLE SIZE: 3¼ HSA, w/ RWB	ROADWAY NAME: 73rd / I-94	NORTHING: 296086
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (8/2011) 58.3%	STATION / OFFSET	EASTING: 580731
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 709.1 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SILTY SAND, gray, wet, loose to medium dense	sm					Driller converted to mud rotary at 20.0'
						21.8 (687.3)						
						POORLY GRADED SAND WITH GRAVEL, gray, wet, medium dense, with silty seams	sp					
9 SS	12	3 6 12	18	25	685							
												Light rig chatter from 25' to 26'
10 SS	11	10 12 15	27	30	680							
						31.8 (677.3)						
						POORLY GRADED GRAVEL WITH SAND, gray, wet, dense	gp					Heavy rig chatter from 32' to 33'
11 SS	10	11 13 17	30	35	675							
						36.8 (672.3)						
						LEAN CLAY, gray, moist, hard	cl					
12 SS	18	18 28 40	68	40	670			4.50			21	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 1/20/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No EB-2**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 3 of 4
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/10/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: RVT	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/10/11	LATITUDE:
CREW CHIEF: J. Broennimann	DRILLING RIG: Diedrich D120 ATV	WisDOT STRUCTURE ID No: B-40-865 (BR-31)	LONGITUDE:
FIELD LOG BY: J. Smotucha	DRILLING METHOD / HOLE SIZE: 3¼ HSA, w/ RWB	ROADWAY NAME: 73rd / I-94	NORTHING: 296086
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (8/2011) 58.3%	STATION / OFFSET	EASTING: 580731
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 709.1 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, gray, moist, hard									
13 SS	18	16 27 28	55	45	665		cl				4.50			16	
						46.8 (662.3)									
						POORLY GRADED SAND, gray, wet, dense									
14 SS	18	13 18 26	44	50	660										
							sp								
15 SS	15	16 20 24	44	55	655										
						56.8 (652.3)									
						LEAN CLAY, gray, moist, hard									Cobbles and/or boulder from 57' to 58.5'
16 SS	10	42 50		60	650		cl				4.25			13	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 1/20/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No EB-2**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 4 of 4
CONSULTANT: Forward 45	CONSULTANT PROJECT No	DATE STARTED: 11/10/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: RVT	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/10/11	LATITUDE
CREW CHIEF: J. Broennimann	DRILLING RIG: Diedrich D120 ATV	WisDOT STRUCTURE ID No: B-40-865 (BR-31)	LONGITUDE
FIELD LOG BY: J. Smotucha	DRILLING METHOD / HOLE SIZE: 3¼ HSA, w/ RWB	ROADWAY NAME: 73rd / I-94	NORTHING: 296086
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (8/2011) 58.3%	STATION / OFFSET	EASTING: 580731
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 709.1 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, gray, moist, hard	cl								
						63.5 (645.6)									
17 SS	0	50/2"	R		645	BOULDER/ COBBLES									Cobbles and/or boulder from 63.5' to 65' Sample obtained from mud return from drilling through cobbles and/or boulder
				65		65 (644.1)									
						SILTY GRAVEL WITH SAND, gray, wet, very dense	gm								
18 SS	2	50/2"	R		640	69 (640.1)									
						BEDROCK, LIMESTONE									
				70											
						73.6 (635.5)									
19 SS	0	50/1"	R			End of Boring at 73.6 ft.									Sample obtained from mud return from drilling into bedrock from 69' to 75'

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 1/20/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No EH-2**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/03/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/03/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295943
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 580515
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 713.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (7") 0.6 (713.1)									
						BASE COURSE, (4") 0.9 (712.8)									
1 SS	5	4 3 4	7			LEAN CLAY, grayish brown, moist, stiff to very stiff, trace to little sand, with occasional sand seams					1.25			17	
					710										
2 SS	18	3 3 4	7	5						1.50-3.00				18	
							cl								
3 SS	18	3 5 6	11								3.00			19	
					705										
4 SS	18	3 6 7	13	10							2.50			28	
						10.5 (703.2)									
						POORLY GRADED SAND, gray, moist, medium dense									
5 SS	16	9 11 10	21				sp								
						12.5 (701.2)									

End of Boring at 12.5 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-3
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/25/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/25/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295965
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION / OFFSET	EASTING: 580241
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 711.1 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (4.5") 0.4 (710.7)									
					710	BASE COURSE, (5") 0.8 (710.3)									
1 SS	9	2 5 8	13			LEAN CLAY, brownish gray to gray, moist, stiff to very stiff					1.00			16	
2 SS	18	3 8 11	19	5							1.75			19	
					705										
3 SS	18	5 8 11	19				cl				2.25			18	
4 SS	18	4 7 11	18	10		Color change to gray in sample SS-4					3.00			14	
					700	With silt lenses in sample SS-5									
5 SS	18	5 7 12	19								2.00			22	
						13 (698.1) POORLY GRADED SAND, gray, wet, medium dense									
6 SS	16	14 17 11	28	15		15 (696.1)	sp								

End of Boring at 15.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 13.5ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No EH-4**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/03/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/03/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295777
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 580037
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 713.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (7") 0.6 (713.2)									
						BASE COURSE, (3") 0.8 (713)									
1 SS	13	3 3 3	6			LEAN CLAY, grayish brown then gray, moist, stiff to hard					4.50			17	
					710	Color change to gray in sample SS-2									
2 SS	14	3 3 3	6	5						1.50-2.00				20	
						With silt seam in sample SS-3									
3 SS	18	2 3 5	8				cl				2.50			20	
					705										
4 SS	18	2 4 4	8	10						2.25-3.00				23	
5 SS	18	3 4 7	11								2.75			20	
						13 (700.8)									
					700	POORLY GRADED SAND, gray, moist, medium dense, trace to little gravel (fractured rock pieces in sample SS-6)									
6 SS	15	7 13 13	26	15		15 (698.8)	sp								

End of Boring at 15.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No EH-5**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/25/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/25/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295799
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION / OFFSET	EASTING: 579751
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 708.1 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (5") 0.4 (707.7)									
						BASE COURSE, (5") 0.8 (707.3)									
1 SS	9	2 3 6	9			LEAN CLAY, brown to brownish gray, moist, stiff to very stiff					1.25			18	
					705										
2 SS	13	3 6 7	13	5		Trace gravel in sample SS-2				1.25-1.50				19	
3 SS	18	5 8 9	17			Trace gravel in sample SS-3	cl				2.75			19	
					700										
4 SS	18	5 7 10	17	10						2.00-2.50				21	
5 SS	18	5 9 8	17			12.5 (695.6)					2.00			22	

End of Boring at 12.5 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-6
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/03/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/03/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295627
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 579541
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 713.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (7") 0.6 (713)									
						BASE COURSE, (5") 1 (712.6)									
1 SS	18	2 2 3	5			LEAN CLAY, red brown to brown, moist, stiff to hard					1.25-2.50			20	
					710										
2 SS	18	4 6 7	13	5		Color change to brown					4.00			20	
							cl								
3 SS	18	3 6 5	11			With mottled gray in sample SS-3					3.25			19	
					705										
4 SS	18	3 3 5	8	10		10 (703.6)					1.00-2.75			24	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No EH-7**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/25/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/25/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295676
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION: / OFFSET:	EASTING: 579258
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 710.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					710	CONCRETE, (7.2") 0.6 (709.9)									
						BASE COURSE, (6") 1.1 (709.4)									
1 SS	8	2 2 4	6			LEAN CLAY, red brown, moist, stiff, trace to little sand, trace gravel, with vertical water leaching marks in sample SS-1, (FILL) 2.6 (707.9)	cl				1.50			18	
						LEAN CLAY, light brown to grayish brown, moist, very stiff to hard, little sand									
2 SS	18	4 8 10	18	5							2.75			18	
					705										
3 SS	18	5 8 10	18								3.00			21	
4 SS	18	4 8 11	19	10			cl				2.75			14	
					700										
5 SS	18	3 6 9	15			Color change to grayish brown in sample SS-5					2.25			20	
6 SS	18	5 8 11	19	15		15 (695.5)					4.25			19	

End of Boring at 15.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-8
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/03/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/03/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295522
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 579030
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 715 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (7") 0.6 (714.4)									
						BASE COURSE, (3.5") 0.9 (714.1)									
1 SS	14	7 6 6	12			LEAN CLAY, dark brown and gray, moist, very stiff to hard, little sand, trace gravel (FILL)	cl				4.00			13	
2 SS	12	6 5 6	11	5	710	5.3 (709.7)					3.50			19	
3 SS	18	15 24 19	43			POORLY GRADED SAND, black, moist, dense, possible foundry sand, trace slag and organics (FILL) 8 (707)	sp								
4 SS	18	3 2 3	5	10	705	LEAN CLAY, black and gray, moist, stiff, with organic matter, little possible foundry sand, (FILL)	cl				1.75			38	LOI = 8.0%
5 SS	18	2 2 2	4			12.5 (702.5)					1.50			45	

End of Boring at 12.5 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45	Gestra	B. Sargent	D. Ashford	R. Haque	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	CME 75 (F700)	2¼" HSA	Auto	(6/2011) 61.3%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
10/25/11	10/25/11	East Leg Mainline	Roadway		

BORING No EH-9

PAGE No 1 of 1

HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
WISCRS (2006)	NAVD 88			295597	578752	709.1 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Moisture Content (%)	Notes
						CONCRETE, (6") 0.5 (708.6)				Bulk sample obtained from 0'-5' LL = 39% PL = 16% PI = 23%
						BASE COURSE, (5") 0.9 (708.2)				
1 SS	6	4 4 8	12			LEAN CLAY, black, brown and gray, moist, hard, trace sand and gravel, with sand lenses (FILL)	cl	4.25	16	
2 SS	11	6 11 17	28	5	705	5 (704.1)		4.50	17	
3 SS	9	13 17 23	40			POORLY GRADED SAND, brown and black, moist, loose to dense, alternate layers of lean clay and possible foundry sand (FILL)	sp			
4 SS	5	4 3 5	8	10	700	10 (699.1)				
5 SS	13	2 5 9	14			LEAN CLAY, brown and olive green, moist, very stiff to hard	cl	2.25	21	
6 SS	18	6 13 15	28	15	695	Color change to brown at 13.5 ft 15 (694.1)		4.25	19	

End of Boring at 15.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-10
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/03/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/03/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295458
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 578510
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 712.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (6.9") 0.6 (711.9)									
						BASE COURSE, (2") 0.8 (711.7)									
1 SS	12	6 5 7	12		710	LEAN CLAY, brown and gray, moist, hard, trace sand and gravel with occasional sand seams, (FILL)	cl				4.5+			21	
2 SS	16	5 9 7	16	5		5.4 (707.1)					4.5+			19	
3 SS	14	3 3 5	8		705	POORLY GRADED SAND, brown and black, moist, loose, possible foundry sand, trace slag, with brown clay seam, (FILL) 7.8 (704.7)	sp								
4 SS	10	3 4 5	9	10		LEAN CLAY, black, moist, very stiff, with organic matter, little possible foundry sand, (FILL) 10.2 (702.3)	cl				2.00			37	LOI = 8.0%
5 SS	16	4 6 5	11		700	POORLY GRADED SAND, black and brown, moist, medium dense, possible foundry sand and brown clay seams, (FILL) 12.5 (700)	sp-sc							36	

End of Boring at 12.5 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-11
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 1/31/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 1/31/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: Roadway	NORTHING: 295572
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 578270
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 707.1 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT (5") 0.4 (706.7)									
						CONCRETE (8") 1.1 (706)									
1 SS	14	3 3 5	8		705	POORLY GRADED SAND WITH GRAVEL, brown, moist BASE COURSE (7") 1.7 (705.4)	sp				0.75-2.0			26	
						LEAN CLAY, dark brown, moist, stiff to very stiff, trace gravel, (FILL) 3 (704.1)	cl								
2 SS	16	3 3 8	11	5		LEAN CLAY, brown, moist, very stiff, with gray mottling, (FILL)					2.00			17	
3 SS	18	5 5 7	12		700	Color change to brown at 6'					3.50			14	
							cl								
4 SS	18	4 6 9	15	10		Sand seam in sample SS-4					3.50			16	
5 SS	18	4 7 9	16		695	Clayey sand with gravel seam at the bottom of sample SS-5 12.5 (694.6)					3.50			15	

End of Boring at 12.5 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-12
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/03/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/03/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295423
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 578039
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 707.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (9") 0.8 (706.4)									
						BASE COURSE, (3.5") 1.1 (706.1)									
1 SS	12	10 6 7	13		705	CLAYEY SAND, brown, moist, medium dense 2.8 (704.4)	sc								
						LEAN CLAY, brown, black and gray, moist, hard, with possible foundry sand 5.2 (702)	cl								
2 SS	10	8 7 9	16	5							4.25			15	
						POORLY GRADED SAND, black, moist, loose, little slag 8 (699.2)	sp								
3 SS	18	4 4 3	7		700										
						SILTY SAND, black, moist, loose, possible foundry sand 10 (697.2)	sm								
4 SS	6	4 2 4	6	10										19	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-13
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/25/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/25/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295529
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION: / OFFSET:	EASTING: 577792
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 712.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (6") 0.5 (711.8)									
						BASE COURSE, (5.5") 1 (711.3)									
1 SS	10	8 4 3	7		710	POORLY GRADED SAND, brown, black and gray, wet, loose, trace to little silt, trace gravel (FILL) 3 (709.3)	sp								
2 SS	11	2 4 7	11	5		LEAN CLAY, red brown, moist, very stiff to hard, little sand, trace gravel	cl				2.25			26	
3 SS	18	5 11 17	28		705	8 (704.3)					4.50			20	
4 SS	18	7 10 11	21	10		CLAYEY SAND, brown, wet, medium dense 10 (702.3)	sc								

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 1ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: N/A		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-14
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 1/31/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 1/31/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: Roadway	NORTHING: 295448
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 577526
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 714.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Moisture Content (%)	Notes
						ASPHALT (3") 0.3 (714.5)				
						CONCRETE (7") 0.8 (714)				
1 SS	0	7 9 15	24			POORLY GRADED SAND WITH GRAVEL, dark gray, moist, trace clay BASE COURSE (6½") 1.4 (713.4)	sc			No recovery, sample SS-1 taken from auger cuttings
						CLAYEY SAND WITH GRAVEL, brown, moist, medium dense, with possible foundry material, (FILL) 3 (711.8)				
2 SS	11	9 11 22	33	5	710	LEAN CLAY WITH SAND, gray, moist, hard, trace gravel, (FILL)			14	Push stone during sampling, sample disturbed unable to get Q_p
3 SS	8	5 9 9	18				cl	4.5+	12	
4 SS	10	3 4 9	13	10	705	Brown and gray in sample SS-4 10 (704.8)		4.5+	15	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EB-14
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/25/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/25/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-863/ 864	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼" HSA	ROADWAY NAME: I-94 / 84th St.	NORTHING: 295564
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 577048
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 719.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (5") 0.4 (718.8)									
						CONCRETE, (6") 0.9 (718.3)									
1 SS	18	4 5 2	7			BASE COURSE, (10") 1.8 (717.4)									
						POORLY GRADED SAND, brown and black, moist, medium dense, trace gravel and clay (FILL) 3 (716.2)	sp								
2 SS	15	3 15 4	19	5	715	POORLY GRADED SAND WITH CLAY, dark brown and gray, moist, medium dense, trace gravel with clay seams 5.4 (713.8)	sp-sc							10	
3 SS	18	2 1 1	2			LEAN CLAY, dark brown and black, moist, very soft to very stiff	CL				0.00			26	
4 SH	20			10	710	Color change to gray at 8' 10.3 (708.9)	CL				3.75 (2.3)	40	22	20	Dry Wt = 113 pcf
5 SS	18	4 3 2	5			LEAN CLAY, dark brown and black, moist, medium stiff to very stiff, trace to little sand and gravel, trace organic matter, (FILL)	CL				2.75			16	
6 SS	18	2 7 8	15	15	705		CL				3.50			20	
7 SS	18	2 3 4	7				CL				2.00			16	
8 SH	12			20	700	With gravel in sample SH-8	CL				4.50 (2)			19	Dry Wt = 112 pcf

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 33.5ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/12/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No EB-14**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 2 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/25/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/25/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-863/ 864	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼" HSA	ROADWAY NAME: I-94 / 84th St.	NORTHING: 295564
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 577048
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 719.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, dark brown and black, moist, medium stiff to very stiff, trace to little sand and gravel, trace organic matter, (FILL)									
9 SS	18	3 6 5	11	25	695		CL				2.00			15	
						28.8 (690.4)					0.75	37	9	29	LOI = 4.6%
10 SH	16			30	690	POORLY GRADED SAND, gray, moist to wet, medium dense, trace to little silt and gravel									
						Wet at 33.5'	sp								
11 SS	18	3 6 14	20	35	685										
						36.8 (682.4)									
						SILTY CLAY, gray, moist, with sand seams	cl-ml								
12 SS	18	7 12 35	47	40	680									15	Disturbed sample, no Qp possible

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 33.5ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/12/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No EB-14**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 3 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/25/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/25/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-863/ 864	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼" HSA	ROADWAY NAME: I-94 / 84th St.	NORTHING: 295564
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 577048
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 719.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SILTY CLAY, gray, moist, with sand seams	cl-ml								
						41.8 (677.4)									
						LEAN CLAY, gray, moist, stiff to hard, with occassional silt lenses									
13 SS	18	6 10 13	23	45	675					1.50-4.50				21	
							cl								
14 SS	18	10 13 15	28	50	670						3.50			18	
						51.8 (667.4)									
						SILT, gray, wet, very dense, with clay seams									
15 SS	18	28 30 27	57	55	665		ml							16	
						56.8 (662.4)									
						LEAN CLAY, gray, moist, very stiff to hard, trace gravel, occassional silt seams									
							cl								
16 SS	18	10 20 25	45	60	660						4.50			12	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 33.5ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/12/12

WisDOT PROJECT NAME	Zoo Interchange	BORING LOG	BORING No	EB-14
WisDOT PROJECT ID No	1060-33-01		PAGE No	4 of 5
CONSULTANT	Forward 45	CONSULTANT PROJECT No	DATE STARTED 10/25/11	HORIZONTAL DATUM WISCRS (2006) / VERTICAL DATUM NAVD 88
DRILLING CONTRACTOR	Gestra	DRILLING CONTRACTOR PROJECT No 11039-10	DATE COMPLETED 10/25/11	LATITUDE
CREW CHIEF	A. Woerpel	DRILLING RIG CME 75 (International)	WisDOT STRUCTURE ID No B-40-863/ 864	LONGITUDE
FIELD LOG BY	B. Brown	DRILLING METHOD / HOLE SIZE 3¼" HSA	ROADWAY NAME I-94 / 84th St.	NORTHING 295564
LOG QC BY	R. Haque	HAMMER TYPE Auto / EFFICIENCY (6/2011) 85.1%	STATION / OFFSET	EASTING 577048
COUNTY	40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION 719.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Moisture Content (%)	Notes
						LEAN CLAY, gray, moist, very stiff to hard, trace gravel, occassional silt seams	cl			
						64 (655.2)				
17 SS	18	3 6 6	12	65	655	SILT, gray, wet, medium dense to dense, with silt lenses	ml	2.50	16 14	
18 SS	18	18 22 22	44	70	650				18	
						71.8 (647.4)				
						SILT, gray, moist, medium dense to dense, with alternating lean clay layers	cl / ml			
19 SS	18	13 20 23	43	75	645			4.00	19	
20 SS	18	12 17 25	42	80	640			4.00	18	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 33.5ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/12/12

WisDOT PROJECT NAME	Zoo Interchange	BORING LOG	BORING No	EB-14
WisDOT PROJECT ID No	1060-33-01		PAGE No	5 of 5
CONSULTANT	Forward 45	CONSULTANT PROJECT No	DATE STARTED 10/25/11	HORIZONTAL DATUM WISCRS (2006) / VERTICAL DATUM NAVD 88
DRILLING CONTRACTOR	Gestra	DRILLING CONTRACTOR PROJECT No 11039-10	DATE COMPLETED 10/25/11	LATITUDE
CREW CHIEF	A. Woerpel	DRILLING RIG CME 75 (International)	WisDOT STRUCTURE ID No B-40-863/ 864	LONGITUDE
FIELD LOG BY	B. Brown	DRILLING METHOD / HOLE SIZE 3¼" HSA	ROADWAY NAME I-94 / 84th St.	NORTHING 295564
LOG QC BY	R. Haque	HAMMER TYPE Auto / EFFICIENCY (6/2011) 85.1%	STATION / OFFSET	EASTING 577048
COUNTY	40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION 719.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SILT, gray, moist, medium dense to dense, with alternating lean clay layers	cl / ml								Rig chatter at 81.0 ft to 82.0 ft
21 SS	18	9 16 13	29	85	635						4.50			14	
						86.5 (632.7)									
						SILT, gray, wet, very dense, little sand	ml								
22 SS	18	9 17 26	43	90	630									15	
						91.8 (627.4)									
						POORLY GRADED SAND, gray, wet, very dense	sp								
23 SS	18	19 24 30	54	95	625										
24 SS	16	22 34 42	76	100	620	Trace to little gravel, with clay seams in sample SS-24									
						100 (619.2)									
						End of Boring at 100.0 ft.									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 33.5ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 9/12/12

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-15
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/15/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/15/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295711
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION / OFFSET	EASTING: 576817
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 702.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT (3.2") 0.3 (702.5)									
						CONCRETE (8.3") 1 (701.8)									
1 SS	6	8 4 5	9			POORLY GRADED GRAVEL WITH SAND, gray, moist BASE COURSE (4") 1.3 (701.5)	gp								
					700	POORLY GRADED GRAVEL, dark brown to black, moist, (FILL) 2 (700.8)	cl								
2 SS	13	2 2 4	6			LEAN CLAY WITH SAND, dark brown to brown, moist, some gravel, (FILL) 3 (699.8)					1.50			22	
				5		LEAN CLAY WITH SAND, black, moist, medium stiff to stiff, trace organic matter, (FILL)	cl								
3 SS	16	2 2 3	5								0.75-1			21	LOI = 2.2%
					695	7.9 (694.9)									
						LEAN CLAY, brown with gray, moist, stiff									
4 SS	18	2 3 4	7	10		10 (692.8)	cl				1.50			24	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-16
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 1/31/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 1/31/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: Roadway	NORTHING: 295658
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 576542
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 707.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT (6") 0.5 (707.1)									
						POORLY GRADED SAND WITH GRAVEL, brown, moist, with black lean clay BASE COURSE (6") 1 (706.6)	sp								
1 SS	10	3 5 7	12			LEAN CLAY, brown, moist, hard, with gray mottling					4.5+			20	
					705										
2 SS	11	5 7 7	14	5		Color change to brown at 3.5'	cl				4.50			17	
3 SS	18	4 5 7	12		700						4.00			20	
4 SS	18	5 5 8	13	10		10 (697.6)					4.00			20	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-17
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/15/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/15/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295778
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION / OFFSET	EASTING: 576302
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 712.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE (9") 0.8 (711.4)									
						POORLY GRADED GRAVEL WITH SAND, gray, moist BASE COURSE (5") 1.2 (711)									
1 SS	17	2 4 7	11		710	LEAN CLAY, brown, moist, very stiff, with occasional silt seams	cl				3.50			18	
2 SS	16	3 7 9	16	5		5.5 (706.7)					3.25			19	
						LEAN CLAY, gray, moist, very stiff									
3 SS	16	2 3 6	9		705		cl				2.50			22	
4 SS	18	3 4 7	11	10		10 (702.2)					2.50			17	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-18
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 1/31/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 1/31/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: Roadway	NORTHING: 295728
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 576047
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 711.9 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT (6") 0.5 (711.4)									
1 SS	11	4 6 9	15		710	POORLY GRADED SAND WITH GRAVEL, brown, moist, with dark brown clay seams BASE COURSE (6") 1 (710.9)					4.5+			18	
						LEAN CLAY, brown, moist, hard, with gray mottling, (POSSIBLE FILL)									
2 SS	12	6 7 8	15	5			cl				4.50			18	
3 SS	18	5 7 10	17		705						4.00			20	
4 SS	18	5 6 10	16	10		10 (701.9)					4.00			20	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-19
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/07/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/07/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295793
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 575781
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 719.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SANDY LEAN CLAY, dark brown then brown, moist, hard, (FILL)									
1 SS	18	2 6 10	16				cl				4-4.5			17	LOI = 3.1%
						3 (716.6)									
						LEAN CLAY, dark brown to black, moist, very stiff, with organic matter, (FILL)									
2 SS	18	2 3 4	7	5	715		cl				3.50			31	LOI = 6.4%
						5.5 (714.1)									
						LEAN CLAY, brown with gray, moist, very stiff to hard									
3 SS	18	3 4 5	9								2.75			22	
							cl								
4 SS	18	3 6 8	14	10	710						4.50			18	
						10 (709.6)									

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-20
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 1/31/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 1/31/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: Roadway	NORTHING: 295716
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 575539
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 727.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT (4") 0.3 (727.3)									
						CONCRETE (7") 0.9 (726.7)									
1 SS	6	4 3 4	7			POORLY GRADED GRAVEL WITH SAND, light gray, moist BASE COURSE (5") 1.3 (726.3)					2.25			23	
					725	LEAN CLAY, brown, moist, very stiff, with organic matter, (FILL)									
2 SS	12	4 4 4	8	5		Color change to black at 6'					3.50			32	LOI = 5.3% Sample too sandy to get Q_p
						5.5 (722.1)									
						LEAN CLAY, brown, moist, stiff, (FILL)									
3 SS	18	2 3 4	7		720						1.25			23	
						8 (719.6)									
						LEAN CLAY, brown, moist, stiff, with gray mottling									
4 SS	18	2 4 4	8	10		10 (717.6)					1.25			18	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-21
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/25/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/25/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295772
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION: / OFFSET:	EASTING: 575281
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 737.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (5.5") 0.5 (736.8)									
						BASE COURSE, (5") 0.9 (736.4)									
1 SS	7	4 6 12	18		735	LEAN CLAY, red brown, moist, hard, little sand, trace gravel	cl				4.50			20	
2 SS	13	6 14 18	32	5		With vertical water leaching mark in sample SS-2					4.25			18	
						5.3 (732) LEAN CLAY, brown, moist, very stiff to hard, with gray mottling									
3 SS	18	7 11 17	28		730						3.00			19	
4 SS	18	8 10 13	23	10			cl				4.25			21	
5 SS	18	8 11 10	21			12 (725.3)					4.25			20	

End of Boring at 12.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-22
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 1/31/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 1/31/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: Roadway	NORTHING: 295711
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 575027
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 742.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Moisture Content (%)
						ASPHALT (3") 0.3 (742)			
						CONCRETE (7") 0.8 (741.5)			
1 SS	15	6 8 7	15		740	POORLY GRADED GRAVEL WITH SAND, light gray, moist BASE COURSE (6") 1.3 (741)	sm		
						SILTY SAND, gray, moist, medium dense, (FILL) 3 (739.3)			
2 SS	18	18 12 7	19	5		SANDY LEAN CLAY, brown, moist, (FILL) 5.5 (736.8)	cl		13
3 SS	18	2 2 4	6		735	LEAN CLAY, brown to gray, moist, very stiff to hard, with gray mottling		3.50	27
4 SS	18	2 4 5	9	10			cl	3.50	21
5 SS	18	4 6 8	14		730	Color change to gray at 11'		4.5+	18
6 SS	18	4 8 9	17	15		15 (727.3)		4.5+	

End of Boring at 15.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45	Gestra	A. Woerpel	B. Brown	E. Jeske	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	CME 75 (International)	2¼" HSA	Auto	(6/2011) 85.1%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
11/07/11	11/07/11	East Leg Mainline	Roadway		

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
EH-23	1 of 1	WISCRS (2006)	NAVD 88			295782	574767	749.4 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, brown with gray, moist, hard, trace to some sand, (FILL)									
1 SS	18	4 7 7	14								4.50			16	
2 SS	12	5 5 5	10	5	745		cl				4.50			16	
3 SS	10	4 6 7	13			Color change to brown at 6.0'					4.00			22	
						8 (741.4)									
						LEAN CLAY, brown with gray, moist, very stiff to hard									
4 SS	18	4 6 9	15	10	740						4.50			18	
5 SS	12	5 8 7	15								4.50			19	
6 SS	15	4 6 8	14	15	735		cl				3.50			19	
7 SS	18	3 4 7	11			Color change to grayish brown at 16.0'					3.00			20	
8 SS	18	5 7 6	13	20	730	20 (729.4)					3.25			20	
						End of Boring at 20.0 ft.									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No EB-5**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/13/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: RVT	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/13/11	LATITUDE:
CREW CHIEF: J. Broennimann	DRILLING RIG: Diedrich D120 ATV	WisDOT STRUCTURE ID No: B-40-865 (BR-31)	LONGITUDE:
FIELD LOG BY: J. Smotucha	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: 73rd / I-94	NORTHING: 295712
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (8/2011) 58.3%	STATION / OFFSET	EASTING: 574412
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 748.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT (4") 0.3 (748.2)						Boring drilled at staked location.
						CONCRETE (7") 0.9 (747.6)						
1 SS	14	6 9 13	22			SANDY LEAN CLAY WITH GRAVEL, gray, dry to moist, hard		4.50			9	
					745		cl					
2 SS	11	6 10 15	25	5				4.50				
						5.5 (743) LEAN CLAY, gray, moist, very stiff to hard						
3 SS	13	3 4 7	11					2.00			20	
					740							
4 SS	16	3 4 8	12	10				2.50			19	
5 SH	19							3.00-4.25 (3.9)	32	17	17	Dry Wt = 118 pcf
					735		CL					
6 SS	18	4 5 8	13	15				2.25			18	
7 SS	18	5 6 10	16					2.25			16	
					730							
8 SS	18	4 5 10	15	20				2.25			20	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 12/20/11

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No EB-5**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 2 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/13/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: RVT	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/13/11	LATITUDE:
CREW CHIEF: J. Broennimann	DRILLING RIG: Diedrich D120 ATV	WisDOT STRUCTURE ID No: B-40-865 (BR-31)	LONGITUDE:
FIELD LOG BY: J. Smotucha	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: 73rd / I-94	NORTHING: 295712
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (8/2011) 58.3%	STATION: / OFFSET:	EASTING: 574412
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 748.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, gray, moist, very stiff to hard									Dry to 20.0'. Driller converted to mud rotary at 20.0'.
					725										
9 SS	18	4 6 12	18	25							2.50			25	
							CL								
					720										
10 SS	18	5 6 14	20	30							2.50			23	
						31.8 (716.7)									
						SANDY LEAN CLAY WITH GRAVEL, gray, moist, stiff									
					715										Rig chatter at 33.0'
11 SS	16	6 7 10	17	35							1.75			12	
							cl								Rig chatter at 37.0'
					710										
12 SS	17	5 6 11	17	40							1.50			12	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 12/20/11

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No EB-5**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 3 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/13/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: RVT	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/13/11	LATITUDE:
CREW CHIEF: J. Broennimann	DRILLING RIG: Diedrich D120 ATV	WisDOT STRUCTURE ID No: B-40-865 (BR-31)	LONGITUDE:
FIELD LOG BY: J. Smotucha	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: 73rd / I-94	NORTHING: 295712
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (8/2011) 58.3%	STATION: / OFFSET:	EASTING: 574412
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 748.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					705	SANDY LEAN CLAY WITH GRAVEL, gray, moist, stiff						
13 SS	12	5 8 16	24	45			cl	1.50			12	
					700							
14 SS	13	6 7 14	21	50				1.75			12	
						51.5 (697)						
						SILT, gray, moist, very dense						
					695							
15 SS	9	32 50/5"	R	55			ml				13	
						56.4 (692.1)						
						SILTY SAND, gray, moist to very moist, dense to very dense						
					690		sm					
16 SS	14	6 15 25	40	60								

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 12/20/11

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No EB-5**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 4 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/13/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: RVT	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/13/11	LATITUDE:
CREW CHIEF: J. Broennimann	DRILLING RIG: Diedrich D120 ATV	WisDOT STRUCTURE ID No: B-40-865 (BR-31)	LONGITUDE:
FIELD LOG BY: J. Smotucha	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: 73rd / I-94	NORTHING: 295712
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (8/2011) 58.3%	STATION / OFFSET	EASTING: 574412
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 748.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SILTY SAND, gray, moist to very moist, dense to very dense									
					685		sm								Cobble and/or boulder at 62.0'
17 SS	13	11 20 31	51	65											
						66.8 (681.7)									
						POORLY GRADED GRAVEL WITH SAND, gray, wet, dense									
					680										
18 SS	11	11 16 21	37	70											
					675		gp								
19 SS	10	10 15 21	36	75											
					670										
20 SS	9	12 18 22	40	80											

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 12/20/11

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No EB-5**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 5 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No	DATE STARTED: 11/13/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: RVT	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/13/11	LATITUDE
CREW CHIEF: J. Broennimann	DRILLING RIG: Diedrich D120 ATV	WisDOT STRUCTURE ID No: B-40-865 (BR-31)	LONGITUDE
FIELD LOG BY: J. Smotucha	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: 73rd / I-94	NORTHING: 295712
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (8/2011) 58.3%	STATION / OFFSET	EASTING: 574412
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 748.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						POORLY GRADED GRAVEL WITH SAND, gray, wet, dense	gp					
						81.8 (666.7)						
						SANDY SILTY CLAY WITH GRAVEL, gray, moist, stiff to very stiff						
					665							
21 SS	18	12 15 28	43	85				1.50			12	
							cl-ml					
					660							
22 SS	18	13 17 32	49	90				2.75			13	
						91.6 (656.9)						
						SILTY SAND WITH GRAVEL, gray, moist, very dense						
					655							
23 SS	4	50										
				95			sm					
					650							
24 SS	0	50/5"	R			98.9 (649.6)						

End of Boring at 98.9 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 12/20/11

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-24
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/25/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/25/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295780
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION: / OFFSET:	EASTING: 574151
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 755.9 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (6") 0.5 (755.4)									
					755	BASE COURSE, (5") 0.9 (755)									
1 SS	10	7 4 7	11			LEAN CLAY, brown, moist, very stiff, trace sand and gravel (FILL) 2.7 (753.2)	cl				2.00			17	
2 SS	18	4 6 11	17	5		LEAN CLAY, grayish brown, moist, stiff to very stiff, trace sand and gravel				1.75-3.00				20	
					750										
3 SS	18	4 7 13	20				cl				3.50			20	
4 SS	18	3 7 9	16	10		10 (745.9)					3.50			18	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-25
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/18/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: Roadway	NORTHING: 295721
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 573889
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 769.1 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL (thickness not recorded) 0.5 (768.6)									Bulk sample obtained from 0'-5'
1 SS	18	5 7 8	15			LEAN CLAY WITH GRAVEL, brown, moist, hard, (FILL) 3 (766.1)	cl				4.5-4.5+			14	
2 SS	18	3 3 6	9	5	765	LEAN CLAY, brown to gray, moist, very stiff to hard, trace to some gravel, (FILL)					3.0-4.5			15	
3 SS	18	2 3 5	8				cl				2.75			19	
4 SS	18	2 3 5	8	10	760	10.5 (758.6)					2.25			18	
5 SS	18	4 10 11	21			POORLY GRADED SAND, brown, moist, medium dense, trace to some gravel, with clay seams up to 2" thick (decrease in amount with depth), (FILL)	sp								
6 SS	18	6 10 10	20	15	755	15.5 (753.6)									
7 SS	18	4 6 6	12			LEAN CLAY, gray, moist, very stiff, trace gravel	cl				2.50			20	
8 SS	18	4 7 7	14	20	750	20 (749.1)					2.00			13	
						End of Boring at 20.0 ft.									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-26
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 2
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/18/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: Roadway	NORTHING: 295753
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 573634
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 778.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL (thickness not recorded)									
						0.5 (778.2)									
1 SS	18	4 5 5	10			SILTY SAND, brown, moist, medium dense, (FILL)	sm								
						3 (775.7)									
2 SS	18	5 6 8	14	5	775	LEAN CLAY, brown, moist, very stiff to hard, with silt lamination, (FILL)	cl				3.75-4.0			17	
3 SS	18	6 10 15	25								2.75-4.5			16	
						8 (770.7)									
4 SS	18	7 13 13	26	10	770	POORLY GRADED SAND, brown, moist, medium dense to very dense, with thin silt seams, trace to with gravel, (FILL)									
5 SS	18	9 16 17	33			1½" thick clay seam in sample SS-5									
6 SS	18	8 20 22	42	15	765	½" thick clay seam in sample SS-6	sp								
7 SS	4	18 33 40	73												
8 SS	13	8 14 12	26	20	760	½" thick gray silt seam in sample SS-8									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-26
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 2 of 2
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/18/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: Roadway	NORTHING: 295753
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 573634
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 778.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						20.5 (758.2)	sp								
9 SS	18	3 7 9	16			SILTY SAND, gray, moist, medium dense, trace gravel	sm								
						23 (755.7)									
10 SS	18	2 2 5	7	25	755	LEAN CLAY, gray, moist, very stiff, trace gravel	cl				2.50			18	
						25 (753.7)									

End of Boring at 25.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45	RVT	J. Broennimann	H. Scheelk	E. Jeske	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	Diedrich D120 ATV	3¼ HSA	Auto	(8/2011) 58.3%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
4/26/12	4/26/12	East Leg Mainline	Roadway		

BORING No EH-27

PAGE No 1 of 2

HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
WISCRS (2006)	NAVD 88			295655	573386	779.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Moisture Content (%)	Notes
						ASPHALT (10.1") 0.9 (778.8)				
1 SS	12	5 8 11	19			POORLY GRADED SAND WITH GRAVEL, gray, moist, medium dense, (FILL) Small red brick piece in sample SS-1 4 (775.7)	sp			
2 SS	16	5 3 5	8	5	775	SANDY LEAN CLAY, dark gray to brown, moist, (FILL) 5.4 (774.3)	cl		16	Sample was too sandy to get accurate Q_p
3 SS	11	3 8 8	16			LEAN CLAY, grayish brown to brownish gray, moist, hard, (FILL) 7.7 (772)	cl	4.50	16	
4 SS	16	3 5 7	12	10	770	LEAN CLAY, brown, moist, very stiff to hard, with gray mottling	cl	2.25	18	
5 SS	18	6 10 10	20					4.50	25	
6 SS	18	6 5 10	15	15	765	15.5 (764.2)		4.00	21	
7 SH	15					LEAN CLAY, gray, moist, stiff to hard 3" thick sand sandy seam at 17'	cl	2.75 (3)	23	Dry Wt = 105 pcf
8 SS	18	3 5 7	12	20	760			3.25	18	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE	CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE	CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR	NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45	RVT	J. Broennimann	H. Scheelk	E. Jeske	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	Diedrich D120 ATV	3¼ HSA	Auto	(8/2011) 58.3%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
4/26/12	4/26/12	East Leg Mainline	Roadway		

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
EH-27	2 of 2	WISCRS (2006)	NAVD 88			295655	573386	779.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, gray, moist, stiff to hard									
9 SS	18	4 4 4	8								1.50			30	
10 SH	18			25	755		cl				2.5-2.75 (2.9)			21	Dry Wt = 113 pcf
11 SS	18	5 7 8	15								2.50			23	
12 SS		8 11 12	23	30	750	30 (749.7)					4.50			19	

End of Boring at 30.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR		WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR		WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded		

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45	Gestra	R. Jackson	B. Naughton	E. Jeske	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION
	11039-10	CME 45	2¼" HSA	Auto	(6/2011) 84.3%			

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET	1/4 SECTION	1/4 SECTION
11/30/11	11/30/11	East Leg Mainline	Roadway				

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
EH-28	1 of 3	WISCRS (2006)	NAVD 88			295693	573092	792 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						GRAVEL (2") 0.2 (791.8)									
						LEAN CLAY, brown, moist, hard, trace to with gravel, (FILL)									
1 SS	14	4 5 10	15		790						4.5+			15	
2 SS	18	5 12 13	25	5			cl				4.5+			16	
3 SS	18	5 10 11	21		785	Sand lamination in sample SS-3					4.5+			24	
						8 (784) LEAN CLAY, gray, moist, very stiff to hard, (FILL)									
4 SS	18	5 6 10	16	10							4.00			18	
5 SS	18	2 6 8	14		780						3.50			20	
6 SS	18	1 4 7	11	15			cl				2.50			21	
7 SS	18	4 6 7	13		775	Sand lamination in sample SS-7					2.00			20	
8 SS	18	5 9 10	19	20							3.00			20	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No EH-28**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 2 of 3
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/30/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/30/11	LATITUDE:
CREW CHIEF: R. Jackson	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Naughton	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295693
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION / OFFSET	EASTING: 573092
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 792 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, gray, moist, very stiff to hard, (FILL)									
9 SS	18	7 11 11	22		770						3.00			18	
							cl								
10 SS	18	8 8 10	18	25							2.50			19	
						25.5 (766.5)									
						SILTY SAND, brown, moist, dense to very dense, with clay seams, (POSSIBLE FILL)									
11 SS	18	28 27 29	56		765										
12 SS	16	21 25 25	50	30			sm								
13 SS	18	18 19 28	47		760										
						33 (759)									
						POORLY GRADED SAND WITH SILT, brown, moist, medium dense to dense									
14 SS	18	21 23 19	42	35											
15 SS	18	12 16 19	35		755		sp-sm								
16 SS	18	11 19 17	36	40											

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-28
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 3 of 3
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/30/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/30/11	LATITUDE:
CREW CHIEF: R. Jackson	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Naughton	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: Roadway	NORTHING: 295693
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION: / OFFSET:	EASTING: 573092
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 792 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						POORLY GRADED SAND WITH SILT, brown, moist, medium dense to dense	sp-sm								
17 SS	18	10 17 18	35		750										
18 SS	16	10 13 13	26	45		45 (747)									

End of Boring at 45.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	CONSULTANT PROJECT No	DATE STARTED	HORIZONTAL DATUM	VERTICAL DATUM
Zoo Interchange	1060-33-01	Forward 45		12/01/11	WISCRS (2006)	NAVD 88

BORING LOG

BORING No	PAGE No
EH-29	1 of 3

DRILLING CONTRACTOR	DRILLING CONTRACTOR PROJECT No	DATE COMPLETED	LATITUDE
Gestra	11039-10	12/01/11	

CREW CHIEF	DRILLING RIG	WisDOT STRUCTURE ID No	LONGITUDE
R. Jackson	CME 45	East Leg Mainline	

FIELD LOG BY	DRILLING METHOD / HOLE SIZE	ROADWAY NAME	NORTHING
B. Naughton	2¼" HSA	Roadway	295527

LOG QC BY	HAMMER TYPE	EFFICIENCY	STATION	OFFSET	EASTING
E. Jeske	Auto	(6/2011) 84.3%			572917

COUNTY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION	SURFACE ELEVATION
40-Milwaukee						790.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					790	TOPSOIL (2") 0.2 (790.3)									
1 SS	13	4 16 7	23			LEAN CLAY WITH SAND, brown, moist, very stiff, trace gravel, (FILL)	cl				3.00			11	
						3 (787.5)									
2 SS	16	6 9 8	17	5		POORLY GRADED SAND WITH SILT, brown, moist, loose to medium dense, (FILL)									
					785										
3 SS	16	2 5 4	9				sp-sm								
4 SS	16	4 5 6	11	10		Thin silt seams in sample SS-4									
					780										
5 SS	15	5 9 13	22			12 (778.5)									
						SILTY SAND, brown, moist, medium dense, (FILL)	sm								
						13 (777.5)									
6 SS	18	5 15 22	37	15		LEAN CLAY, brown, moist, hard, (FILL)	cl				4.5+			14	
					775	15.5 (775)									
7 SS	15	7 12 13	25			POORLY GRADED SAND WITH GRAVEL, brown, moist, medium dense to dense, (FILL)	sp								
8 SS	13	15 18 16	34	20											

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE	CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR	CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR	NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45	Gestra	R. Jackson	B. Naughton	E. Jeske	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION
	11039-10	CME 45	2¼" HSA	Auto	(6/2011) 84.3%			

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET	1/4 SECTION	1/4 SECTION
12/01/11	12/01/11	East Leg Mainline	Roadway				

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
EH-29	2 of 3	WISCRS (2006)	NAVD 88			295527	572917	790.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					770	POORLY GRADED SAND WITH GRAVEL, brown, moist, medium dense to dense, (FILL)									
9 SS	15	12 19 20	39				sp								
10 SS	15	16 22 20	42	25											
					765	25.5 (765)									
						POORLY GRADED SAND, brown, moist, dense									
11 SS	18	14 21 25	46				sp								
12 SS	16	14 17 16	33	30											
					760	30.5 (760)									
						SILTY SAND, brown, moist, dense, some gravel									
13 SS	18	14 21 18	39				sm								
						33 (757.5)									
						POORLY GRADED SAND WITH GRAVEL, brown, moist, dense									
14 SS	16	9 19 19	38	35			sp								
					755	35.5 (755)									
						SANDY SILT, brown, moist, very dense									
15 SS	18	17 27 27	54			¾" thick clay seam in sample SS-15									
							ml								
16 SS	18	19 30 30	60	40		¼" thick clay seam in sample SS-16									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	CONSULTANT PROJECT No	DATE STARTED	HORIZONTAL DATUM	VERTICAL DATUM
Zoo Interchange	1060-33-01	Forward 45		12/01/11	WISCRS (2006)	NAVD 88

BORING LOG

BORING No	PAGE No
EH-29	3 of 3

DRILLING CONTRACTOR	DRILLING CONTRACTOR PROJECT No	DATE COMPLETED	LATITUDE
Gestra	11039-10	12/01/11	

CREW CHIEF	DRILLING RIG	WisDOT STRUCTURE ID No	LONGITUDE
R. Jackson	CME 45	East Leg Mainline	

FIELD LOG BY	DRILLING METHOD / HOLE SIZE	ROADWAY NAME	NORTHING
B. Naughton	2¼" HSA	Roadway	295527

LOG QC BY	HAMMER TYPE	EFFICIENCY	STATION	OFFSET	EASTING
E. Jeske	Auto	(6/2011) 84.3%			572917

COUNTY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION	SURFACE ELEVATION
40-Milwaukee						790.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					750	SANDY SILT, brown, moist, very dense									
17 SS	18	22 32 30	62			42.5 (748)	ml								

End of Boring at 42.5 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No EH-30**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 2
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/07/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/07/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: Roadway	NORTHING: 295568
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 572607
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 773 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, red brown to grayish brown, moist, very stiff to hard									
1 SS	18	3 5 6	11								4.50			20	
					770										
2 SS	18	4 7 9	16	5			cl				4.50			18	
3 SS	18	4 8 8	16								4.50			17	
					765										
4 SS	18	3 6 16	22	10		With silt laminations in sample SS-4				2.25-4.00				20	
						10.5 (762.5)									
						POORLY GRADED SAND, brown, moist, medium dense to dense, little gravel									
5 SS	18	15 16 15	31												
					760										
6 SS	18	5 14 18	32	15			sp								
						Little silt, with occasional clay seams									
7 SS	18	7 10 13	23												
					755										
8 SS	18	6 13 23	36	20											

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: EH-30
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 2 of 2
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/07/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/07/11	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: East Leg Mainline	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: Roadway	NORTHING: 295568
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 572607
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 773 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						20.5 (752.5)	sp								
9 SS	18	14 11 10	21			LEAN CLAY, grayish brown, moist, hard, with sand seam at the bottom of sample	cl				4.00			22	
					750	23 (750)									
10 SS	18	11 13 17	30	25		SILTY SAND, brown, moist, dense 25 (748)	sm								

End of Boring at 25.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45	Gestra	A. Woerpel	B. Brown	R. Haque	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	CME 75 (International)	3¼ HSA	Auto	(6/2011) 85.1%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
11/07/11	11/07/11	East Leg Mainline	Roadway		

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
EH-31	1 of 1	WISCRS (2006)	NAVD 88			295453	572439	772.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, red brown, moist, hard									
1 SS	18	6 5 8	13		770		cl				4.50			17	
						3 (769.3)									
						LEAN CLAY, grayish brown, moist, very stiff to hard									
2 SS	18	3 6 7	13	5							3.50			21	
3 SS	18	4 5 8	13		765					3.25-4.00				19	
4 SS	18	4 6 8	14	10							4.00			19	
5 SS	18	3 6 10	16		760		cl				4.50			20	
6 SS	18	3 6 8	14	15						3.00-4.00				21	
7 SS	18	3 6 10	16		755					4.00-4.25				24	
8 SS	18	2 6 8	14	20						3.50-4.00				22	
						20 (752.3)									
						End of Boring at 20.0 ft.									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-1
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/27/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/27/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296615
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 565160
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 757.4 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (4") 0.3 (757.1)									
						BASE COURSE, (4.5") 0.8 (756.6)									
1 SS	13	6 4 5	10		755	LEAN CLAY, brown and gray, moist, stiff to very stiff, trace to little sand, trace gravel, with occasional silty sand lenses (FILL) Brown and gray alternating color layers from 0.9 ft to 8.0 ft					3.00				
2 SS	15	4 6 8	10	5			cl				2.75			17	
3 SS	17	3 3 4	6		750	8 (749.4)				1.50-2.50				14	
4 SS	18	3 6 8	9	10		LEAN CLAY, brown, moist, very stiff, with gray mottling 10 (747.4)	cl				3.25			20	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-2
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/31/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/31/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296775
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 565382
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 753.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (3.7") 0.3 (753)									
						CONCRETE, (7.8") 0.9 (752.4)									
1 SS	18	5 5 10	15			BASE COURSE, (4") 1.3 (752)					4.5+			11	
					750	LEAN CLAY, grayish brown, moist to wet, very stiff to hard, trace to little sand, trace gravel (FILL) Trace organics, slight fuel odor in sample SS-1									
2 SS	8	21 12 10	22	5		Coarse gravel piece in sample SS-2								11	Pushed stone during sampling, disturbed sample, no Qp possible
							cl								
3 SS	18	3 5 8	13			With silt lenses, with red brown vertical mottling					3.75			12	
					745										
4 SS	9	4 4 7	11	10		10 (743.3)								14	Pushed stone during sampling, disturbed sample, no Qp possible

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 4ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-3
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/27/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/27/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296736
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 565653
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 751.9 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (4") 0.3 (751.6)									
						BASE COURSE, (4.5") 0.8 (751.1)									
1 SS	15	5 16 14	30		750	LEAN CLAY, brown and black, moist, hard, trace to little sand, trace gravel and organics (FILL) 2.9 (749)	cl				4.5+			9	
2 SS	13	4 5 8	13	5		SANDY LEAN CLAY, brown, moist, hard, trace gravel (FILL) 5.3 (746.6)	cl				4.25			14	
3 SS	18	4 3 4	7		745	LEAN CLAY, brown and gray, moist, stiff to hard, with occasional gray silty sand seams (FILL)	cl				1.75			18	
4 SS	15	3 5 7	12	10		10 (741.9)					4.50			19	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-4
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/31/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/31/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296902
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 565877
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 758.1 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE (6.8") 0.5 (757.6)									
						BASE COURSE, (3.5") 0.8 (757.3)									
1 SS	10	5 6 5	11			LEAN CLAY WITH SAND, dark brown and gray, moist, very stiff, trace to little gravel 2.7 (755.4)	cl				3.75			14	
					755	LEAN CLAY, dark brown and gray, moist, stiff to hard, trace gravel and organics									
2 SS	18	2 3 4	7	5							1.50			19	
3 SS	18	3 3 4	7				cl				4.00			19	
					750										
4 SS	18	10 7 8	15	10		10 (748.1)					4.50			14	Possible change from fill to native in sample SS-4

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-5
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/27/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/27/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296841
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 566169
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 764.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						POORLY GRADED SAND WITH GRAVEL 0.5 (763.8)	sp								
1 SS	10	3 5 7	12			LEAN CLAY, brown and dark gray, moist, very stiff to hard, trace to little sand, trace gravel, with occasional sand and silt seams (FILL) Brown and gray alternating color layers from 0.5 ft to the end of boring					4.25			22	
2 SS	11	5 4 5	9	5	760		cl				2.00			19	
3 SS	18	4 5 6	11								3.00			18	
4 SS	18	4 6 8	14	10	755	10 (754.3)					4.50			15	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-6
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/31/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/31/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296990
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 566726
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 769.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (6") 0.5 (769.3)									
						BASE COURSE, (5") 0.9 (768.9)									
1 SS	12	4 5 6	11			LEAN CLAY, dark brown, black and gray, moist, stiff to hard, trace to little sand, trace gravel, with occasional silt seam/ lenses (FILL)					3.75			15	
2 SS	18	3 3 6	9	5	765		cl				1.50			17	
3 SS	18	4 3 5	8								4.00			18	
4 SS	18	7 8 10	18	10	760	10 (759.8)					4.50			13	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WB-52
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 4
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 8/01/13	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 8/01/13	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 550 ATV	WisDOT STRUCTURE ID No: B-40-869/B-40-870	LONGITUDE:
FIELD LOG BY: D. Harris	DRILLING METHOD / HOLE SIZE: 3¼ HSA, w/ RWB	ROADWAY NAME: UPRR Bridge I-94 Pile Test	NORTHING: 296758
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (07/2013) 80.4%	STATION / OFFSET	EASTING: 567000
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 739 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL (10") 0.8 (738.2)									
1 SS	8	4 6 8	14			LEAN CLAY, dark brown to brown, moist, hard, trace gravel, (FILL) 2.6 (736.4)	cl				4.5+			14	
2 SS	7	3 5 5	10	5	735	LEAN CLAY, brown and black with gray, moist, very stiff to hard, (FILL) 7.5 (731.5)	cl				4.00			22	
3 SS	6	2 2 3	5								2.75			24	
4 SS	18	3 5 7	12	10	730	LEAN CLAY, brown, moist, very stiff 10.5 (728.5)	cl				2.5-3.5			20	
5 SS	12	2 3 4	7			LEAN CLAY, gray, moist, stiff to very stiff					1.25			24	
6 SH	21			15	725		cl				2.0-2.25 (1.4)			28	Dry Wt = 96 pcf
7 SS	18	2 3 4	7								1.75-2.0			24	
8 SS	18	1 3 4	7	20	720						1.5-2.5			24	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 27ft.		CAVE DEPTH AT COMPLETION: N/A	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45	Gestra	A. Woerpel	D. Harris	E. Jeske	40-Milwaukee

BORING LOG

zoo interchange

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM
WB-52	2 of 4	WISCRS (2006)	NAVD 88

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	CME 550 ATV	3¼ HSA, w/ RWB	Auto	(07/2013) 80.4%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
8/01/13	8/01/13	B-40-869/B-40-870	UPRR Bridge I-94 Pile Test		

LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
		296758	567000	739 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, gray, moist, stiff to very stiff									
9 SS	18	3 5 5	10	25	715	With silt lenses in sample SS-9	cl				2.0-2.5			27	
						26.9 (712.1) POORLY GRADED SAND, gray, wet, medium dense, trace gravel									
10 SS	18	4 8 16	24	30	710		sp								Driller attempted to push tube at 28' and had 3" of sand in tube. Driller drove spoon at 28.3'. Driller converted to mud rotary drilling at 30', hole collapsed between 30' and 35'. Driller extended augers to 50'
						31.8 (707.2) POORLY GRADED SAND WITH SILT AND GRAVEL, gray, wet, medium dense to dense									
11 SS	15	5 10 26	36	35	705		sp-sm								
12 SS	14	7 8 14	22	40	700										

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 27ft.		CAVE DEPTH AT COMPLETION: N/A	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45	Gestra	A. Woerpel	D. Harris	E. Jeske	40-Milwaukee

BORING LOG

zoo interchange

BORING No WB-52

PAGE No 3 of 4

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	CME 550 ATV	3¼ HSA, w/ RWB	Auto	(07/2013) 80.4%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
8/01/13	8/01/13	B-40-869/B-40-870	UPRR Bridge I-94 Pile Test		

HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
WISCRS (2006)	NAVD 88			296758	567000	739 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						POORLY GRADED SAND WITH SILT AND GRAVEL, gray, wet, medium dense to dense	sp-sm								
						41.6 (697.4)									
						SAND WITH SILT, gray, wet, very dense, trace to with gravel, with sand lenses, with rock chips	sp-sm								
13 SS	6	50/6"	R		695										
				45											
						46.3 (692.7)									
						SILT, gray, moist, very dense, trace gravel and rock chips	ml								
14 SS	5	50/5"	R		690										
				50											Driller converted to mud rotary drilling at 50'
						51.2 (687.8)									
						SANDY SILT, gray, wet, very dense, trace gravel	ml								
15 SS	4	50/4"	R		685										
				55											
						58.6 (680.4)									
16 SS	1	50/1"	R			End of Boring at 58.6 ft.									Driller had roller bit refusal at 59'. Driller noted possible bedrock.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 27ft.		CAVE DEPTH AT COMPLETION: N/A	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	CONSULTANT PROJECT No	DATE STARTED	HORIZONTAL DATUM	VERTICAL DATUM
Zoo Interchange	1060-33-01	Forward 45		8/01/13	WISCRS (2006)	NAVD 88

BORING LOG

BORING No WB-52

PAGE No 4 of 4

DRILLING CONTRACTOR	DRILLING CONTRACTOR PROJECT No	DATE COMPLETED	LATITUDE
Gestra	11039-10	8/01/13	

CREW CHIEF	DRILLING RIG	WisDOT STRUCTURE ID No	LONGITUDE
A. Woerpel	CME 550 ATV	B-40-869/B-40-870	

FIELD LOG BY	DRILLING METHOD / HOLE SIZE	ROADWAY NAME	NORTHING
D. Harris	3¼ HSA, w/ RWB	UPRR Bridge I-94 Pile Test	296758

LOG QC BY	HAMMER TYPE	EFFICIENCY	STATION	OFFSET	EASTING
E. Jeske	Auto	(07/2013) 80.4%			567000

COUNTY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION	SURFACE ELEVATION
40-Milwaukee						739 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
															NQ core run attempted from 59' to 69'. No recovery due to the rod breaking at the core barrel. Driller notes the first 2" felt weathered/ layered then rock felt consistent to 69'. Boring was abandoned with core barrel in borehole.

WATER & CAVE-IN OBSERVATION DATA

▽	WATER ENCOUNTERED DURING DRILLING: 27ft.		CAVE DEPTH AT COMPLETION: N/A	WET ☐ DRY ☐
▼	WATER LEVEL AT COMPLETION: NMR	■	CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
▼	WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-8
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 2/02/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 2/02/12	LATITUDE:
CREW CHIEF: B. Brown	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: K. Gorenschek	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296888
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 567238
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 756.6 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT (6.2") 0.5 (756.1)									
						POORLY GRADED SAND WITH GRAVEL, dark brown to black, moist BASE COURSE (5") 1 (755.6)									
1 SS	11	3 6 8	14		755	LEAN CLAY, brown and gray, moist, stiff to hard, trace sand and gravel, (FILL)					3.50			13	
2 SS	8	5 5 7	12	5			cl				4.50			17	
3 SS	13	2 4 5	9		750						1.0-2.0			17	
4 SS	10	3 5 8	13	10		10 (746.6)					2.75			17	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-9
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/23/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/23/11	LATITUDE:
CREW CHIEF: R. Jackson	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Naughton	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296706
LOG QC BY:	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION: / OFFSET:	EASTING: 567512
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 744.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL (4") 0.3 (744.5)									
1 SS	12	3 7 10	17			LEAN CLAY WITH SAND AND GRAVEL, olive brown with red brown, dry to moist, hard, with black, (FILL) 3 (741.8)	cl				4.0-4.5+			14	
2 SS	12	5 10 16	26	5	740	LEAN CLAY, black, dry, hard, few organic matter, (POSSIBLE BURIED TOPSOIL) 5.5 (739.3)	cl				4.5+			20	LOI = 6.3%
3 SS	18	5 10 16	26			LEAN CLAY, brown, dry to moist, hard, with gray mottling	cl				4.5+			19	
4 SS	18	10 19 22	41	10	735	10 (734.8)					4.5+			19	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-10
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 2/02/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 2/02/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: K. Gorenschek	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296782
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 567741
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 753.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT (6.6") 0.5 (753.3)									
						POORLY GRADED SAND WITH GRAVEL, black with brown, moist BASE COURSE (4") 0.9 (752.9)									
1 SS	9	3 3 3	6			LEAN CLAY, brown, moist, medium stiff	cl				0.5-0.75			23	
						3 (750.8)									
					750	LEAN CLAY WITH SAND, brown, very moist, very soft to medium stiff									
2 SS	15	2 3 2	5	5			cl				0.0-0.75			23	
						5.5 (748.3)									
						LEAN CLAY, brown, moist, stiff to very stiff									
3 SS	7	2 2 3	5								1.75-2.0			22	
							cl								
					745										
4 SS	18	2 3 2	5	10		10 (743.8)					1.50			21	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-11
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/23/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/23/11	LATITUDE:
CREW CHIEF: R. Jackson	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Naughton	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296641
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION: / OFFSET:	EASTING: 567964
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 750.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					750	TOPSOIL (4") 0.3 (750.2)									
1 SS	15	5 13 19	32			POORLY GRADED SAND WITH GRAVEL, brown, moist, medium dense to dense, (FILL) With silty seams in sample SS-1									
2 SS	11	8 13 12	25	5											
					745		sp								
3 SS	14	8 14 15	29												
4 SS	12	14 19 20	39	10		10 (740.5)									

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-20**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 7/11/11	HORIZONTAL DATUM / VERTICAL DATUM
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 7/11/11	LATITUDE
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-868 (BR-25)	LONGITUDE
FIELD LOG BY: J. Bruesewitz	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: Flyover STH 100	NORTHING: 296543
LOG QC BY: R. Haque	HAMMER TYPE: Auto; EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 568232
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 749.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CLAYEY SAND WITH GRAVEL, brown, moist, medium dense, (FILL)									
1 SS	16	4 6 10	16				sc							15	
						4 (745.2)									
2 SS	16	7 13 14	27	5	745	SAND WITH GRAVEL, brown, fine to medium grained, moist, medium dense, (FILL)									
3 SS	13	3 7 5	12				sp							18	
						7.8 (741.4)									
						SILTY CLAYEY SAND WITH GRAVEL, brown, moist, loose to very dense, (FILL)									
4 SS	6	2 1 2	3	10	740										
5 SS	9	1 3 2	5				sc, sm							14	
6 SS	5	1 50/0"	R	15	735										
						16 (733.2)									Obstruction at 16 ft, spoon bent
						OBSTRUCTION (POSSIBLE CONCRETE)									No SPT sample attempted at SS-7
						18 (731.2)									Terminated boring at 18.0 ft due to obstruction

End of Boring at 18.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 6/22/12

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-12
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 2/02/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 2/02/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: K. Gorenschek	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296488
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 568485
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 749.1 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT (4.5") 0.4 (748.7)									
						CONCRETE (7.5") 1 (748.1)									
1 SS	15	5 5 8	13			BASE COURSE (6.5") 1.5 (747.6)					2.0-2.75			15	
						SANDY LEAN CLAY, dark gray, moist, very stiff, trace gravel, (FILL)									
2 SS	16	2 5 8	13		745	Black layer in sample SS-2	cl				2.00			24	
				5		5.5 (743.6)									
3 SS	9	3 4 8	12			SILT, black, moist, medium dense 8 (741.1)	ml							21	LOI = 4.1%
4 SS	17	4 4 2	6	10	740	LEAN CLAY, olive with brown, moist, medium stiff 10 (739.1)	cl				0.75			24	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-13
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/23/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/23/11	LATITUDE:
CREW CHIEF: R. Jackson	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Naughton	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296330
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION: / OFFSET:	EASTING: 568676
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 746.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL (3") 0.3 (746.5)						
1 SS	12	2 3 5	8		745	LEAN CLAY WITH SAND, brown and black, moist, stiff to very stiff, (FILL)	cl	2.00			22	
2 SS	16	5 7 7	14	5		5.5 (741.3)		1.50			15	
3 SS	11	10 8 6	14		740	POORLY GRADED SAND WITH GRAVEL, brown, moist, very loose to medium dense, (FILL)						
4 SS	8	3 3 2	5	10								
5 SS	5	3 3 5	8		735		sp					
6 SS	0	3 1 1	2	15								Possible sample blow-in at SS-6, SS-7
7 SS	0	0 0 0	0		730	18 (728.8)						
8 SS	18	7 4 4	8	20		SILTY SAND WITH GRAVEL, gray, wet, loose 20 (726.8)	sm					
						End of Boring at 20.0 ft.						

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 18.5ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WB-10
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/13/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/13/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-770 (BR-26A)	LONGITUDE:
FIELD LOG BY: R. Jackson	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: STH 100	NORTHING: 296046
LOG QC BY: S. Miller	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 569106
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 769.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (3") 0.3 (769)									
						CONCRETE, (8") 0.9 (768.4)									
1 SS	5	15 50/5"	R			POORLY GRADED SAND WITH GRAVEL, brown, dry to moist, medium dense to very dense, (FILL)	sp								
2 SS	6	4 8 6	14	5	765										
						5.5 (763.8) LEAN CLAY, dark brown to brown, moist, medium stiff to very stiff, (FILL)									
3 SS	8	2 2 3	5								0.50			17	
4 SS	12	5 4 7	11	10	760						2.00			14	
5 SS	12	3 6 7	13				cl				3.50			13	
6 SH	10			15	755						(3.1)			13	Dry Wt = 122 pcf
7 SS	12	3 4 6	10								2.50			13	
8 SH	13			20	750						(3.6)			12	Dry Wt = 124 pcf

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 1/3/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-10**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 2 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/13/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/13/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-770 (BR-26A)	LONGITUDE:
FIELD LOG BY: R. Jackson	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: STH 100	NORTHING: 296046
LOG QC BY: S. Miller	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 569106
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 769.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, dark brown to brown, moist, medium stiff to very stiff, (FILL)	cl								Driller converted to mud rotary at 20.0'
						21.8 (747.5)									
						SANDY LEAN CLAY, dark brown, very moist, very stiff, trace to little gravel (FILL)									
9 SS	6	7 9 14	23	25	745						3.00			14	
							cl								
10 SS	12	5 9 16	25	30	740						2.50			16	
						31.8 (737.5)									
						SILTY CLAY, light brown, moist, very stiff									
11 SS	14	6 10 21	31	35	735		cl-ml				2.00			21	
						36.8 (732.5)									
						POORLY GRADED SAND, brown, wet, medium dense	sp								
12 SS	12	10 12 14	26	40	730										

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 1/3/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-10**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 3 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/13/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/13/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-770 (BR-26A)	LONGITUDE:
FIELD LOG BY: R. Jackson	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: STH 100	NORTHING: 296046
LOG QC BY: S. Miller	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 569106
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 769.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						POORLY GRADED SAND, brown, wet, medium dense	sp								
						41.8 (727.5)									
						POORLY GRADED SAND WITH SILT, gray, wet, medium dense									
13 SS	15	10 11 12	23	45	725										
14 SS	16	9 11 12	23	50	720		sp-sm								
15 SS	14	5 6 5	11	55	715										
						58.5 (710.8)									
						LEAN CLAY, gray, moist, very stiff									
16 SS	12	6 6 8	14	60	710		cl				2.50			20	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 1/3/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-10**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 4 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/13/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/13/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-770 (BR-26A)	LONGITUDE:
FIELD LOG BY: R. Jackson	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: STH 100	NORTHING: 296046
LOG QC BY: S. Miller	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 569106
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 769.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, gray, moist, very stiff	cl								
						63.5 (705.8)									
17 SH	0				705	WELL GRADED SAND WITH SILT AND GRAVEL, gray, wet, medium dense to very dense	SW-SM								Attempted tube. Bent tube, no recovery
				65											
18 SS	5	50/5"	R		700										
				70											
19 SS	12	23 22 15	37		695										Fines = 10%
				75											
20 SS	8	11 8 8	16		690										
				80											

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 1/3/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-10**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 5 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/13/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/13/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-770 (BR-26A)	LONGITUDE:
FIELD LOG BY: R. Jackson	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: STH 100	NORTHING: 296046
LOG QC BY: S. Miller	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 569106
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 769.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						WELL GRADED SAND WITH SILT AND GRAVEL, gray, wet, medium dense to very dense	SW-SM					
						81.8 (687.5)						
						SILTY SAND, gray, moist to wet, dense, with clay layers						
21 SS	13	17 22 19	41	85	685		sm					
						86.8 (682.5)						
						SILTY SAND WITH GRAVEL, gray, wet, very dense						
22 SS	15	29 41 43	84	90	680		sm					
						91.8 (677.5)						
						SANDY LEAN CLAY WITH GRAVEL, gray, moist, hard						
23 SS	18	28 38 47	85	95	675		cl	4.5+			13	
24 SS	5	50/5"	R			98.9 (670.4)		4.5+			13	

End of Boring at 98.9 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 1/3/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-16**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 4
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/20/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/21/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: Diedrich D50 ATV	WisDOT STRUCTURE ID No: B-40-771 (BR-26B)	LONGITUDE:
FIELD LOG BY: J. Winston	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: STH 100	NORTHING: 295954
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 78.9%	STATION / OFFSET	EASTING: 569256
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 757.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, brown, moist, very stiff, some sand and gravel (FILL)									
1 SS	10	5 7 8	15		755						3.75			13	
2 SS	18	3 5 7	12	5			cl				3.50			12	
3 SS	12	4 6 7	13		750						3.50			14	
4 SS	18	4 6 11	17	10							3.50			14	
						10.5 (747)									
						LEAN CLAY WITH SAND, brown with gray, moist, with gravel, wood, cementitious material (FILL)									
5 SS	8	5 6 8	14		745		cl								
						13 (744.5)									
						LEAN CLAY, brownish gray to dark olive gray, moist, stiff to very stiff, trace sand and gravel (FILL)									
6 SS	12	3 2 4	6	15							1.25			20	
							cl								
7 SS	12	3 4 5	9		740						2.00			14	
						18 (739.5)									
						LEAN CLAY, brown, moist, hard, with gray mottling in sample SS-8									
8 SS	18	4 7 10	17	20			CL				4.50	41	23	19	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 33.5ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 1/3/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-16**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 2 of 4
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/20/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/21/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: Diedrich D50 ATV	WisDOT STRUCTURE ID No: B-40-771 (BR-26B)	LONGITUDE:
FIELD LOG BY: J. Winston	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: STH 100	NORTHING: 295954
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 78.9%	STATION / OFFSET	EASTING: 569256
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 757.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					735	LEAN CLAY, brown, moist, hard, with gray mottling in sample SS-8									
9 SS	18	7 9 15	24	25							4.5+			21	
					730		CL								
10 SS	18	6 10 12	22	30							4.5+			22	
						31.8 (725.7)									
					725	POORLY GRADED SAND WITH SILT, gray, wet, medium dense									
11 SS	18	1 10 10	20	35			sp-sm								
						36.8 (720.7)									
					720	SILTY SAND, gray, wet, medium dense to dense									
12 SS	18	8 10 15	25	40			SM								

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 33.5ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 1/3/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-16**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 3 of 4
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/20/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/21/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: Diedrich D50 ATV	WisDOT STRUCTURE ID No: B-40-771 (BR-26B)	LONGITUDE:
FIELD LOG BY: J. Winston	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: STH 100	NORTHING: 295954
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 78.9%	STATION / OFFSET	EASTING: 569256
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 757.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					715	SILTY SAND, gray, wet, medium dense to dense									
13 SS	18	8 8 12	20	45											Fines = 36%
					710										
14 SS	18	9 16 22	38	50			SM								
					705										
15 SS	18	9 11 12	23	55											
					700										
16 SS		50/5"	R			58.9 (698.6)									
				60		PROBABLE BOULDER/ COBBLES/ COARSE GRAVEL									Recovery not recorded on field log Fractured rock in sample SS-16

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 33.5ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 1/3/12

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45	Gestra	R. Johnson	J. Winston	E. Jeske	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION
	11039-10	Diedrich D50 ATV	3¼" HSA w/ RWB	Auto	(6/2011) 78.9%			

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET	1/4 SECTION	1/4 SECTION
6/20/11	6/21/11	B-40-771 (BR-26B)	STH 100				

BORING No WB-16

PAGE No 4 of 4

HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
WISCRS (2006)	NAVD 88			295954	569256	757.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
Core Run #1	36				695	PROBABLE BOULDER/ COBBLES/ COARSE GRAVEL 63 (694.5)									NQ rock Core Run #1: 59.0 to 63.0'. Recovery: 30"/48" - 62%. Recovered material included various tan dolomite (longest piece was 6") and dark granitic pieces and gravel Roller bit and spoon refusal at 59.0'

End of Boring at 63.0 ft.

Core barrel blocked out at 63.0'. Boring off-set approx. 10' east per discussion with Engineer and drilled WB-16A. See WB-16A borelog for details.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 33.5ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 1/3/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-8**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/15/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/15/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-770 (BR-26A)	LONGITUDE:
FIELD LOG BY: R. Jackson	DRILLING METHOD / HOLE SIZE: 4¼" HSA w/ RWB	ROADWAY NAME: STH 100	NORTHING: 296199
LOG QC BY: S. Miller	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 569071
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 745.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					745	ASPHALT, (5.5") 0.5 (745.3)						
						CONCRETE, (5") 0.9 (744.9)						
1 SS	12	3 8 9	17			POORLY GRADED SAND, brown, moist, medium dense, with clay seams (POSSIBLE FILL)	sp					
						3 (742.8)						
2 SS	10	5 11 10	21	5		LEAN CLAY, brown, moist, stiff to very stiff, with sand seams	CL	2.00			20	
					740							
3 SS	11	5 11 15	26					1.00	23	8	16	
						8 (737.8)						
4 SS	16	6 8 8	16	10		POORLY GRADED SAND WITH SILT, brown, moist, medium dense	sp-sm					
					735							
5 SS	16	6 10 9	19									
						13 (732.8)						
6 SS	18	5 7 7	14	15		POORLY GRADED SAND, brown, moist, medium dense, with clay layers	sp					
						15.5 (730.3)						
					730	SILTY CLAYEY SAND, dark brown, wet, medium dense	sc-sm					
7 SS	13	3 8 6	14									
						18 (727.8)						
8 SS	15	2 5 4	9	20		POORLY GRADED SAND, dark gray, wet, loose	sp					

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 1/3/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-8**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 2 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/15/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/15/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-770 (BR-26A)	LONGITUDE:
FIELD LOG BY: R. Jackson	DRILLING METHOD / HOLE SIZE: 4¼" HSA w/ RWB	ROADWAY NAME: STH 100	NORTHING: 296199
LOG QC BY: S. Miller	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 569071
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 745.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					725	POORLY GRADED SAND, dark gray, wet, loose	sp								Converted to mud rotary at 20.0 ft
						21.8 (724)									
						SILTY SAND, gray, wet, medium dense, clay layers noted 28.5' to 30' and 33.5' to 35'									
9 SS	9	5 6 7	13	25											
					720										
10 SS	10	5 6 10	16	30			sm							23	
					715										
11 SS	15	9 7 12	19	35										23	
					710										
						36.8 (709)									
						POORLY GRADED SAND WITH SILT, gray, wet, medium dense	sp-sm								
12 SS	12	8 10 12	22	40											

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 1/3/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-8**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 3 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/15/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/15/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-770 (BR-26A)	LONGITUDE:
FIELD LOG BY: R. Jackson	DRILLING METHOD / HOLE SIZE: 4¼" HSA w/ RWB	ROADWAY NAME: STH 100	NORTHING: 296199
LOG QC BY: S. Miller	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 569071
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 745.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					705	POORLY GRADED SAND WITH SILT, gray, wet, medium dense	sp-sm								
						42 (703.8)									
						WELL GRADED GRAVEL WITH SILT AND SAND, gray, wet, medium dense to very dense									Based on driller observation RDR hard at 42.0 ft
13 SS	15	38 32 36	68	45											
					700										
14 SS	15	19 21 25	46	50											Fines = 8%
					695		GP-GM								
15 SS	7	14 13 12	25	55											
					690										
16 SS	5	10 4 6	10	60											

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 1/3/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-8**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 4 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/15/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/15/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-770 (BR-26A)	LONGITUDE:
FIELD LOG BY: R. Jackson	DRILLING METHOD / HOLE SIZE: 4¼" HSA w/ RWB	ROADWAY NAME: STH 100	NORTHING: 296199
LOG QC BY: S. Miller	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 569071
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 745.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					685	WELL GRADED GRAVEL WITH SILT AND SAND, gray, wet, medium dense to very dense	GP-GM								
						61.8 (684)									
						POORLY GRADED GRAVEL WITH CLAY AND SAND, gray, wet, loose									
17 SS	5	5 3 4	7	65			gp-gc								
					680										
						66.8 (679)									
						WELL GRADED GRAVEL WITH SILT AND SAND, gray, wet, dense to very dense									
18 SS	12	21 25 22	47	70											
					675										
							gw-gm								
19 SS	11	23 31 29	60	75											
					670										Normal drilling, some rig chatter at 76.0 ft to 78.5 ft
						78.5 (667.3)									
20 SS	9	18 50/3"	R			SILTY SAND, gray, wet, very dense	sm								Based on driller observation RDR hard at 79.0 ft
				80											

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 1/3/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-8**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 5 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/15/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/15/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-770 (BR-26A)	LONGITUDE:
FIELD LOG BY: R. Jackson	DRILLING METHOD / HOLE SIZE: 4¼" HSA w/ RWB	ROADWAY NAME: STH 100	NORTHING: 296199
LOG QC BY: S. Miller	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 569071
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 745.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					665	SILTY SAND, gray, wet, very dense	sm								Very hard, slow drilling from 79.5 ft to 83.5ft . Possible weathered bedrock
21 SS	0	50/0"	R	85		85 (660.8)									Roller bit refusal at 85.0 ft

End of Boring at 85.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 1/3/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-14**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/15/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/15/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: B-40-771 (BR-26B)	LONGITUDE:
FIELD LOG BY: B. Sargent	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: STH 100	NORTHING: 296113
LOG QC BY: S. Miller	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION / OFFSET	EASTING: 569249
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 748 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (5.5") 0.5 (747.5)									
						CONCRETE, (10.5") 0.9 (747.1)									
1 SS	6	14 14 15	29			LEAN CLAY, black mottled gray, moist, very stiff, little sand, trace gravel, (FILL)								8	
					745		cl								
2 SS	10	6 8 9	17	5							3.50			17	
						5.5 (742.5)									
						SILTY SAND, yellow, moist, medium dense to dense, (FILL)									
3 SS	12	8 6 7	13											17	
					740										
4 SS	15	9 15 19	34	10			sm							17	
5 SS	14	9 12 13	25			12 (736)								18	
						LEAN CLAY, brown, moist, very stiff, trace gravel									
					735										
6 SS	18	10 7 10	17	15			cl				2.00			27	
															Driller converted to mud rotary at 15.0'. Dry to 15.0'
7 SS	15	6 5 7	12			16.8 (731.2)									
						SILTY SAND, brown, wet, medium dense									
					730		sm								
8 SS	14	5 5 5	10	20										18	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 1/3/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-14**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 2 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/15/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/15/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: B-40-771 (BR-26B)	LONGITUDE:
FIELD LOG BY: B. Sargent	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: STH 100	NORTHING: 296113
LOG QC BY: S. Miller	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION / OFFSET	EASTING: 569249
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 748 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SILTY SAND, brown, wet, medium dense	sm								
						21.8 (726.2)									
						POORLY GRADED SAND, dark gray, wet, medium dense									
					725										
9 SS	16	6 8 9	17	25											
					720		sp								
10 SS	16	5 7 8	15	30											
						31.8 (716.2)									
						SANDY SILT, gray, wet, medium dense									
					715										
11 SS	18	7 7 13	20	35											
							ml								
					710										
12 SS	17	6 7 11	18	40										24	Brown clay layers noted in sample SS-12

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-14**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 3 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/15/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/15/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: B-40-771 (BR-26B)	LONGITUDE:
FIELD LOG BY: B. Sargent	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: STH 100	NORTHING: 296113
LOG QC BY: S. Miller	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION / OFFSET	EASTING: 569249
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 748 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SANDY SILT, gray, wet, medium dense	ml					
						41.8 (706.2)						
					705	LEAN CLAY, gray, moist, very stiff, trace gravel, and sand						
13 SS	18	7 10 12	22	45				2.00			13	
					700		cl					
14 SS	18	7 11 14	25	50				2.25			10	
												Very hard drilling at 50.0'
						51.8 (696.2)						
					695	WELL GRADED GRAVEL WITH SILT, gray, wet, very dense						Hard drilling from 52.0' to 62.0', driller notes drilling through possible boulders and cobbles
15 SS	5	37 28 31	59	55								
					690		gw-gm					
16 SS	6	32 36 34	70	60								

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-14**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 4 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/15/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/15/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: B-40-771 (BR-26B)	LONGITUDE:
FIELD LOG BY: B. Sargent	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: STH 100	NORTHING: 296113
LOG QC BY: S. Miller	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION / OFFSET	EASTING: 569249
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 748 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					685	WELL GRADED GRAVEL WITH SILT, gray, wet, very dense									
17 SS	4	47 50/3"	R	65			gw-gm								With trace clay in sample SS-17
					680	68 (680)									
18 SS	5	50/5"	R	70		SANDY LEAN CLAY WITH GRAVEL, gray, moist, hard								10	Very hard drilling from 68.0' to 87.0'
					675										
19 SS	3	50/3"	R	75			cl				4.5+			13	
					670										
20 SS	3	50/3"	R	80							4.5+			13	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 1/3/12

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-14**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 5 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/15/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/15/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: B-40-771 (BR-26B)	LONGITUDE:
FIELD LOG BY: B. Sargent	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: STH 100	NORTHING: 296113
LOG QC BY: S. Miller	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION / OFFSET	EASTING: 569249
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 748 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SANDY LEAN CLAY WITH GRAVEL, gray, moist, hard	cl								
						81.8 (666.2)									
						SILTY, CLAYEY GRAVEL, gray, wet, very dense									
					665										
21 SS	3	50/3"	R												
				85			gm								
						87 (661)									Roller bit refusal at 87.2 ft
22 SS	0	50/2"	R												

End of Boring at 87.2 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 16ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 1/3/12

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-14
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 2/02/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 2/02/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: K. Gorenschek	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296272
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 568929
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 745.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Moisture Content (%)	Notes
					745	ASPHALT (4.5") 0.4 (744.9)				
						CONCRETE (7") 1 (744.3)				
1 SS	17	4 7 7	14			POORLY GRADED GRAVEL WITH SAND, gray, moist BASE COURSE (6") 1.5 (743.8)			21	
						SANDY SILT, brown, moist, medium dense, trace gravel	ml			
2 SS	15	4 7 12	19	5					15	
					740	5.5 (739.8)				
						LEAN CLAY, brown, moist, very stiff With sand seam in sample SS-3 7 (738.3)	cl			
3 SS	15	3 7 9	16					3.75	18	
						POORLY GRADED SAND, brown, moist, medium dense	sp			
4 SS	15	5 7 9	16	10		10 (735.3)				

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-15
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/23/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/23/11	LATITUDE:
CREW CHIEF: R. Jackson	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Naughton	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 295935
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION: / OFFSET:	EASTING: 569374
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 746.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY WITH SAND AND GRAVEL, brown, moist, hard, (FILL)									
					745										
1 SS	15	6 8 10	18				cl				4.50			10	
						3 (743.2)									
						LEAN CLAY, brown, moist, very stiff to hard, with gray mottling, (FILL)									
2 SS	15	3 6 9	15	5							4.00			23	
					740										
3 SS	18	5 9 15	24				cl				3.50			21	
4 SS	18	3 5 8	13	10							2.75			24	
						10 (736.2)									

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-4**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 5/31/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/02/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: B-40-773 (BR-24)	LONGITUDE:
FIELD LOG BY: B. Sargent	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: RRA UPRR / 94 EB & WB	NORTHING: 295784
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION / OFFSET	EASTING: 569659
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 749.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL 1 (748.7)									Auto hammer calibrated during drilling
1 SS	11	5 6 6	12			LEAN CLAY, brown, moist, stiff to hard, (FILL) 4.5 (745.2)	CL				4.5+	35	20	14	Dry Wt = 108 pcf
2 SS	12	3 3 5	8	5	745	LEAN CLAY, black, moist, stiff, trace organic (roots), (POSSIBLE BURIED TOPSOIL) 5.5 (744.2)	cl			1.00-1.75	1.00			20	
3 SS	8	4 6 8	14			LEAN CLAY, brown gray, moist, stiff to hard, with decomposed roots					2.75			24	
4 SS	17	4 11 18	29	10	740						4.5+			16	
5 SS	17	6 10 14	24				cl				4.5+			19	
6 SS	18	5 9 13	22	15	735						4.5+			20	
7 SS	18	3 4 6	10			18 (731.7)				1.75-2.5				25	Dry to 16.0', Switch to mud rotary at 16.0'
8 SS	18	4 5 6	11	20	730	LEAN CLAY, gray, moist, stiff to very stiff	cl				2.00			25	Sand lamination in sample SS-8

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 12/8/11

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-4**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 2 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 5/31/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/02/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: B-40-773 (BR-24)	LONGITUDE:
FIELD LOG BY: B. Sargent	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: RRA UPRR / 94 EB & WB	NORTHING: 295784
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION / OFFSET	EASTING: 569659
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 749.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, gray, moist, stiff to very stiff	cl								
9 SS	18	5 5 6	11	25	725						1.75			26	
						26.75 (722.95) SITY SAND, gray, moist to wet, very loose to dense, little gravel	SM								
10 SS	18	8 14 19	33	30	720										Fines = 35%
11 SS	16	4 9 13	22	35	715										
12 SS	18	5 10 15	25	40	710										

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 12/8/11

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-4**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 3 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 5/31/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/02/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: B-40-773 (BR-24)	LONGITUDE:
FIELD LOG BY: B. Sargent	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: RRA UPRR / 94 EB & WB	NORTHING: 295784
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION / OFFSET	EASTING: 569659
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 749.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SITY SAND, gray, moist to wet, very loose to dense, little gravel	SM								
13 SS	18	0 0 4	4	45	705										Possible inaccurate blow counts, could be due to possible blow-in
14 SS	18	4 4 11	15	50	700										Hard drilling at 48.0', possible gravel layer
						51.75 (697.95) POORLY GRADED GRAVEL WITH SAND, COBBLES AND BOULDERS, gray, wet, dense to very dense	gp								
15 SS	18	42 27 33	60	55	695										
16 SS	18	42 22 14	36	60	690										

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 12/8/11

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-4**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 4 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 5/31/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/02/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: B-40-773 (BR-24)	LONGITUDE:
FIELD LOG BY: B. Sargent	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: RRA UPRR / 94 EB & WB	NORTHING: 295784
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION / OFFSET	EASTING: 569659
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 749.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						POORLY GRADED GRAVEL WITH SAND, COBBLES AND BOULDERS, gray, wet, dense to very dense	gp								
17 SS	18	28 14 17	31	65	685										
						66.75 (682.95) SANDY SILTY CLAY WITH GRAVEL, COBBLES AND BOULDERS, gray, moist, very hard	CL-ML								Very hard drilling from 67.0' to end of boring
18 SS	5	50/5"	R	70	680						4.5+	17	7		
19 SS	4	50/4"	R	75	675						4.5+			12	
						76.75 (672.95) SILTY GRAVEL WITH SAND, COBBLES AND BOULDERS, gray, wet, very dense, some clay	gm								
20 SS	4	50/4"	R	80	670										

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 12/8/11

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-4**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 5 of 5
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 5/31/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/02/11	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: CME 75 (F700)	WisDOT STRUCTURE ID No: B-40-773 (BR-24)	LONGITUDE:
FIELD LOG BY: B. Sargent	DRILLING METHOD / HOLE SIZE: 3¼" HSA w/ RWB	ROADWAY NAME: RRA UPRR / 94 EB & WB	NORTHING: 295784
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 61.3%	STATION / OFFSET	EASTING: 569659
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 749.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						SILTY GRAVEL WITH SAND, COBBLES AND BOULDERS, gray, wet, very dense, some clay	gm								
21 SS	3	50/3"	R	85	665										
22 SS	0	50/2"	R	90	660										
						92 (657.7)									

End of Boring at 92.0 ft.

Refusal, probable weathered bedrock. Boring terminated after discussion with Engineer

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 12/8/11

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-16
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/27/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/27/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 295730
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 569916
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 757.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (10.9") 0.9 (756.9)									
1 SS	9	7 5 6	11			BASE COURSE, (4") 1 (756.8) LEAN CLAY, brown and gray, moist, very stiff to hard, trace sand, gravel and organics, (FILL)					4.5+			12	
					755										
2 SS	12	4 5 5	10	5		With silt lenses					4.25			17	
							cl								
3 SS	18	3 4 7	11								3.00			20	
					750										
4 SS	18	3 5 7	12	10							2.25			19	
						10.5 (747.3) LEAN CLAY, brown, moist, very stiff									
5 SS	18	3 4 5	9			12.5 (745.3)	cl				2.00			18	

End of Boring at 12.5 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-17
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/18/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/18/11	LATITUDE:
CREW CHIEF: R. Jackson	DRILLING RIG: CME 45	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Sargent	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 295544
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 84.3%	STATION: / OFFSET:	EASTING: 570105
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 742.9 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL (3") 0.3 (742.6)									
1 SS	15	1 2 3	5			SILTY CLAY, brown then gray, moist, medium stiff to very stiff, to SILT					0.50			20	
					740										
2 SS	18	3 6 9	15	5			cl-ml				1.50			16	
						Color change to gray at 6'									
3 SS	17	1 3 5	8								2.25-3.0			16	
					735	8 (734.9)									
						LEAN CLAY, gray, moist, stiff									
4 SS	18	1 3 4	7	10							1.00			25	
							cl								
						With silt lamination and seams in sample SS-5									
5 SS	18	3 4 7	11			12.5 (730.4)					1.50			22	

End of Boring at 12.5 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-18
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/27/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/27/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 295511
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 570365
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 764.9 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (9.6") 0.8 (764.1)									
						BASE COURSE, (4") 1.1 (763.8)									
1 SS	9	5 4 5	9			LEAN CLAY, brown, moist, stiff to very stiff, trace to little sand, with silt lenses (FILL) 2.6 (762.3)	cl			1.25-2.50				12	
						LEAN CLAY, brown and black, moist, very stiff to hard, (POSSIBLE FILL)									
2 SS	18	3 4 5	9	5	760						3.25			11	
						With sand lenses	cl								
3 SS	18	3 6 9	15								3.00			17	
						Trace to little sand, trace gravel									
4 SS	18	3 5 9	14	10	755	10 (754.9)					4.25			16	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-19
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/27/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/27/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 295364
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 570662
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 768.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (8") 0.7 (768.1)									
						BASE COURSE, (4") 1 (767.8)									
1 SS	12	4 5 6	11			LEAN CLAY, brown, moist, hard, with sand lenses (FILL) 2.8 (766)	cl				4.25				
					765	LEAN CLAY, brown, moist, very stiff, little sand with silt lenses (POSSIBLE FILL)									
2 SS	18	5 6 9	15	5		5.5 (763.3)	cl				3.00				
						CLAYEY SAND, brown and gray, moist, loose, trace gravel, with gray clay seams 8 (760.8)	sc								
3 SS	18	3 3 5	8												
					760	SANDY LEAN CLAY, light brown, moist to wet, very stiff, with silt seams 10 (758.8)	cl				2.50				
4 SS	18	2 4 5	9	10											

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 8.5ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-20
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 2/16/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 2/16/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 3¼ HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 295354
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 571030
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 774.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT (15.6") 1.3 (773.5)									
1 SS	12	7 10 12	22			POORLY GRADED GRAVEL WITH SAND, gray, moist BASE COURSE (7") 1.9 (772.9)									Sample disturbed unable to get Q_p
						SANDY SILTY CLAY, brown, moist, with sand and silt seams, (FILL) 3 (771.8)	cl-ml							11	
2 SS	15	6 9 13	22	5	770	LEAN CLAY, gray, moist, very stiff, (FILL)					3.25			15	
3 SS	14	4 5 7	12				cl				3.5-3.75			18	
4 SS	12	3 6 15	21			9.5 (765.3)					2.25			15	
				10	765	CONCRETE 11 (763.8)									
5 SS	15	4 6 8	14			LEAN CLAY WITH SAND, gray, moist, very stiff, (FILL) 12.5 (762.3)	cl				3.75			13	

End of Boring at 12.5 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-21
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/21/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/21/12	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: Diedrich D50 ATV	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 295269
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 78.9%	STATION: / OFFSET:	EASTING: 571247
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 762.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL (7") 0.6 (762.2)									
1 SS	6	3 3 3	6			LEAN CLAY, brown and gray, moist, stiff to very stiff, (FILL) <1/8" thick sand seams in samples SS-1 to SS-3					1.00			17	
					760										
2 SS	15	2 2 4	6	5			cl				1.00			19	
3 SS	15	5 6 6	12			Small pieces of brick in sample SS-3					2.00			22	
					755										
4 SS	16	3 5 5	10	10		Driller observed wood and gravel in sample SS-4 10 (752.8)					1.25			19	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NMR		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NMR		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-22
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/21/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/21/12	LATITUDE:
CREW CHIEF: R. Johnson	DRILLING RIG: Diedrich D50 ATV	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: B. Brown	DRILLING METHOD / HOLE SIZE: 3¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 295394
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 78.9%	STATION / OFFSET	EASTING: 571555
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 774.2 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL 0.5 (773.7)									Topsoil thickness not recorded
1 SS	16	6 5 7	12			LEAN CLAY, gray and brown, moist, very stiff to hard, with <1/8" thick sand seams, trace gravel, (FILL)					2.50			16	
2 SS	18	8 6 8	14	5	770						2.00			14	
3 SS	16	6 9 11	20			With <1/4" thick gray silt seams in sample SS-3	cl				2.75			18	
4 SS	16	6 11 16	27	10	765						4.00			14	
5 SS	16	5 10 10	20								4.25			16	Rig chatter at 11', probable cobbles and/ or boulders
6 SS	16	6 11 12	23	15	760	15 (759.2)					4.00			14	

End of Boring at 15.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45	RVT	J. Broennimann	H. Scheelk	E. Jeske	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	Diedrich D120 ATV	2¼" HSA	Auto	(8/2012) 58.3%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
2/16/12	2/16/12	Roadway	West Leg Mainline		

BORING No WH-23

PAGE No 1 of 2

HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
WISCRS (2006)	NAVD 88			295336	571679	790.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Moisture Content (%)	Notes
					790	ASPHALT (9.5") 0.7 (789.6)				
						BASE COURSE (6") 1.3 (789)				
1 SS	6	50/6"	R			POORLY GRADED SAND WITH SILT AND GRAVEL, gray, moist, very dense, (FILL) 2.3 (788)	sp-sm			
						LEAN CLAY, brown, moist, very stiff to hard, trace to with sand, with gravel, (FILL)				Driller notes change in strata from drilling action
2 SS	14	10 8 7	15	5	785		cl	4.00	15	
3 SS	16	7 8 9	17					3.25	15	
						8 (782.3)				
						SILTY SAND, brown, moist, medium dense, with brown and gray clay seams, (FILL)				
4 SS	18	3 5 8	13	10	780		sm		14	
5 SS	18	4 6 6	12							
						13 (777.3)				
						LEAN CLAY, brown with gray, moist, very stiff, (FILL)				
6 SS	18	5 6 9	15	15	775		cl	2.75	19	
						15.5 (774.8)				
						LEAN CLAY, dark gray and black, moist, very stiff to hard, (FILL) With asphalt pieces in sample SS-7				
7 SS	17	5 7 10	17					3.00	14	
							cl			
						Color change to gray at 18.5'				
8 SS	18	6 8 10	18	20				4.50	13	

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45	RVT	J. Broennimann	H. Scheelk	E. Jeske	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	Diedrich D120 ATV	2¼" HSA	Auto	(8/2012) 58.3%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
2/16/12	2/16/12	Roadway	West Leg Mainline		

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
WH-23	2 of 2	WISCRS (2006)	NAVD 88			295336	571679	790.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
					770	LEAN CLAY, dark gray and black, moist, very stiff to hard, (FILL)									
9 SS	18	6 11 13	24	25			cl				4.50			16	
					765	26.8 (763.5)									
						LEAN CLAY, brown mottled gray, moist, hard									
10 SS	18	8 15 19	34	30		30 (760.3)	cl				4.50			16	

End of Boring at 30.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-24
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 6/07/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 6/07/12	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: A. Woerpel	DRILLING METHOD / HOLE SIZE: 3¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 295435
LOG QC BY: E. Jeske	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 571916
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 771.4 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						TOPSOIL, brown, moist, silt with gravel, (FILL) 0.5 (770.9)	ml								
1 SS	9	3 2 3	5		770	LEAN CLAY, dark gray, moist, very stiff, (FILL) 2.6 (768.8)	cl				2.50			20	LOI = 2.8%
2 SS	18	3 6 8	14	5		LEAN CLAY WITH SAND, brown and dark gray, moist, hard, (FILL) Thin sand seam in sample SS-2 5.5 (765.9)	cl				4.00			18	
3 SS	8	3 3 3	6		765	LEAN CLAY, brown to dark brown, moist, very stiff, (FILL)	cl				2.25			13	
4 SS	18	3 6 4	10	10		Driller observed gravel seam at 9'. Sand seam in sample SS-4. Decomposed wood in SS-4. 10.5 (760.9)					2.00			24	
5 SS	18	4 7 11	18		760	LEAN CLAY, brown, moist, hard	cl				4.00			14	
6 SS	18	4 8 10	18	15		15 (756.4)					4.00			20	

End of Boring at 15.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-26
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/31/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/31/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296147
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 562788
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 743.4 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (2.5") 0.2 (743.2)									
						CONCRETE, (7.25") 0.8 (742.6)									
1 SS		12 6 6	12			BASE COURSE, (4") 1.1 (742.3)									Recovery not recorded on field log
						CLAYEY SAND, dark brown, moist, medium dense to dense, trace gravel (FILL)									
					740		sc								
2 SS	13	7 10 20	30	5											
						5.3 (738.1)									
						LEAN CLAY, brown and gray, moist, hard, little sand (FILL)									
3 SS	18	4 7 7	14				cl				4.50			19	
						8 (735.4)									
					735	LEAN CLAY, brown, moist, hard, trace sand and gravel with silt lenses (POSSIBLE FILL)									
4 SS	18	6 8 10	18	10			cl				4.50			14	
						10.5 (732.9)									
						LEAN CLAY, brown, moist, very stiff, trace sand and gravel									
5 SS	18	6 11 9	20								3.00			15	
							cl								
					730										
6 SS	18	6 9 12	21	15		15 (728.4)					2.50			16	

End of Boring at 15.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-27
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/27/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/27/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296119
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 563161
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 740.9 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						BASE COURSE, (3") 0.3 (740.6)									
					740	LEAN CLAY, brown and gray, moist, very stiff to hard, with occasional silt and sand lenses (FILL)									
1 SS	10	3 4 6	10								4.00			13	
2 SS	12	3 5 10	15	5			cl				4.5+			21	
					735										
3 SS	18	4 5 6	11								2.25			15	
						8 (732.9) LEAN CLAY, brown, moist, very stiff, with silt and sand seams (POSSIBLE FILL)									
4 SS	17	3 8 6	14	10			cl				3.75			12	
						10.5 (730.4)									
					730	LEAN CLAY, brown, moist, very stiff to hard, with silt seams									
5 SS	18	4 5 7	12								4.00			22	
							cl								
6 SS	12	3 5 8	13	15		15 (725.9)					3.00			16	

End of Boring at 15.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-28
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/31/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/31/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296293
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 563381
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 743.7 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (2.2") 0.3 (743.4)									
						CONCRETE, (7.4") 0.8 (742.9)									
1 SS	4	8 8 11	19			BASE COURSE, (5.5") 1.3 (742.4)								12	Disturbed sample no Qp Possible
						LEAN CLAY, dark brown to brown, moist, little sand, trace gravel with sand seams (FILL)	cl								
					740										
2 SS	12	3 6 5	11	5										17	Disturbed sample no Qp Possible
						5.3 (738.4)									
						LEAN CLAY, grayish brown, moist, hard, with occasional silt lenses (POSSIBLE FILL)									
3 SS	18	3 3 9	12								4.5+			14	
							cl								
					735										
4 SS	18	4 7 10	17	10							4.50			13	
						10.5 (733.2)									
						LEAN CLAY, grayish brown, moist, very stiff, with silt seams									
5 SS	18	5 10 11	21								3.00			15	
							cl								
					730										
6 SS	18	4 7 9	16	15		15 (728.7)					2.50			14	

End of Boring at 15.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-29
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/27/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/27/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296245
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION / OFFSET	EASTING: 563658
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 746.3 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (3") 0.3 (746)									
					745	CONCRETE, (5") 0.7 (745.6)									
1 SS	10	4 3 4	7			BASE COURSE, (3.5") 1 (745.3)	cl				3.50			13	
						LEAN CLAY, dark brown, black and gray, moist, very stiff, little sand, trace gravel (FILL) 2.7 (743.6)									
2 SS	11	4 5 6	11	5		CLAYEY SAND, brown, moist, loose to medium dense, trace to little gravel, trace organics with silt seams (FILL)	sc								
					740										
3 SS	18	4 4 2	6			8 (738.3)									
						LEAN CLAY, grayish brown, moist, very stiff, little sand, trace gravel (FILL)									
4 SS	18	4 3 3	6	10							3.00			13	
					735										
5 SS	18	3 3 3	6				cl				2.25			14	
6 SS		6 5 5	10	15		15 (731.3)								13	Driller did not record recovery on field log Pushed stone, poor recovery

End of Boring at 15.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WB-46
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 4
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/14/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/14/12	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-873/B-40-874	LONGITUDE:
FIELD LOG BY: D. Magee	DRILLING METHOD / HOLE SIZE: 3¼ HSA, w/ RWB	ROADWAY NAME: I94 E-W over Underwood Pkwy	NORTHING: 296327
LOG QC BY: L. Gliniecki	HAMMER TYPE: Auto / EFFICIENCY: (7/2012) 81.4%	STATION / OFFSET	EASTING: 563749
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 747.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (8") 0.7 (747.1)									Boring was offset 7' south of staked location, minimal elevation difference between the staked location and the drilled location
						BASE COURSE, (12") 1.7 (746.1)									
1 SS	9	6 12 8	20			SANDY LEAN CLAY, brown, moist, stiff, trace gravel, (FILL) 2.6 (745.2)	cl				1.25			14	
					745	SILTY CLAY WITH SAND AND GRAVEL, brown, moist, very stiff to hard, (FILL)									
2 SS	8	5 8 9	17								4.50			13	
				5			CL-ML								
3 SS	10	3 11 12	23								2.75	23	7	13	
					740	7.7 (740.1) LEAN CLAY WITH GRAVEL, brown, moist, stiff to hard, (FILL)									
						With silt seams in sample SS-4									
4 SS	10	3 9 11	20								2.0-3.5			14	
				10			CL								
5 SH	11										4.5+ (1.9)	31	16	12	Dry Wt = 121 pcf G_s = 2.71
					735	12.7 (735.1) SILTY CLAY, brown, moist, stiff to very stiff, trace gravel, (FILL)									
6 SS	16	4 6 10	16				CL				2.00 (1.6)	29	14	16	Dry Wt = 120 pcf
				15		15.4 (732.4) LEAN CLAY, brown and gray, moist, very stiff, (FILL)									
7 SS	8	4 8 10	18								3.0-3.75			15	
					730		CL								
8 SS	14	8 7 9	16								2.0-3.0	28	14	14	
				20											

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 38.5ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME: Zoo Interchange	**BORING LOG**		**BORING No WB-46**
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 2 of 4
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 11/14/12	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/14/12	LATITUDE:
CREW CHIEF: A. Woerpel	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-873/B-40-874	LONGITUDE:
FIELD LOG BY: D. Magee	DRILLING METHOD / HOLE SIZE: 3¼ HSA, w/ RWB	ROADWAY NAME: I94 E-W over Underwood Pkwy	NORTHING: 296327
LOG QC BY: L. Gliniecki	HAMMER TYPE: Auto / EFFICIENCY: (7/2012) 81.4%	STATION / OFFSET	EASTING: 563749
COUNTY: 40-Milwaukee	TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 747.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						LEAN CLAY, brown and gray, moist, very stiff, (FILL)	CL								
						21.6 (726.2)									
					725	POORLY GRADED SAND WITH GRAVEL, brown, moist, dense									
9 SS	17	14 20 14	34	25			sp								
						26.7 (721.1)									
					720	POORLY GRADED SAND, gray, moist, medium dense									
10 SS	11	14 12 9	21	30			sp								
						31.2 (716.6)									
					715	LEAN CLAY, gray, moist, stiff									
11 SH	8			35		1" thick sand seam at 33.3'	CL					22	9	13	Sample disturbed unable to obtain Q_p
						36.1 (711.7)									
					710	POORLY GRADED GRAVEL WITH SAND, gray, wet, very dense	gp								Rig chatter at 36', possible cobbles and/or boulders
12 SS	2	50/3"	R	40											Driller converted to mud rotary at 38.5'

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 38.5ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45	Gestra	A. Woerpel	D. Magee	L. Gliniecki	40-Milwaukee

BORING LOG

zoo interchange

BORING No WB-46

PAGE No: 3 of 4

CONSULTANT PROJECT No	DATE STARTED	HORIZONTAL DATUM	VERTICAL DATUM
	11/14/12	WISCRS (2006)	NAVD 88
DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 11/14/12	LATITUDE	
DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: B-40-873/B-40-874	LONGITUDE	
DRILLING METHOD / HOLE SIZE: 3¼ HSA, w/ RWB	ROADWAY NAME: I94 E-W over Underwood Pkwy	NORTHING: 296327	
HAMMER TYPE: Auto; EFFICIENCY: (7/2012) 81.4%	STATION / OFFSET	EASTING: 563749	
TOWNSHIP / RANGE / SECTION / 1/4 SECTION / 1/4 SECTION		SURFACE ELEVATION: 747.8 ft	

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						POORLY GRADED GRAVEL WITH SAND, gray, wet, very dense	gp								Medium to hard drilling at 40' Drilling rate from 40' to 65', 5' per 10 to 15 minutes Driller used 2 15/16" carbide tri-cone rock bit in HSA from 40' to 80'
						41.1 (706.7)									
						SILTY SAND WITH GRAVEL, gray, wet, very dense									
					705										
13 SS	10	33 50/6"	R												Fines = 25%
				45											Hard drilling at 45', driller noted possible cobbles and/or boulders
					700										
14 SS	13	26 30 28	58				SM					NP	NP		
				50											Driller noted possible cobbles and/or boulders at 50'
					695										
15 SS	4	50/6"	R												
				55											
						56.2 (691.6)									
						POORLY GRADED SAND WITH GRAVEL, gray, wet, very dense									
					690		gp								
16 SS	2	50/4"	R												
				60											

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 38.5ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

WisDOT PROJECT NAME	WisDOT PROJECT ID No	CONSULTANT	DRILLING CONTRACTOR	CREW CHIEF	FIELD LOG BY	LOG QC BY	COUNTY
Zoo Interchange	1060-33-01	Forward 45	Gestra	A. Woerpel	D. Magee	L. Gliniecki	40-Milwaukee

BORING LOG

CONSULTANT PROJECT No	DRILLING CONTRACTOR PROJECT No	DRILLING RIG	DRILLING METHOD / HOLE SIZE	HAMMER TYPE	EFFICIENCY	TOWNSHIP	RANGE	SECTION	1/4 SECTION	1/4 SECTION
	11039-10	CME 75 (International)	3¼ HSA, w/ RWB	Auto	(7/2012) 81.4%					

DATE STARTED	DATE COMPLETED	WisDOT STRUCTURE ID No	ROADWAY NAME	STATION	OFFSET
11/14/12	11/14/12	B-40-873/B-40-874	I94 E-W over Underwood Pkwy		

BORING No	PAGE No	HORIZONTAL DATUM	VERTICAL DATUM	LATITUDE	LONGITUDE	NORTHING	EASTING	SURFACE ELEVATION
WB-46	4 of 4	WISCRS (2006)	NAVD 88			296327	563749	747.8 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						POORLY GRADED SAND WITH GRAVEL, gray, wet, very dense									
					685										
17 SS	0	50/2"	R												Driller collected cuttings from mud return during drilling for samples SS-17 thru SS-20. Drilling rate from 65' to 80', 5' per 30 minutes
				65											
					680										
18 SS	0	50/2"	R												
				70			gp								
					675										
19 SS	0	50/0"	R												
				75											
					670										
20 SS	0	50/2"	R												Rock bit penetration rate decreased significantly at 79'. Driller terminated borehole at 80'
				80		80 (667.8)									
						End of Boring at 80.0 ft.									

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: 38.5ft.		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-30
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/27/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/27/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296374
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 564175
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 747.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (5") 0.4 (747.1)									
						BASE COURSE, (4") 0.9 (746.6)									
1 SS	10	3 4 3	7		745	LEAN CLAY, dark brown and gray, moist, stiff to hard, trace sand and gravel (FILL)					4.50			13	
2 SS	13	2 3 4	7	5		Trace organics	cl				2.00			13	
3 SS	16	3 3 5	8		740	With silt seams					1.75			18	
						7.9 (739.6) SANDY LEAN CLAY, brown, moist, very stiff, with silt seams (POSSIBLE FILL)									
4 SS		3 5 11	16	10		10 (737.5)	cl				2.75			15	Driller did not record recovery on field log

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-31
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/31/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/31/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296540
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 564390
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 748 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (9.4") 0.8 (747.2)									
						BASE COURSE, (3.5") 1 (747)									
1 SS	14	5 7 7	14			LEAN CLAY, dark brown, black and gray, moist, hard, trace to little sand, trace gravel and organics with sand seams (FILL) 2.8 (745.2)	cl				4.5+			10	
					745	POORLY GRADED SAND, brown and gray, moist, medium dense, little gravel, trace clay (FILL)									
2 SS	12	6 6 4	10	5		5.3 (742.7)	sp								
						LEAN CLAY, grayish brown, moist, hard, trace gravel (FILL)									
3 SS	11	5 5 8	13								4.50			12	
					740		cl								
4 SS	18	7 10 8	18	10		10 (738)					4.50			10	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-32
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/27/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/27/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296494
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 564664
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 753 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						CONCRETE, (4.5") 0.4 (752.6)									
						BASE COURSE, (3") 0.7 (752.3)									
1 SS	9	3 3 3	6			LEAN CLAY, brown and gray, moist, very stiff, little sand, trace gravel (FILL)					2.00			13	
					750		cl								
2 SS	18	3 4 7	11	5										20	Pushed stone during sampling, disturbed sample, no Qp possible
						5.5 (747.5)									
						CLAYEY SAND, dark brown, black and gray, moist, loose, trace gravel and organics (FILL)									
3 SS	18	3 3 4	7				sc								
					745	8 (745)									
						LEAN CLAY, brown, moist, hard, with silty sand seams (POSSIBLE FILL)									
4 SS	18	4 6 10	16	10		10 (743)	cl				4.50			12	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

BORING LOG

WisDOT PROJECT NAME: Zoo Interchange			BORING No: WH-33
WisDOT PROJECT ID No: 1060-33-01			PAGE No: 1 of 1
CONSULTANT: Forward 45	CONSULTANT PROJECT No:	DATE STARTED: 10/31/11	HORIZONTAL DATUM: WISCRS (2006) / VERTICAL DATUM: NAVD 88
DRILLING CONTRACTOR: Gestra	DRILLING CONTRACTOR PROJECT No: 11039-10	DATE COMPLETED: 10/31/11	LATITUDE:
CREW CHIEF: B. Sargent	DRILLING RIG: CME 75 (International)	WisDOT STRUCTURE ID No: Roadway	LONGITUDE:
FIELD LOG BY: D. Ashford	DRILLING METHOD / HOLE SIZE: 2¼" HSA	ROADWAY NAME: West Leg Mainline	NORTHING: 296660
LOG QC BY: R. Haque	HAMMER TYPE: Auto / EFFICIENCY: (6/2011) 85.1%	STATION: / OFFSET:	EASTING: 564880
COUNTY: 40-Milwaukee	TOWNSHIP: / RANGE: / SECTION: / 1/4 SECTION: / 1/4 SECTION:		SURFACE ELEVATION: 757.5 ft

Sample No / Type	Sample Recovery (in)	Blow Counts	N - Value	Depth (ft)	Elevation (ft)	Soil / Rock Description and Geological Origin for Each Major Unit / Comments	USCS / AASHTO	Graphic	Well Diagram	PID / FID	Unconfined Comp. Strength Q_p or (Q_u) (tsf)	Liquid Limit (%)	Plasticity Index (%)	Moisture Content (%)	Notes
						ASPHALT, (4") 0.3 (757.2)									
						CONCRETE, (9") 1.1 (756.4)									
1 SS	18	5 7 9	16		755	LEAN CLAY, dark brown to grayish brown, moist, very stiff to hard, trace to little sand, trace gravel, with occasional sand seam (FILL)					4.5+			12	
2 SS	18	3 4 5	9	5										13	Disturbed sample no Qp
							cl								
3 SS	18	4 5 7	12		750						3.75			23	
4 SS	18	8 11 6	17	10		10 (747.5)					4.50			11	

End of Boring at 10.0 ft.

WATER & CAVE-IN OBSERVATION DATA

WATER ENCOUNTERED DURING DRILLING: NE		CAVE DEPTH AT COMPLETION: NMR	WET ☐ DRY ☐
WATER LEVEL AT COMPLETION: NE		CAVE DEPTH AFTER 0 HOURS: NMR	WET ☐ DRY ☐
WATER LEVEL AFTER 0 HOURS: NMR		NE = Not Encountered; NMR = No Measurement Recorded	

NOTE: Stratification lines between soil types represent the approximate boundary; gradual transition between in-situ soil layers should be expected.

Laboratory Data

North Leg

South Leg

East Leg

West Leg

GESTRA Engineering
1626 W Fond du Lac Avenue
Milwaukee, WI 53205
Phone: (414) 933-7444
Fax: (414) 933-844

Laboratory Test Results of
CBR (California Bearing Ratio) of Laboratory-Compacted Soils

Project Name:	Zoo Interchange
Project Number:	11039-10
Project Location:	Milwaukee, WI
ASTM Designation:	**D 1883**

Date: Thursday, November 17, 2011
Report To: Forward 45

Sample Information

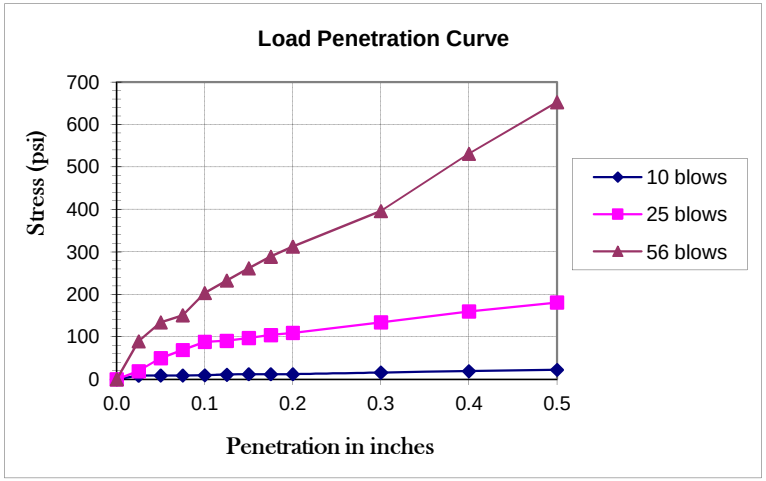
Boring number:	NH-5
Description of Soil:	Poorly graded sand with gravel
Strain Rate (in/min):	0.05
Method used for CBR sample preparation:	Standard (ASTM D698)
Condition of Sample:	Soaked
Surcharge Amount:	**10 lbs**
Desired percent compaction:	95%

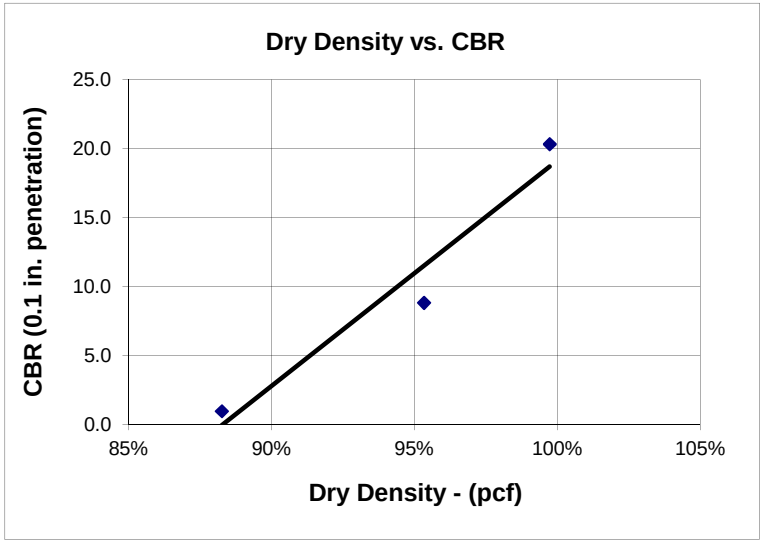
From Proctor Results

Uncorrected Optimum Moisture:	9.3%
Uncorrected Maximum Dry Density: (pcf)	129.7

Test Results

		Trial 1	Trial 2	Trial 3
	Number of blows / layer:	10 blows	25 blows	56 blows
Moisture Content	Before Compaction	7.8	8.2	8.5
	After Compaction	7.8	7.1	8.7
	Top 1" after soaking	14.6	11.9	11.5
	Average after soaking	14.2	10.9	9.5
	% swelling	**0.1**	**0.1**	**0.1**
Dry Density	Before soaking (pcf)	114.5	123.6	129.3
	After soaking (pcf)	116.7	124.8	131.3
	Percent Compaction	88.3%	95.3%	99.7%
	CBR at 0.1 in. penetration	**0.96**	**8.82**	**20.32**
	CBR at 0.2 in. penetration	**0.81**	**7.29**	**20.83**
	CBR @ 95 %:	**10.9**		





Reviewed By: Eric Jeske
GESTRA Engineering, Inc.

GESTRA Engineering, Inc
1626 W. Fond du Lac Avenue
Milwaukee, WI 53205
Phone: (414) 933-7444; Fax: (414) 933-7844

Laboratory Test Results of Proctor Sample

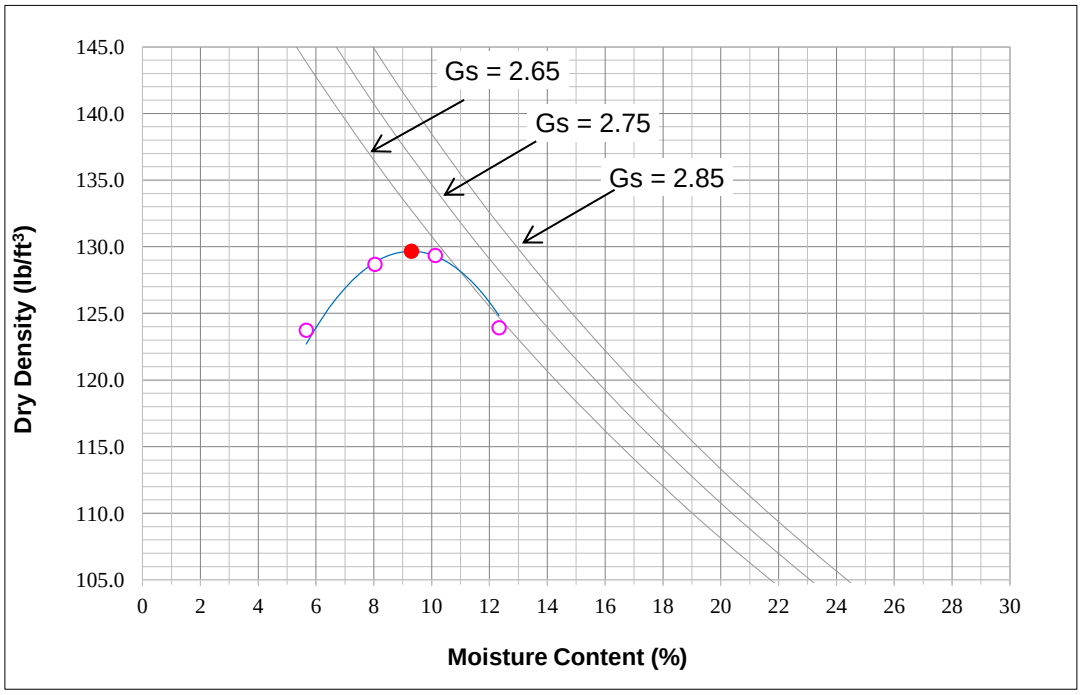
Project Name:	Zoo Interchange	Date:	November 15, 2011
Project Number:	11039-10	Client:	Forward 45
Projection Location:	Milwaukee Co., WI		
ASTM Designation:	**D698** Method: **B**		

Sample Information

Type of Sample	Poorly graded sand with gravel
Sample Location	Drill Cuttings
Sample Number	NH-5

OPTIMUM MOISTURE 9.3 **%**

UNCORRECTED			**CORRECTED**		
Maximum Density:	129.7	**lb/ft^3**	**Maximum Dry Density**	132.4	**lb/ft^3**
Test Gravel Content:	19	**%**	**Original Gravel Content**	30	**%**
			Corrected Optimum Moisture	8.4	**%**



Notes: [1]The solid dot indicates uncorrected maximum density at test gravel content.
[2]Field density tests should be compared to the corrected maximum dry density, listed above, which uses insitu gravel content

Performed by: Jeff Bruesewitz

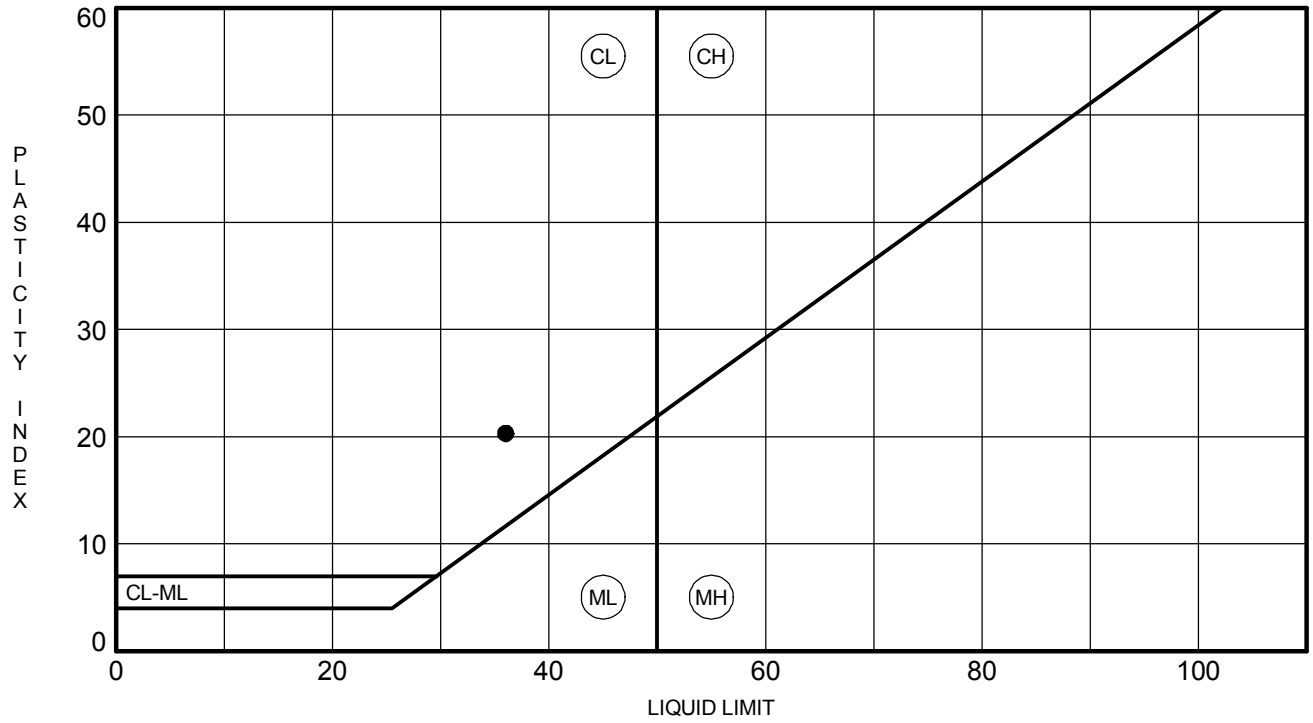
Reviewed By: Jorge Martinez
GESTRA Engineering

Geotechnical-Structural-Pavement-Construction Material

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



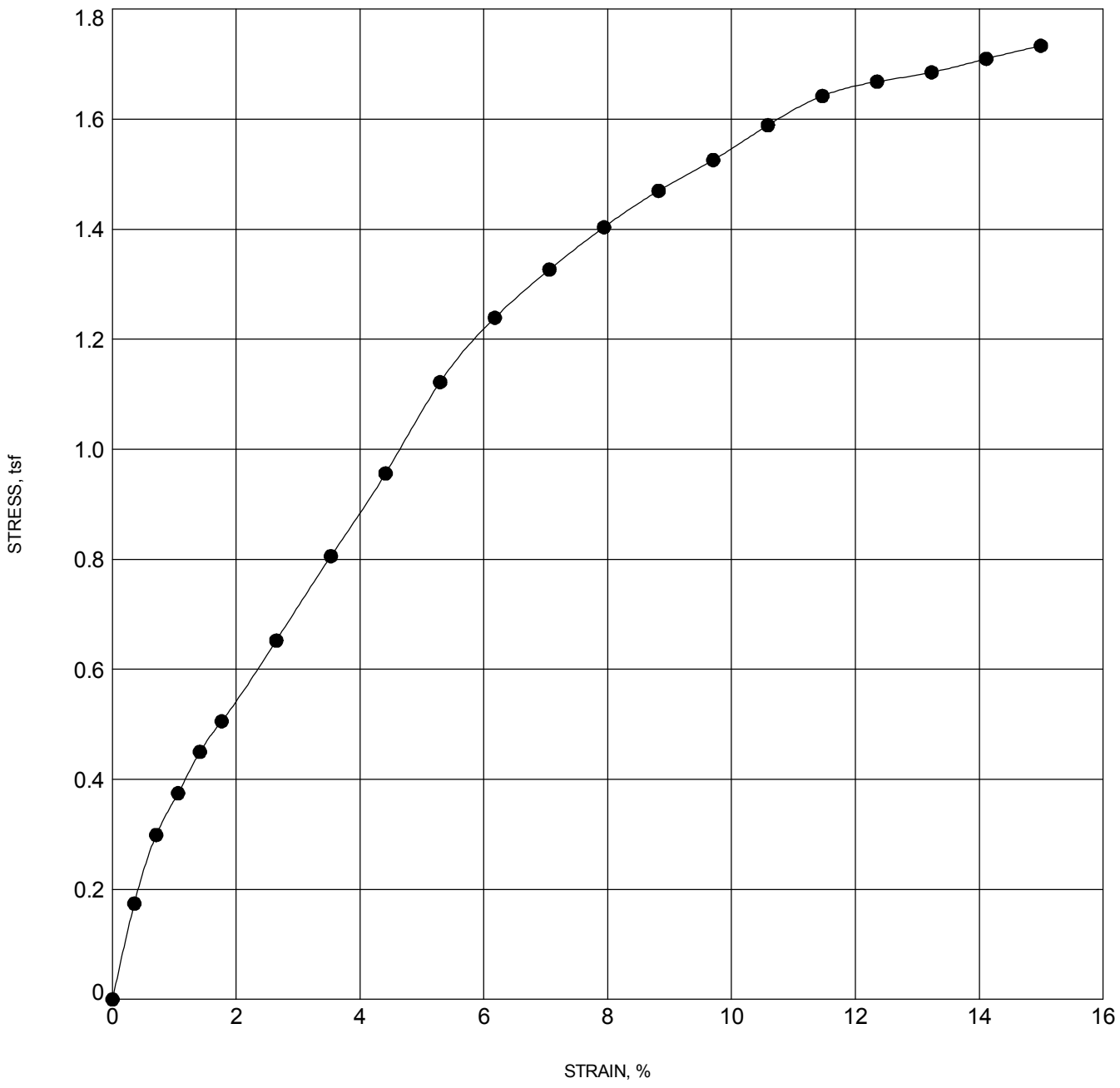
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**NR-3**	**SS-4**	**8.5'**	**22%**	**36**	**16**	**20**	**0.3**		**B. Bills**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 4/23/12

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**NR-2**	**SH-6**	**13.0'**	**23**	**1.73**	**100**	**C. Brown**	**E. Jeske**

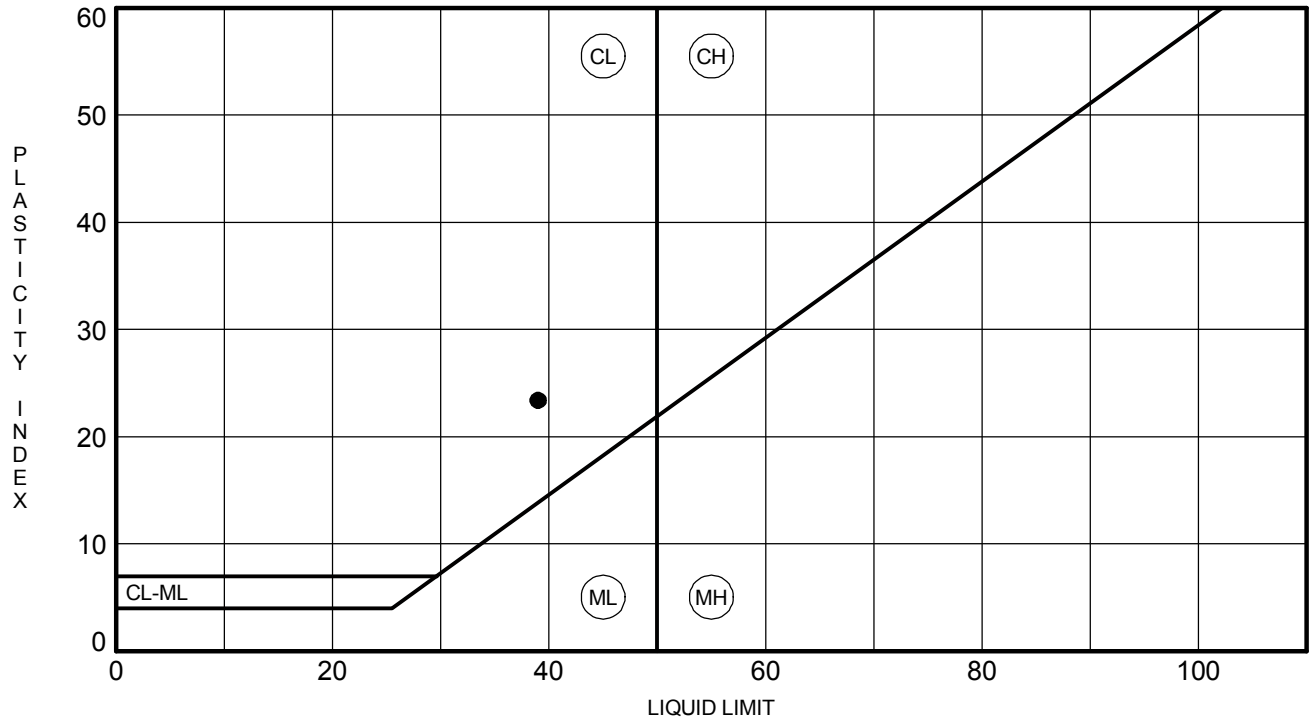
COMMENTS:

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 4/23/12

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



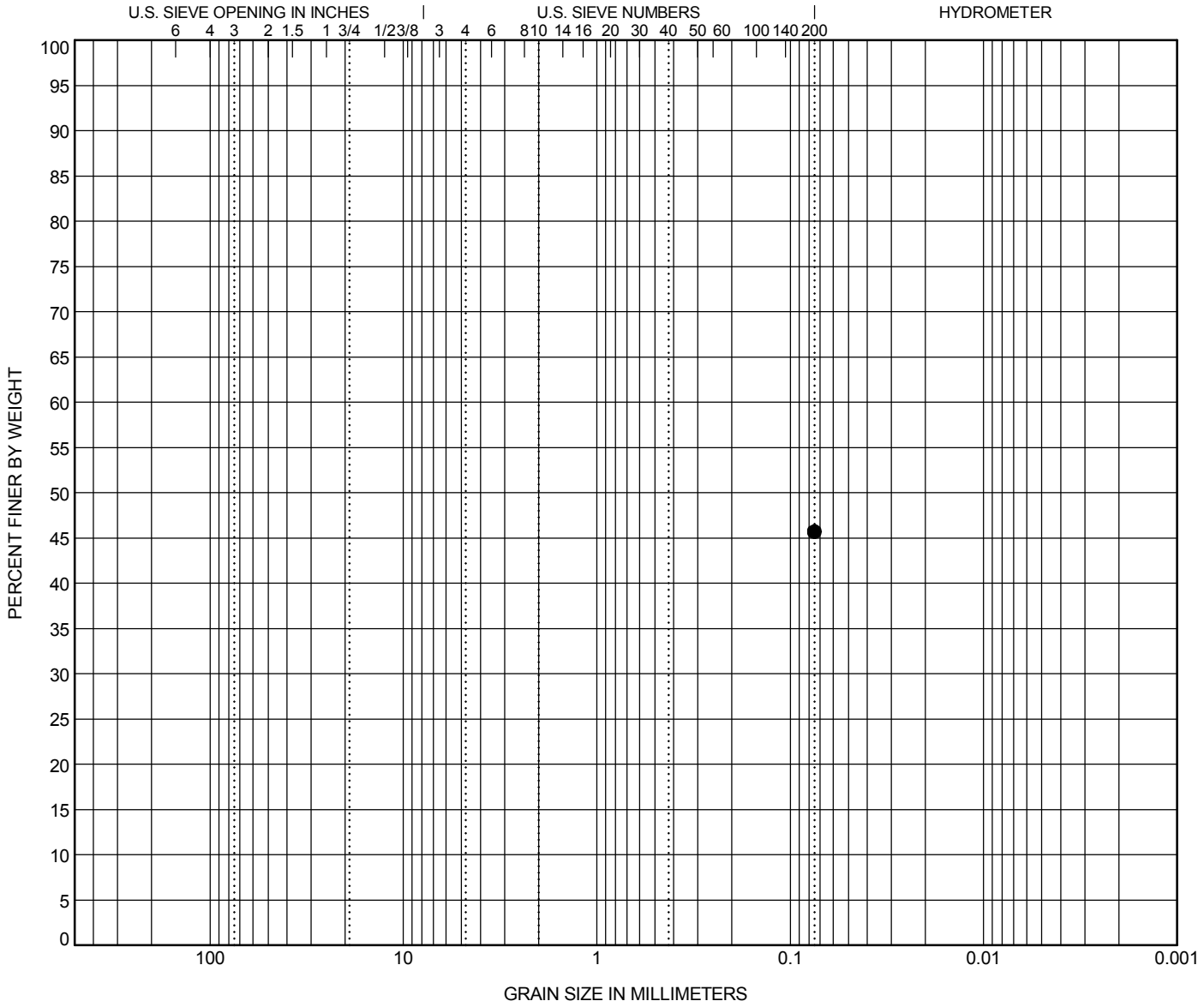
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**NB-35**	**SS-10**	**28.5'**	**22%**	**39**	**16**	**23**	**0.26**		**D. Born**	**E. Jeske**

C:\USERS\ERIC JESKE\DESKTOP\ZOO INTERCHANGE-NORTH LEG - COPY.GPJ Zoo Interchange 4/15/12

GRAIN SIZE DISTRIBUTION
(ASTM D422)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● **NB-35, SS-13**	**43.5'**	**CLAYEY SAND(SC)**					

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **NB-35, SS-13**	**43.5'**	**0.075**						**45.7**	

PERFORMED BY: C. Brown **CHECKED BY: E. Jeske**

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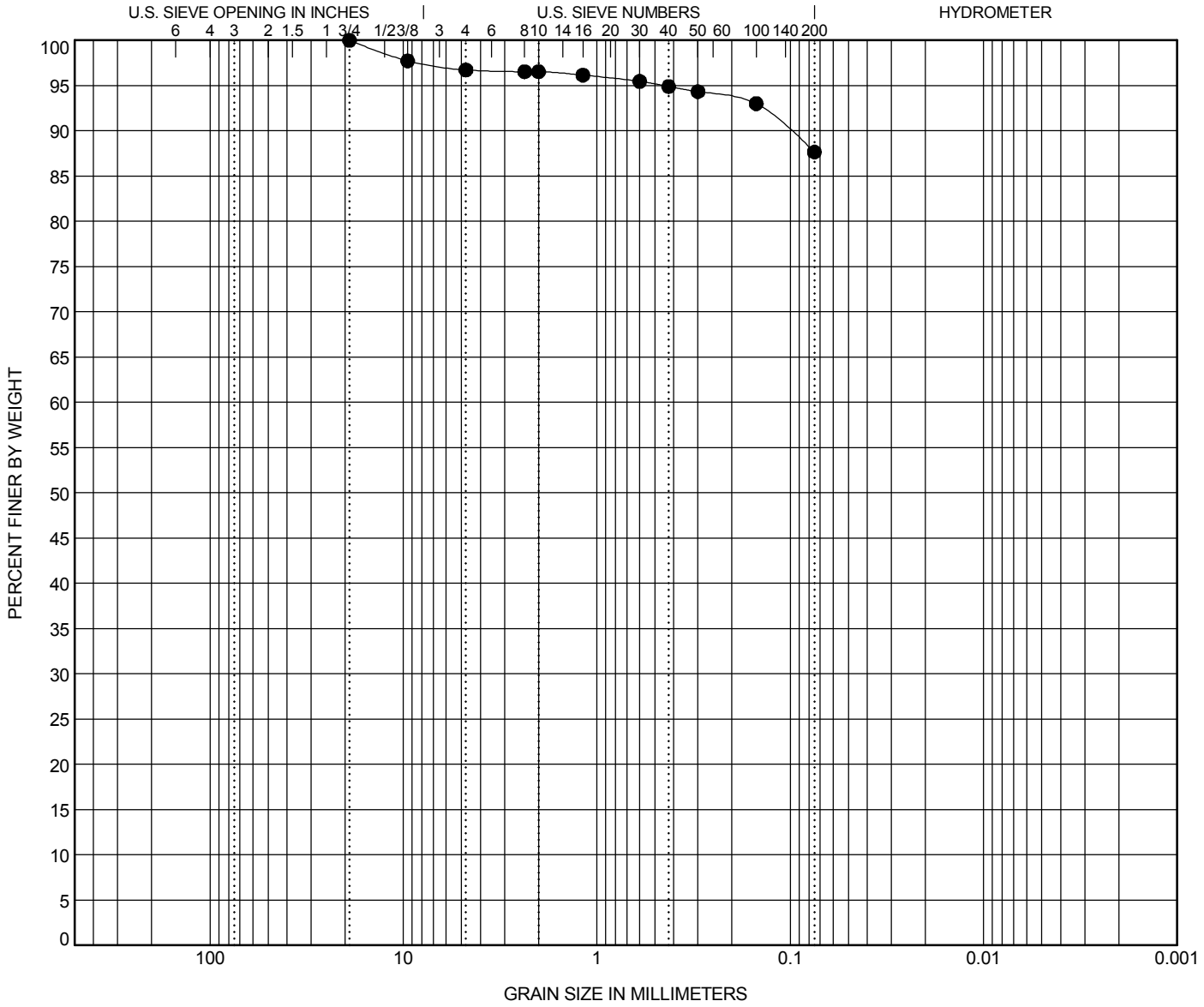
GRAIN SIZE DISTRIBUTION
(ASTM D422)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● NB-35, SS-16	58.5'	LEAN CLAY(CL)					

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● NB-35, SS-16	58.5'	19				3.3	9.1	87.7	

PERFORMED BY: C. Brown **CHECKED BY: E. Jeske**

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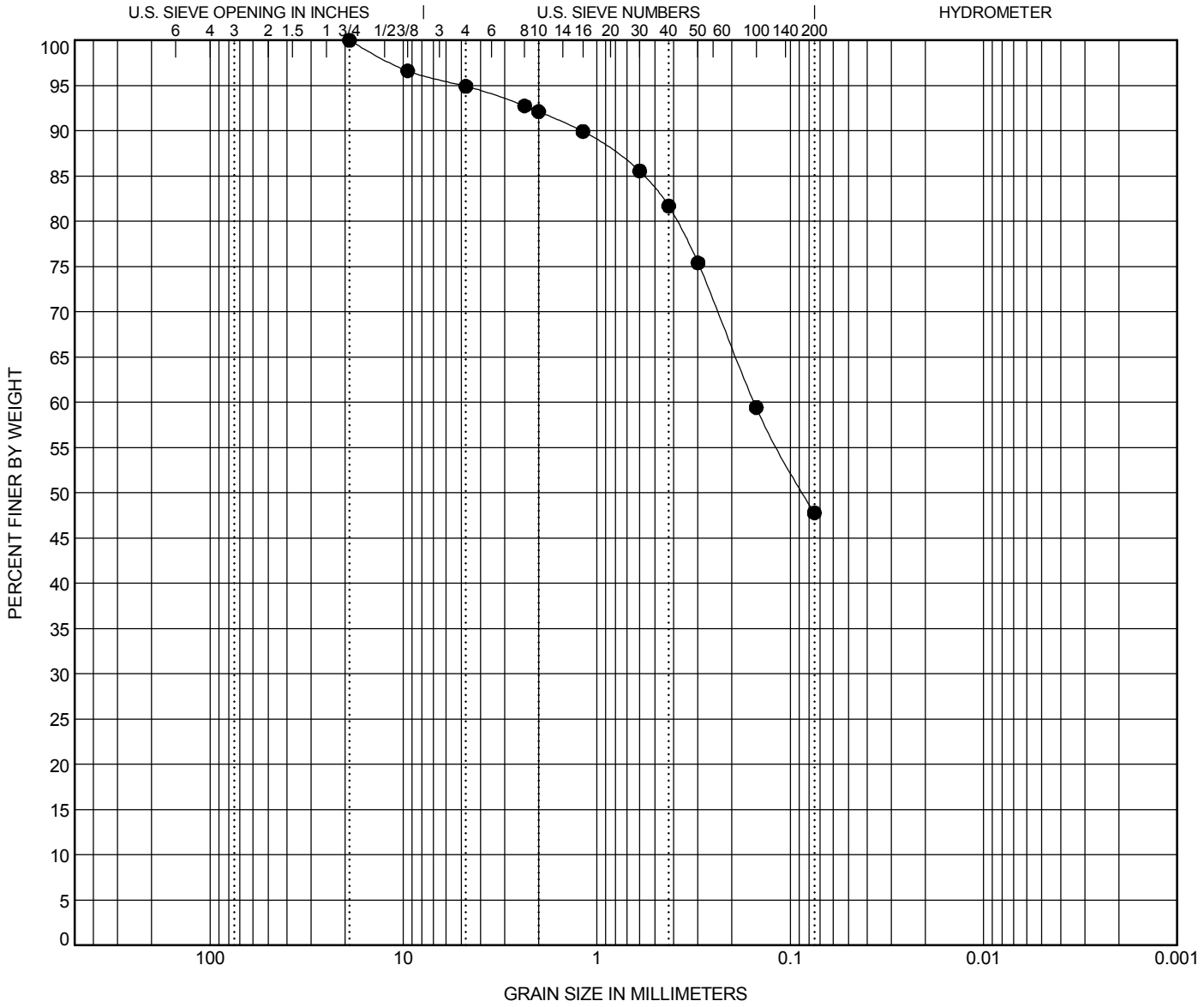
GRAIN SIZE DISTRIBUTION
(ASTM D422)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● NB-35, SS-18	68.5'	CLAYEY SAND(SC)					

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● NB-35, SS-18	68.5'	19	0.154			5.1	47.1	47.8	

PERFORMED BY: B. Bills **CHECKED BY: E. Jeske**

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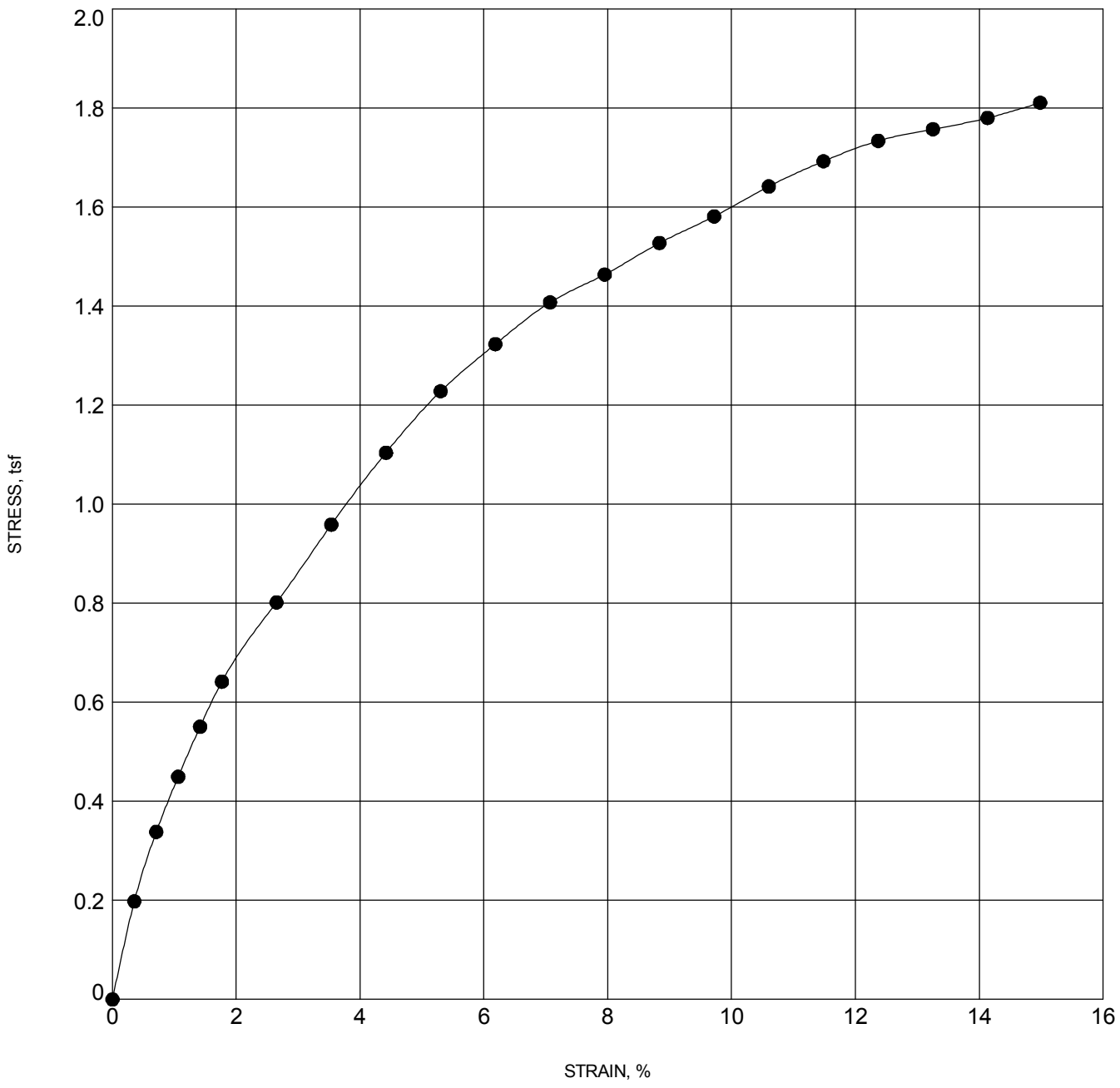
UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-80 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**NH-25**	**SH-4**	**8.0'**	**16**	**1.81**	**118**	**D. Born**	**E. Jeske**

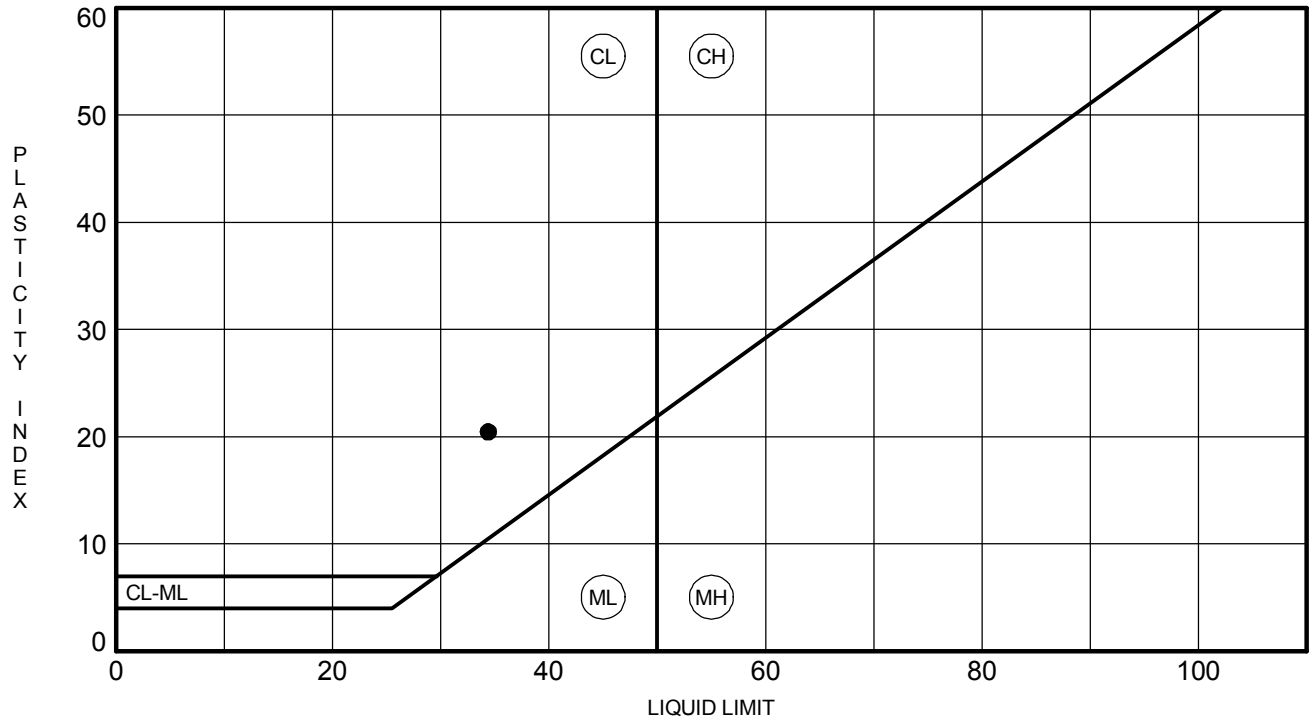
COMMENTS:

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 11/2/12

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



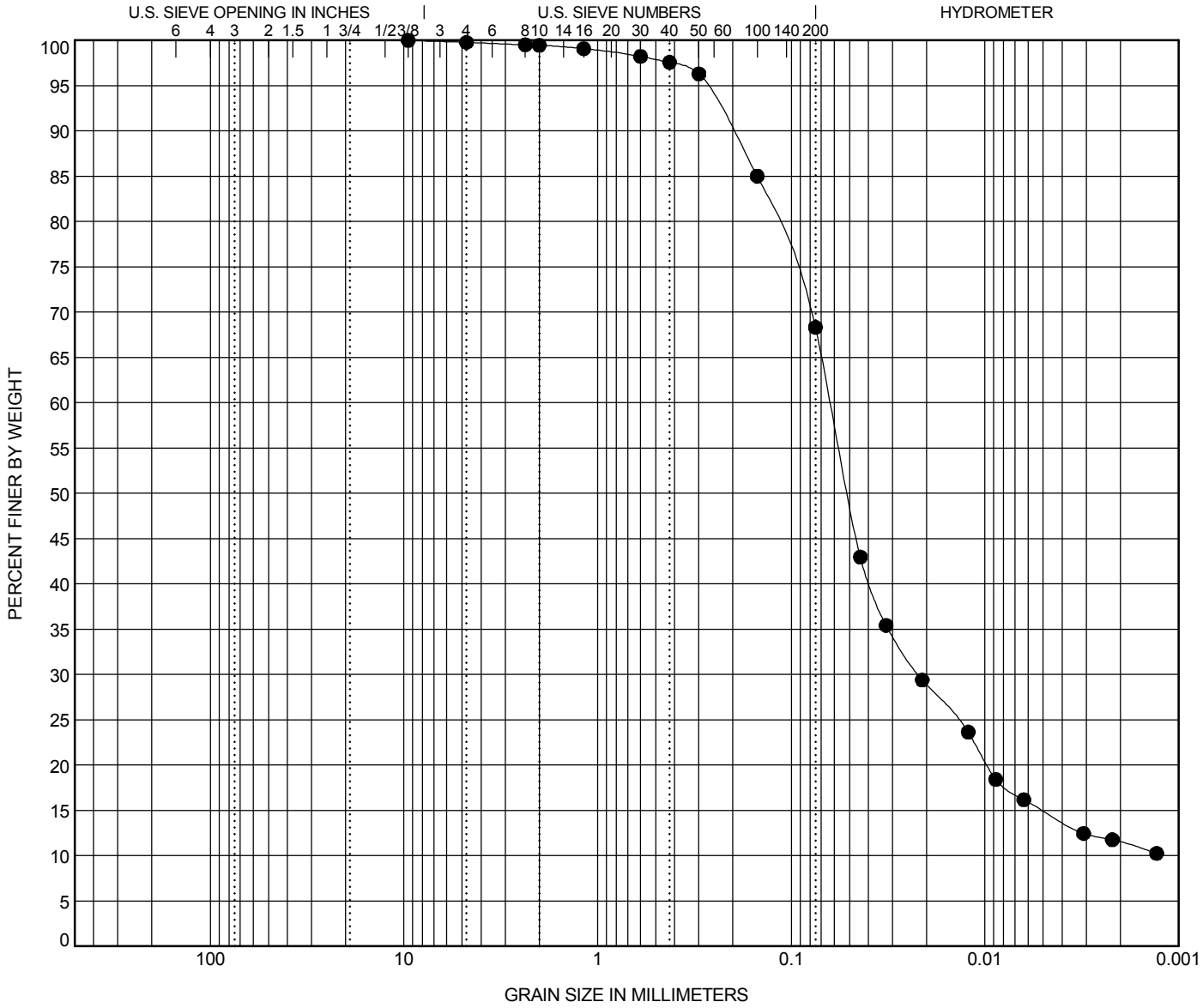
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**NB-38**	**SS-2**	**3.5'**	**18%**	**34**	**14**	**20**	**0.2**		**D. Born**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 1/9/12

GRAIN SIZE DISTRIBUTION
(ASTM D422)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**NB-38, SS-8**	**18.5'**						

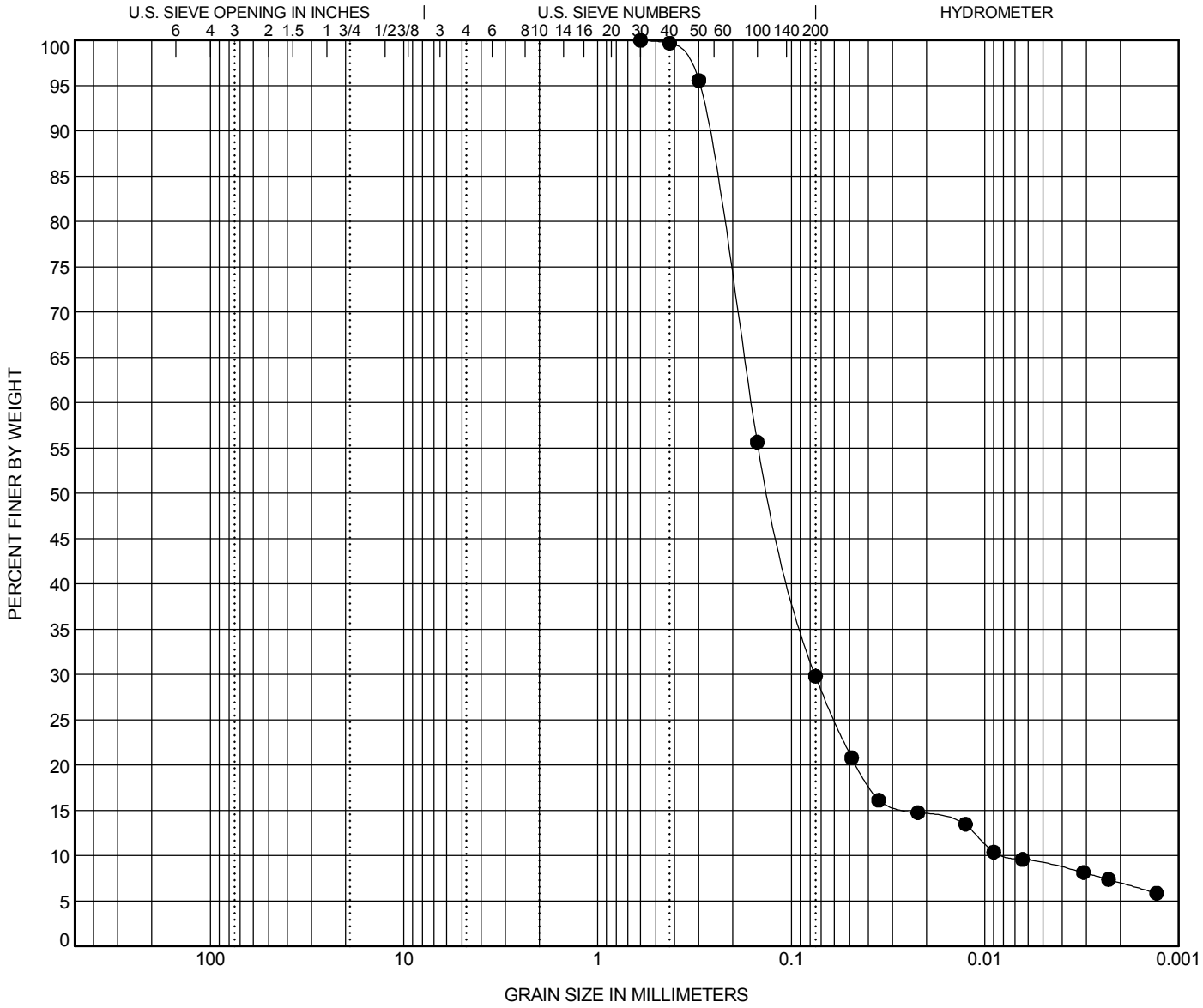
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**NB-38, SS-8**	**18.5'**	**9.5**	**0.063**	**0.022**		**0.2**	**31.5**	**53.4**	**15.0**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 1/3/12

GRAIN SIZE DISTRIBUTION
(ASTM D422)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● **NB-38, SS-11**	**33.0'**	**SILTY SAND (SM)**				**4.62**	**21.28**

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **NB-38, SS-11**	**33.0'**	**0.6**	**0.162**	**0.075**	**0.008**	**0.0**	**70.2**	**20.7**	**9.1**

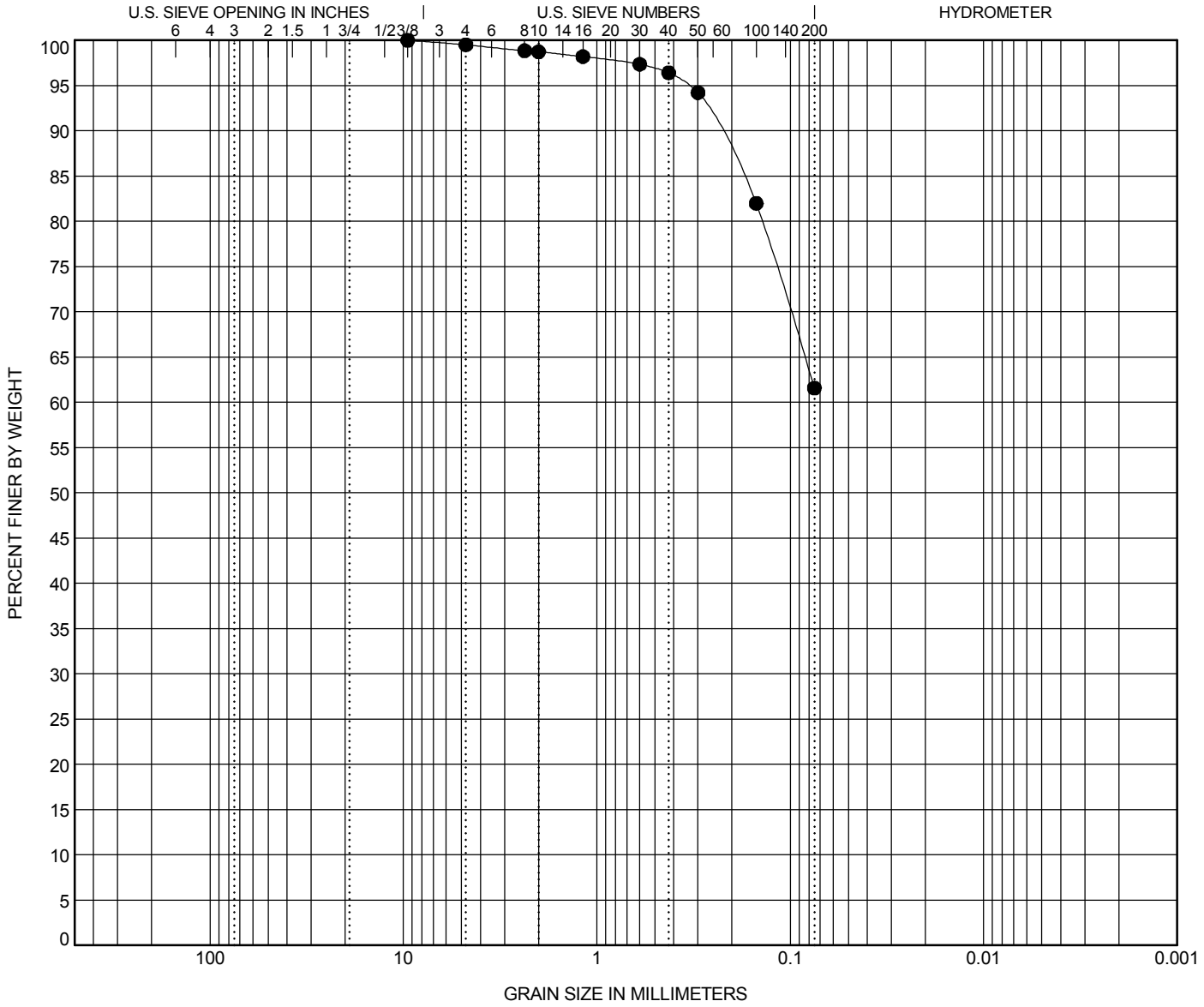
PERFORMED BY: B. Bills **CHECKED BY: E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 1/9/12

GRAIN SIZE DISTRIBUTION
(ASTM D422)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**NB-38, SS-13**	**43.5'**						

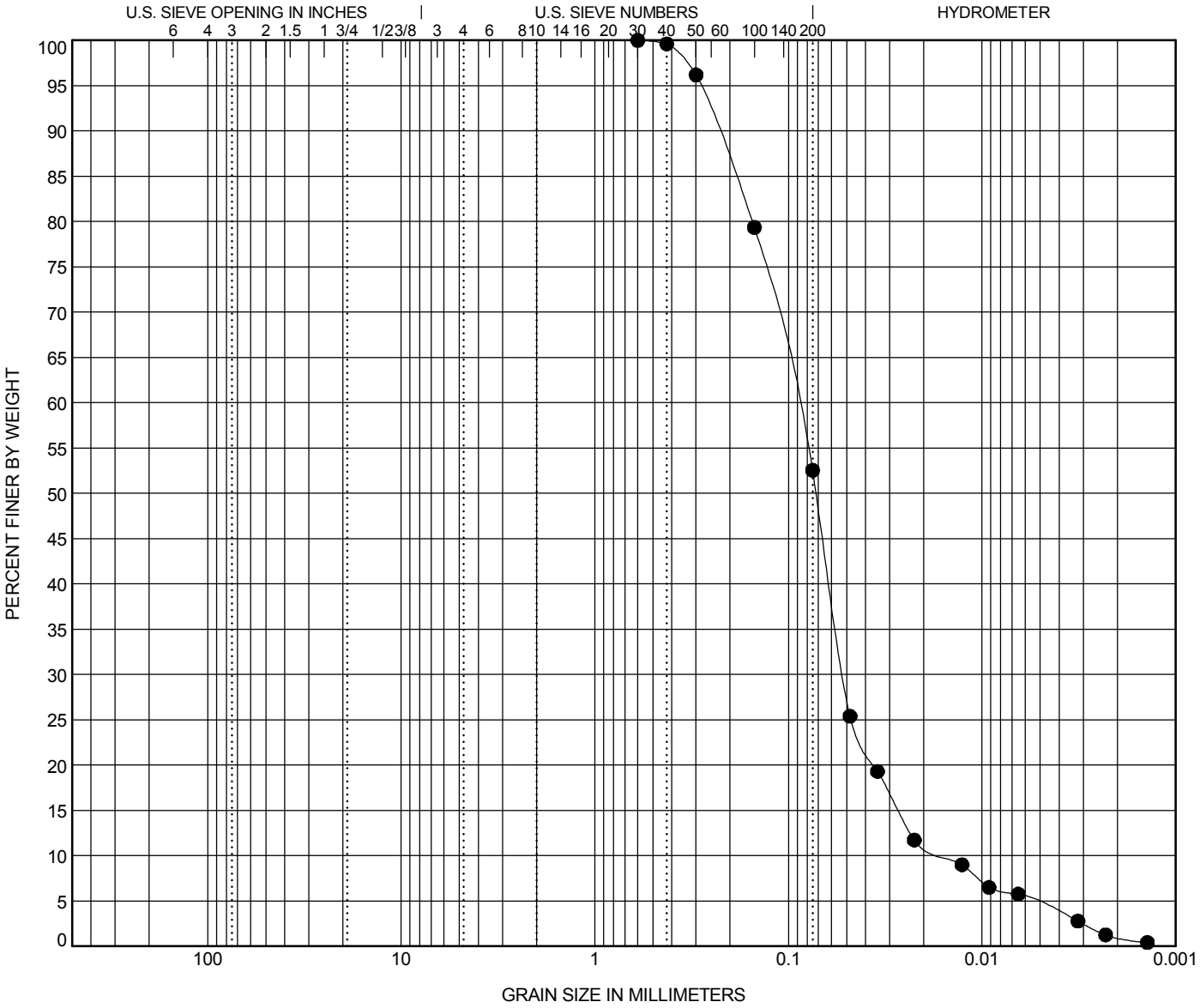
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**NB-38, SS-13**	**43.5'**	**9.5**				**0.5**	**37.9**	**61.6**	

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 1/3/12

GRAIN SIZE DISTRIBUTION
(ASTM D422)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● NB-40, SS-15	53.5'	SANDY SILT (ML)				1.90	5.83

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● NB-40, SS-15	53.5'	0.6	0.091	0.052	0.016	0.0	47.4	47.9	4.7

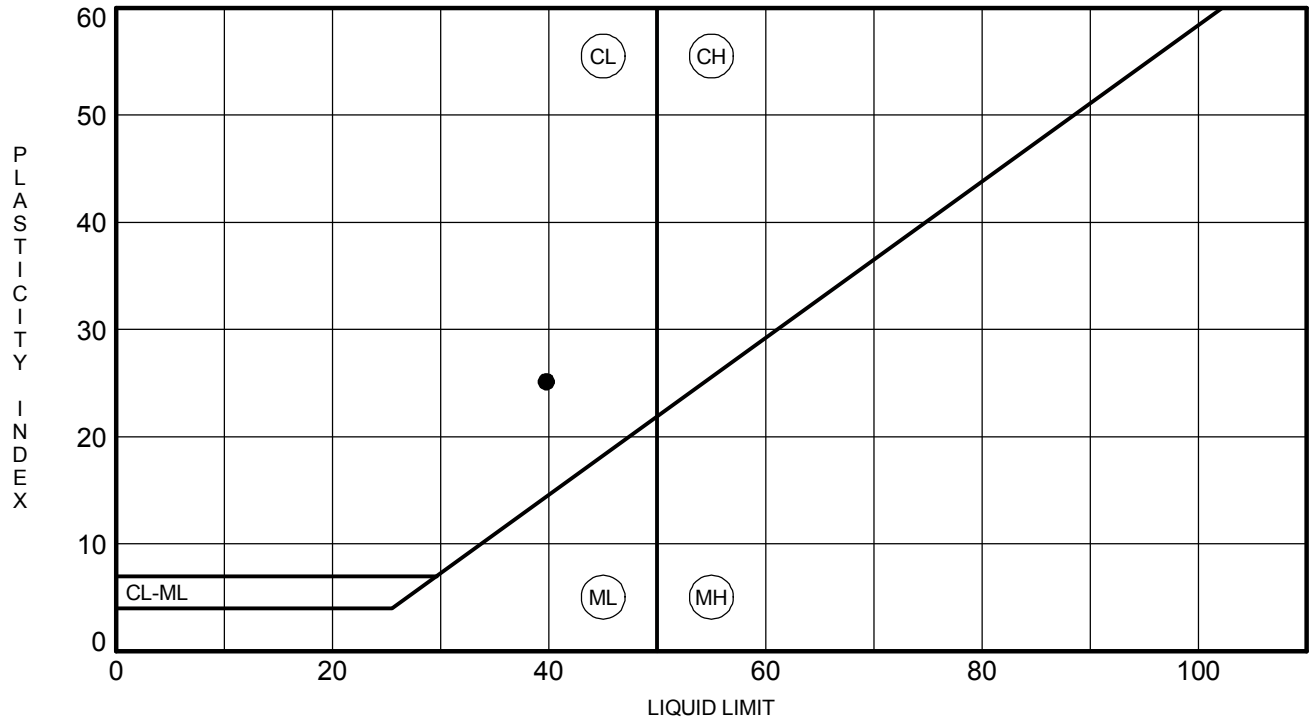
PERFORMED BY: B. Bills **CHECKED BY: E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 1/9/12

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



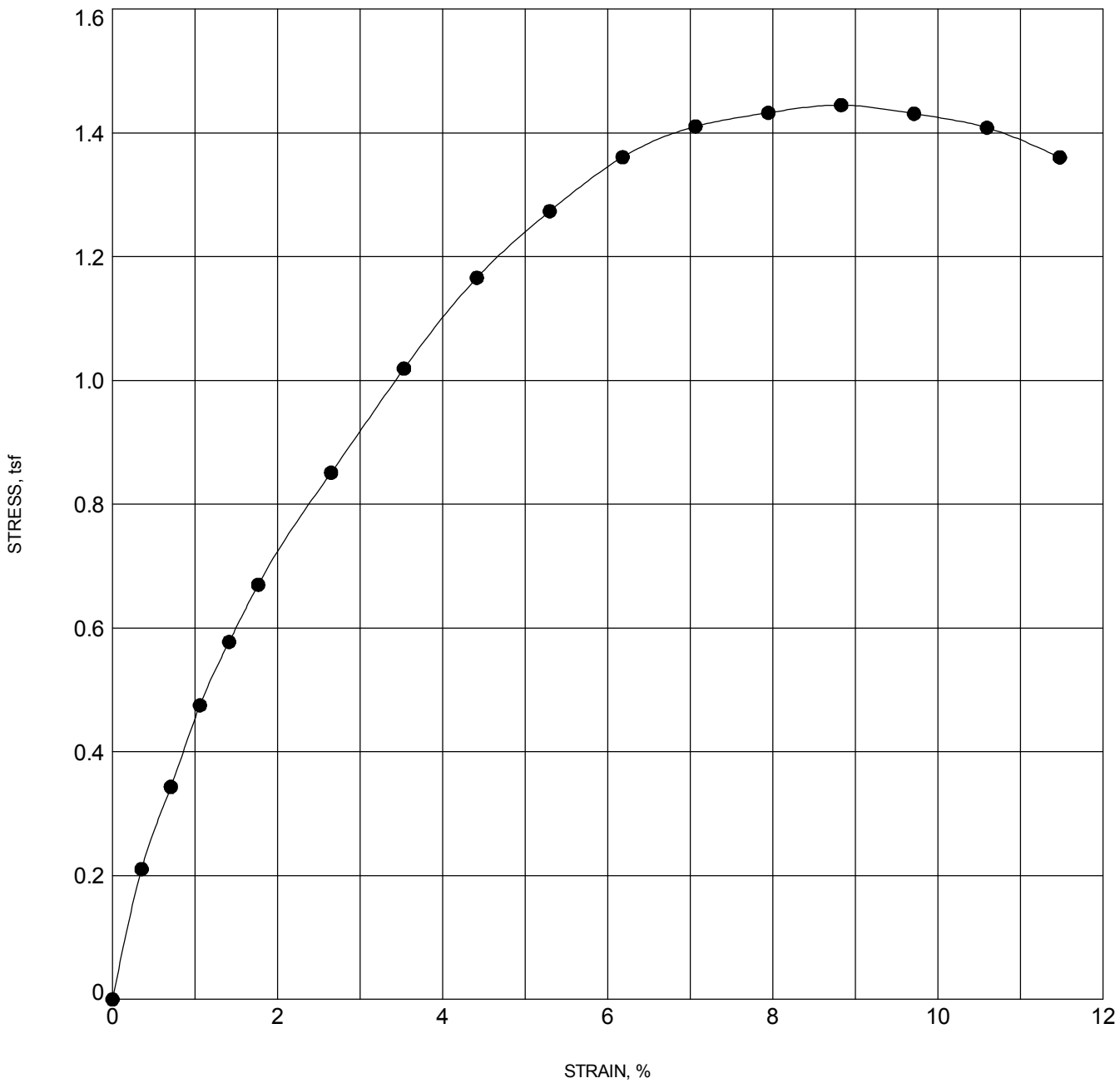
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**NB-38**	**SS-18**	**68.5'**	**22%**	**40**	**15**	**25**	**0.28**		**D. Born**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 1/9/12

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-80 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**NH-36**	**SH-8**	**18.0'**	**23**	**1.45**	**105**	**D. Born**	**E. Jeske**

COMMENTS:

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 11/2/12

GESTRA Engineering, Inc
1626 W. Fond du Lac Avenue
Milwaukee, WI 53205
Phone: (414) 933-7444; Fax: (414) 933-7844

Laboratory Test Results of Proctor Sample

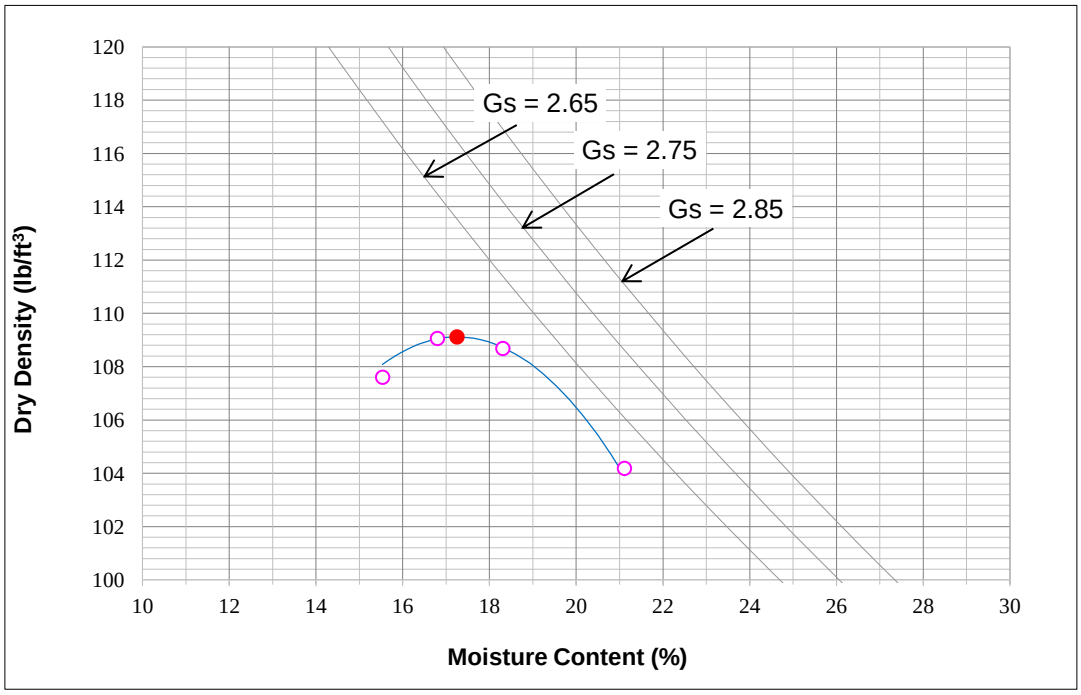
Project Name:	Zoo Interchange	Date:	December 14, 2011
Project Number:	11039-10	Client:	Forward 45
Projection Location:	Milwaukee Co., WI		
ASTM Designation:	**D698** Method: **A**		

Sample Information

Sample Description	LEAN CLAY
Sample Location	NH-38 auger cuttings
Sample Number	Bulk

OPTIMUM MOISTURE 17.3 **%**

UNCORRECTED		**CORRECTED**	
Maximum Density:	109.1 **lb/ft^3**	**Maximum Dry Density**	113.8 **lb/ft^3**
Test Gravel Content:	0 **%**	**Original Gravel Content**	11 **%**
		Corrected Optimum Moisture	15.4 **%**



Notes: [1]The solid dot indicates uncorrected maximum density at test gravel content.
[2]Field density tests should be compared to the corrected maximum dry density, listed above, which uses insitu gravel content

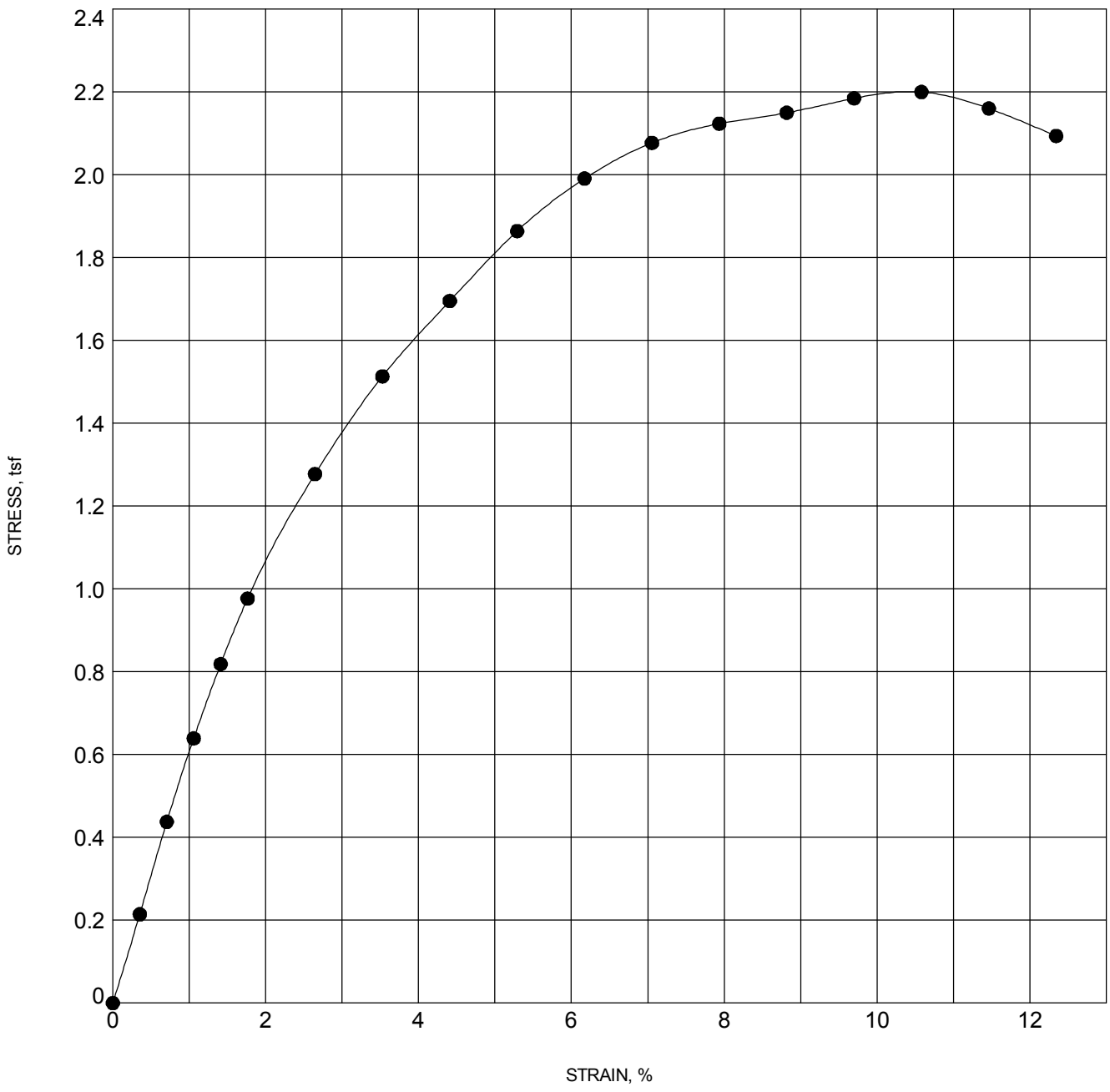
Performed by: JB/BN

Reviewed By: E. Jeske
GESTRA Engineering

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-80 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**NH-38**	**SH-7**	**16.0'**	**20**	**2.2**	**116**	**D. Born**	**E. Jeske**

COMMENTS: Pushed stone during sampling, test sample was not perfectly cylindrical but did not seem to effect the testing and results

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-NORTH LEG.GPJ Zoo Interchange 11/2/12

GESTRA Engineering
1626 W Fond du Lac Avenue
Milwaukee, WI 53205
Phone: (414) 933-7444
Fax: (414) 933-844

Laboratory Test Results of
CBR (California Bearing Ratio) of Laboratory-Compacted Soils

Project Name:	Zoo Interchange	Date:	Friday, November 04, 2011
Project Number:	11039-10	Report To:	Forward 45
Project Location:	Milwaukee, WI		
ASTM Designation:	**D 1883**		

Sample Information

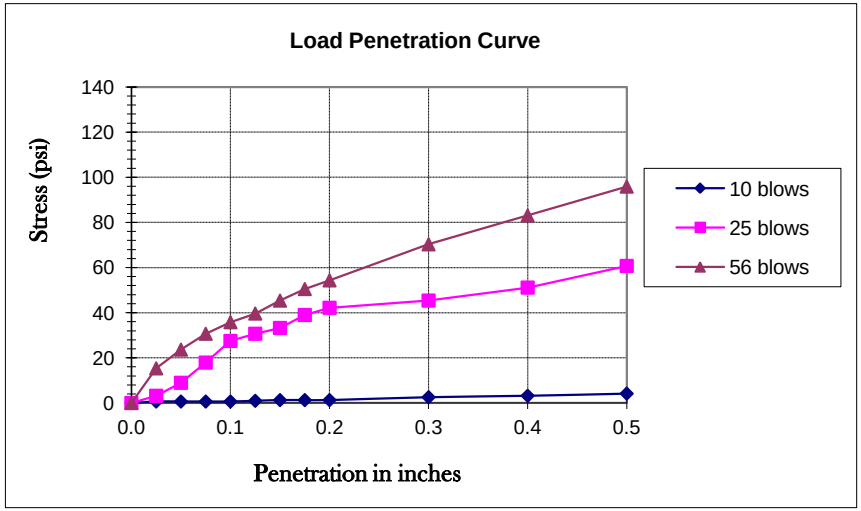
Boring number:	SH-4
Description of Soil:	Lean Clay
Strain Rate (in/min):	0.05
Method used for CBR sample preparation:	Standard (ASTM D698)
Condition of Sample:	Soaked
Surcharge Amount:	**10 lbs**
Desired percent compaction:	95%

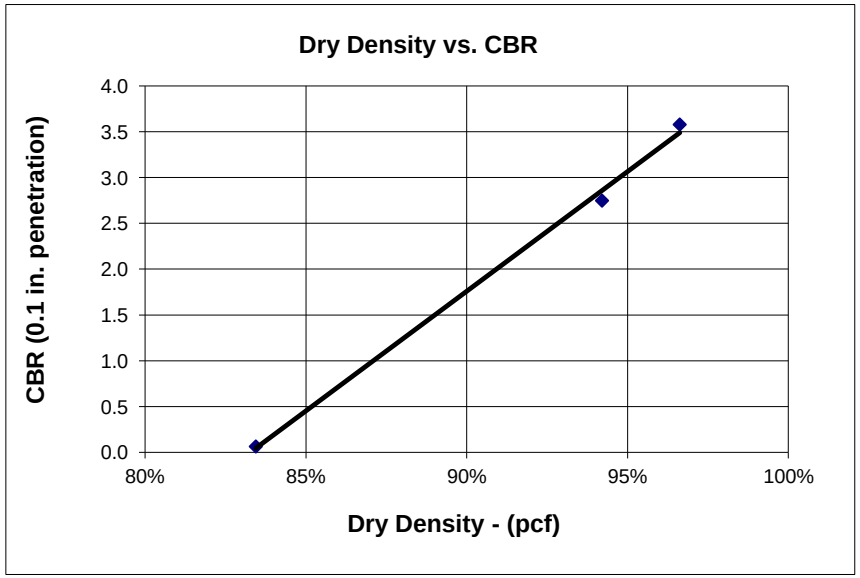
From Proctor Results

Uncorrected Optimum Moisture:	12.3%
Uncorrected Maximum Dry Density: (pcf)	119.6

Test Results

		Trial 1	Trial 2	Trial 3
	Number of blows / layer:	10 blows	25 blows	56 blows
Moisture Content	Before Compaction	11.7	11.7	11.7
	After Compaction	13.6	12.8	13.8
	Top 1" after soaking	22.1	21.1	19.4
	Average after soaking	19.5	15.5	13.3
	% swelling	**1.8**	**1.4**	**0.9**
Dry Density	Before soaking (pcf)	99.8	112.7	115.6
	After soaking (pcf)	99.4	113.3	121.6
	Percent Compaction	83.4%	94.2%	96.6%
	CBR at 0.1 in. penetration	**0.06**	**2.75**	**3.58**
	CBR at 0.2 in. penetration	**0.09**	**2.81**	**3.62**
	CBR @ 95 %:	**3.0**		





Reviewed By: Eric Jeske
GESTRA Engineering, Inc.

GESTRA Engineering, Inc
1626 W. Fond du Lac Avenue
Milwaukee, WI 53205
Phone: (414) 933-7444; Fax: (414) 933-7844

Laboratory Test Results of Proctor Sample

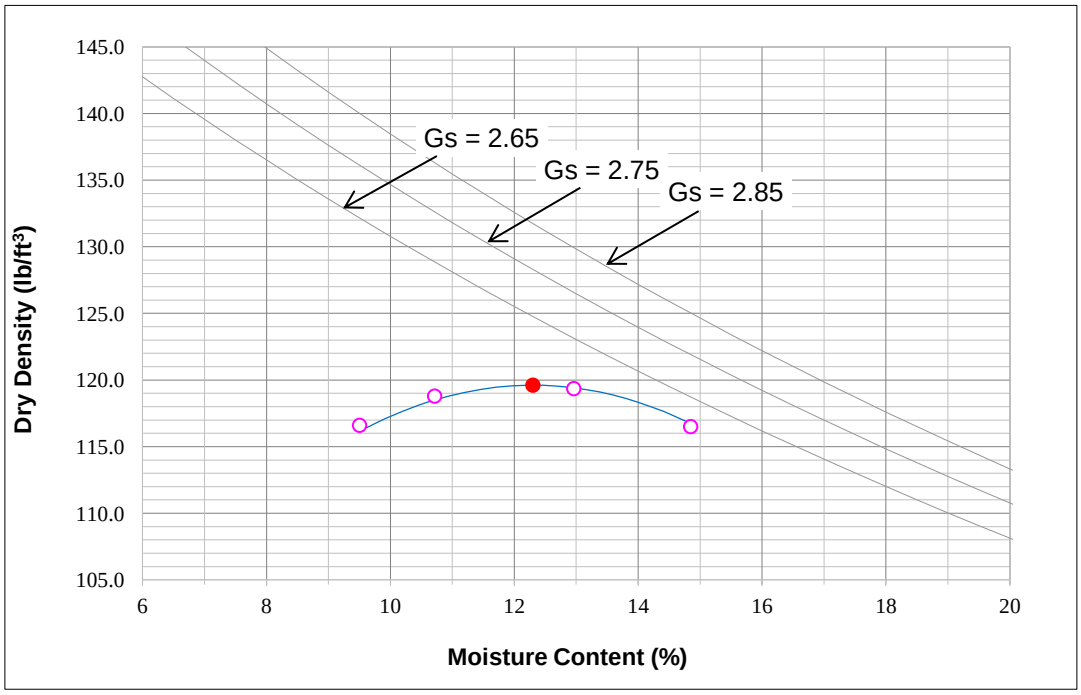
Project Name:	Zoo Interchange	Date:	November 2, 2011
Project Number:	11039-10	Client:	Forward 45
Projection Location:	Milwaukee Co., WI		
ASTM Designation:	**D698** Method: **A**		

Sample Information

Type of Sample	Lean Clay
Sample Location	SH-4 Drill Cuttings
Sample Number	1

OPTIMUM MOISTURE 12.3 **%**

UNCORRECTED		**CORRECTED**	
Maximum Density:	119.6 **lb/ft^3**	**Maximum Dry Density**	121.5 **lb/ft^3**
Test Gravel Content:	0 **%**	**Original Gravel Content**	6 **%**
		Corrected Optimum Moisture	11.6 **%**



Notes: [1]The solid dot indicates uncorrected maximum density at test gravel content.
[2]Field density tests should be compared to the corrected maximum dry density, listed above, which uses insitu gravel content

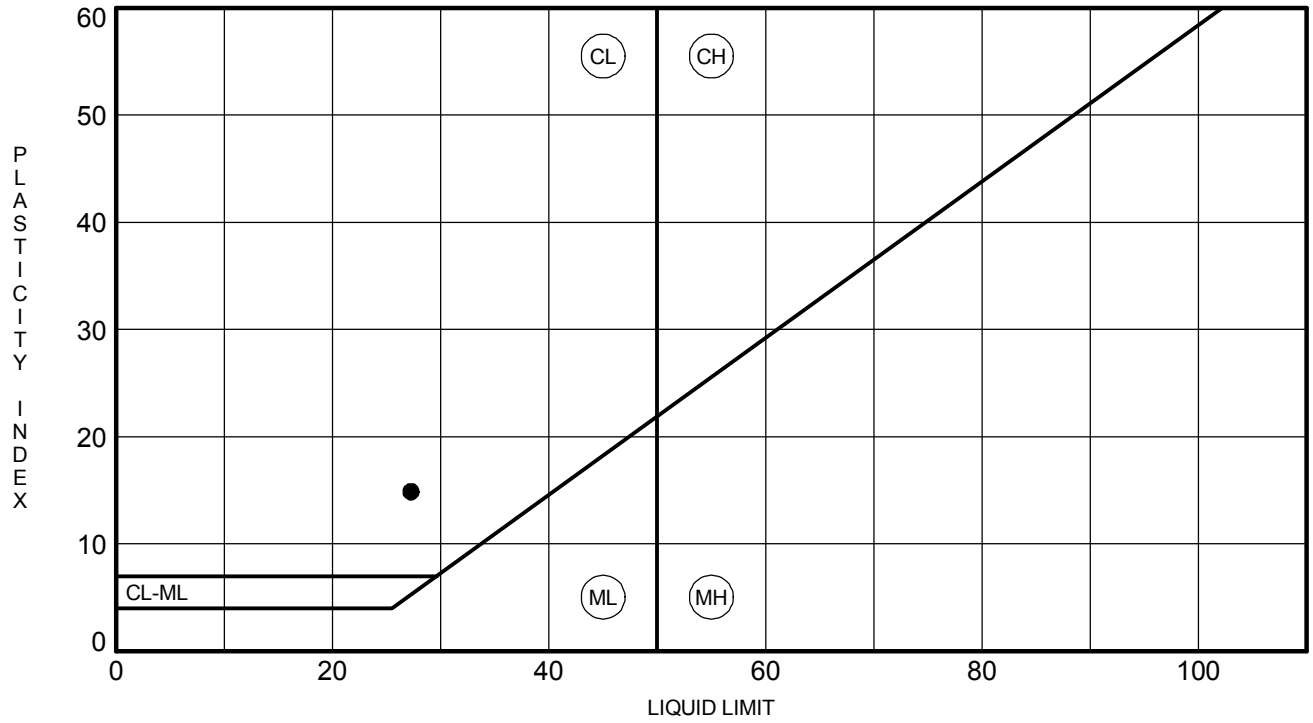
Performed by: Jeff Bruesewitz

Reviewed By: Jorge Martinez
GESTRA Engineering

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-77 **LAB TEST PERFORMED BY** Gestra



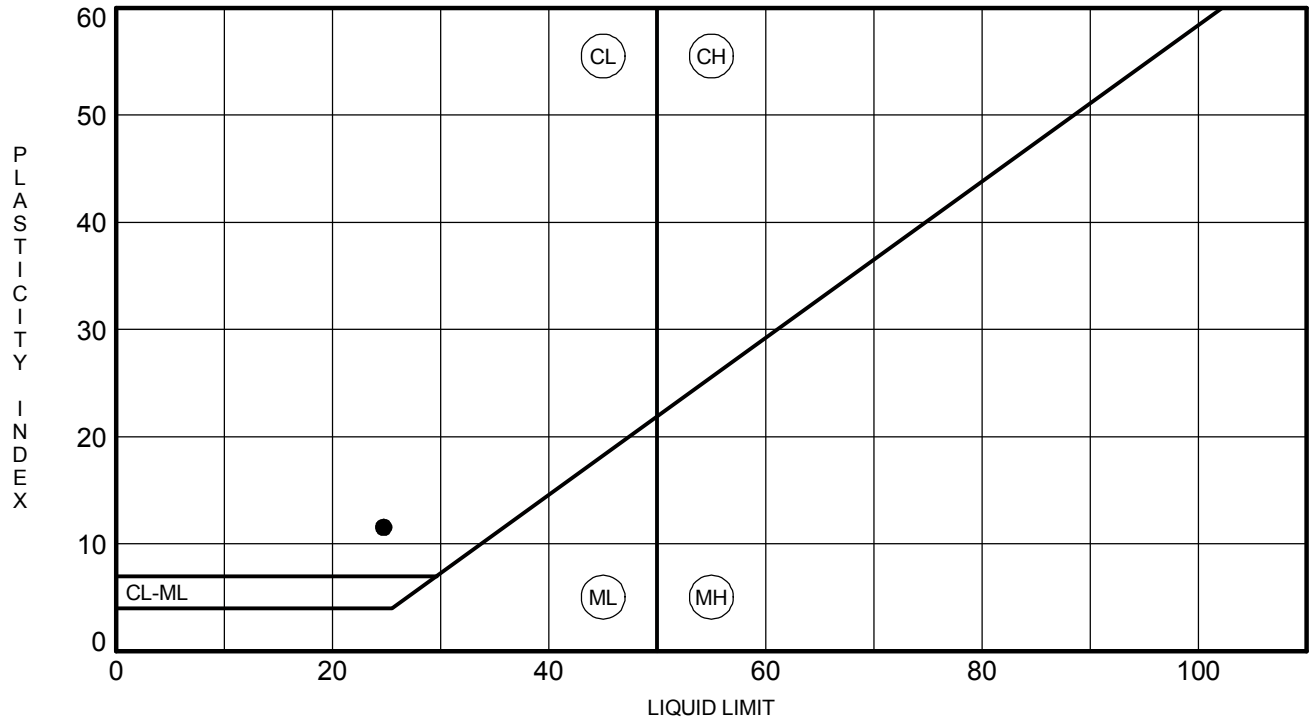
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**SR-71**	**SS-6**	**13.5'**	**12%**	**27**	**12**	**15**	**0**		**B. Bills**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 7/29/13

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-77 **LAB TEST PERFORMED BY** Gestra



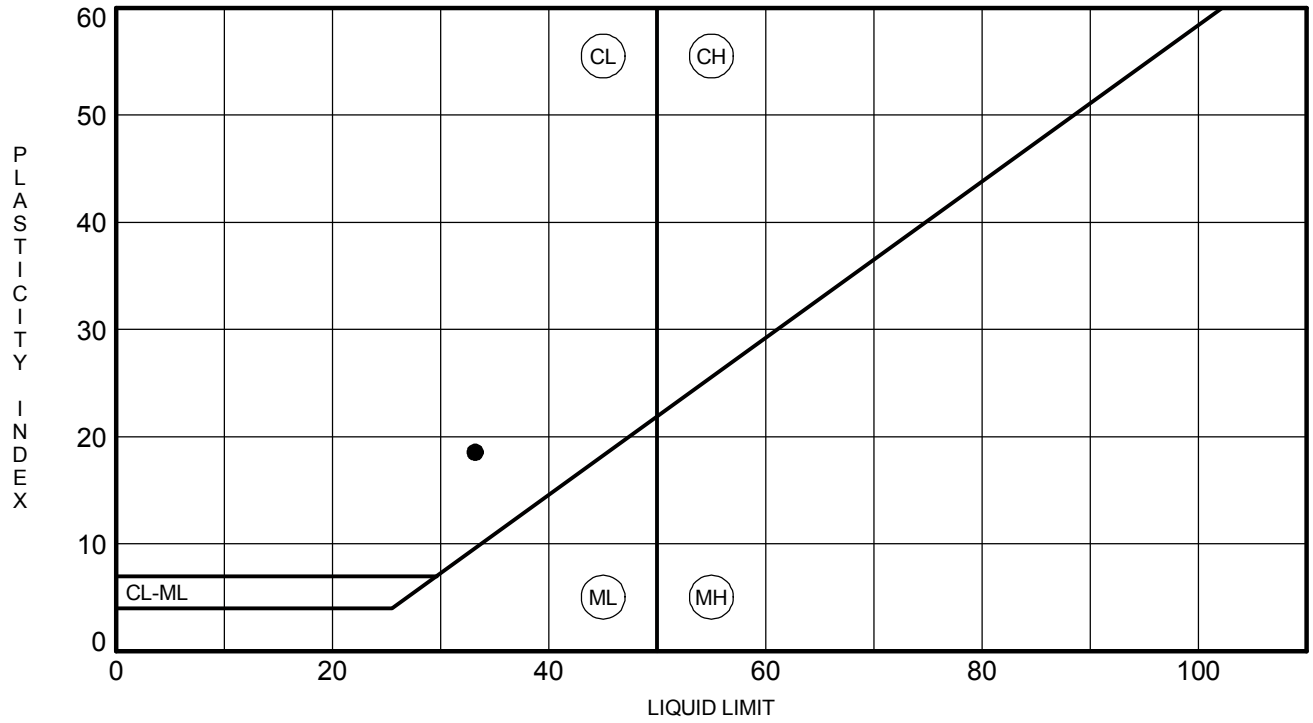
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**SR-71**	**SS-7**	**16.0'**	**14%**	**25**	**13**	**12**	**0.08**		**B. Bills**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 7/29/13

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-77 **LAB TEST PERFORMED BY** Gestra



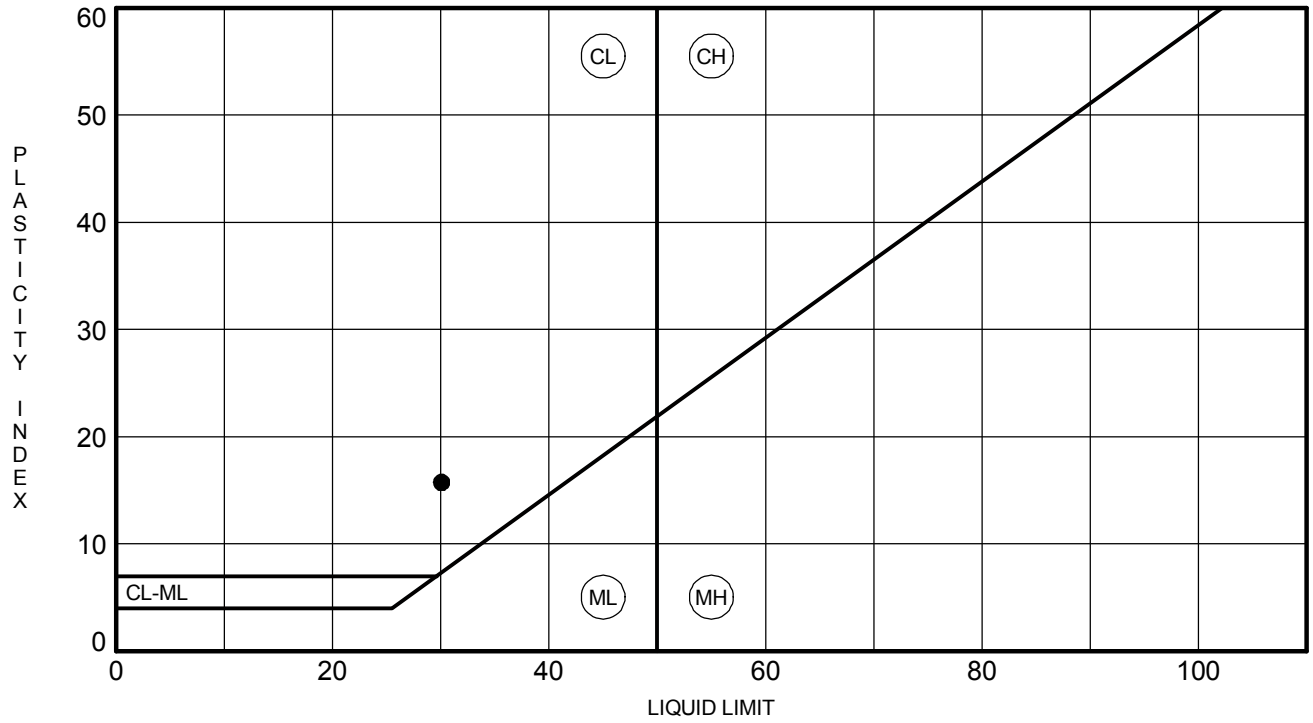
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**SR-71**	**SS-8**	**18.5'**	**18%**	**33**	**15**	**18**	**0.17**		**B. Bills**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 7/29/13

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-77 **LAB TEST PERFORMED BY** Gestra



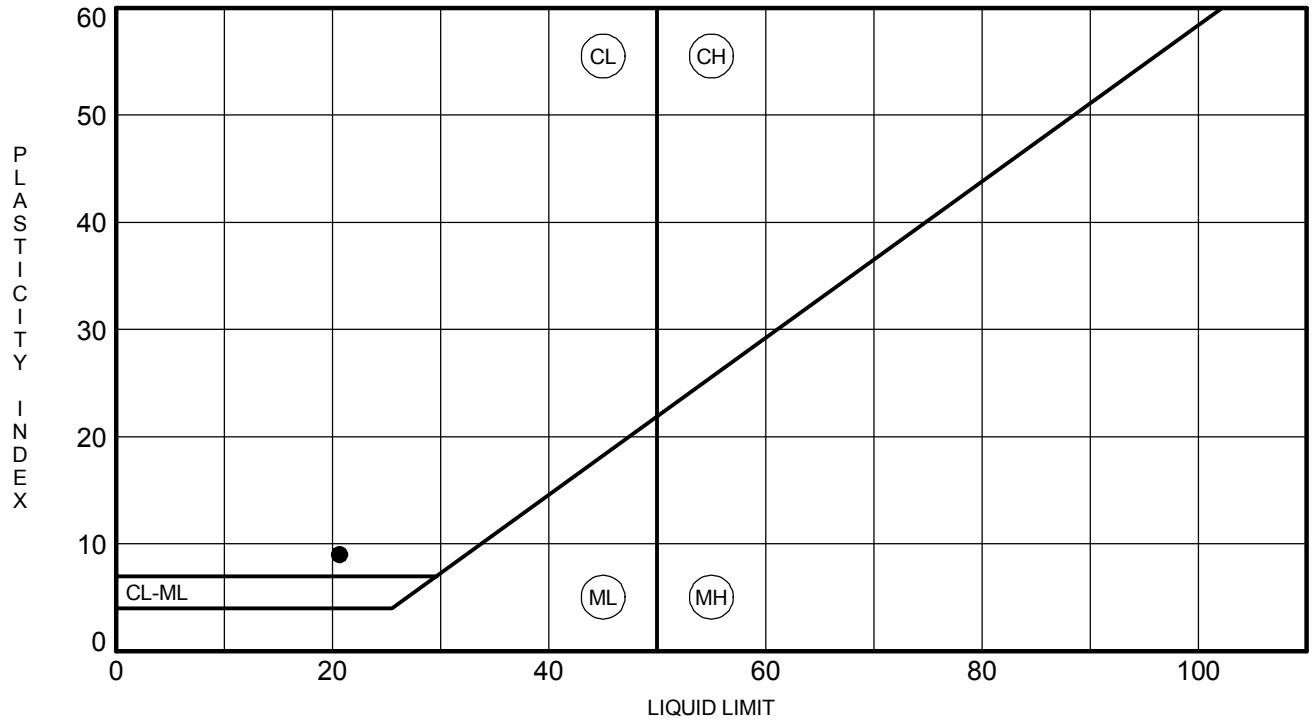
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**SR-71**	**SH-10**	**28.0'**	**20%**	**30**	**14**	**16**	**0.38**		**B. Bills**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 7/29/13

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-77 **LAB TEST PERFORMED BY** Gestra



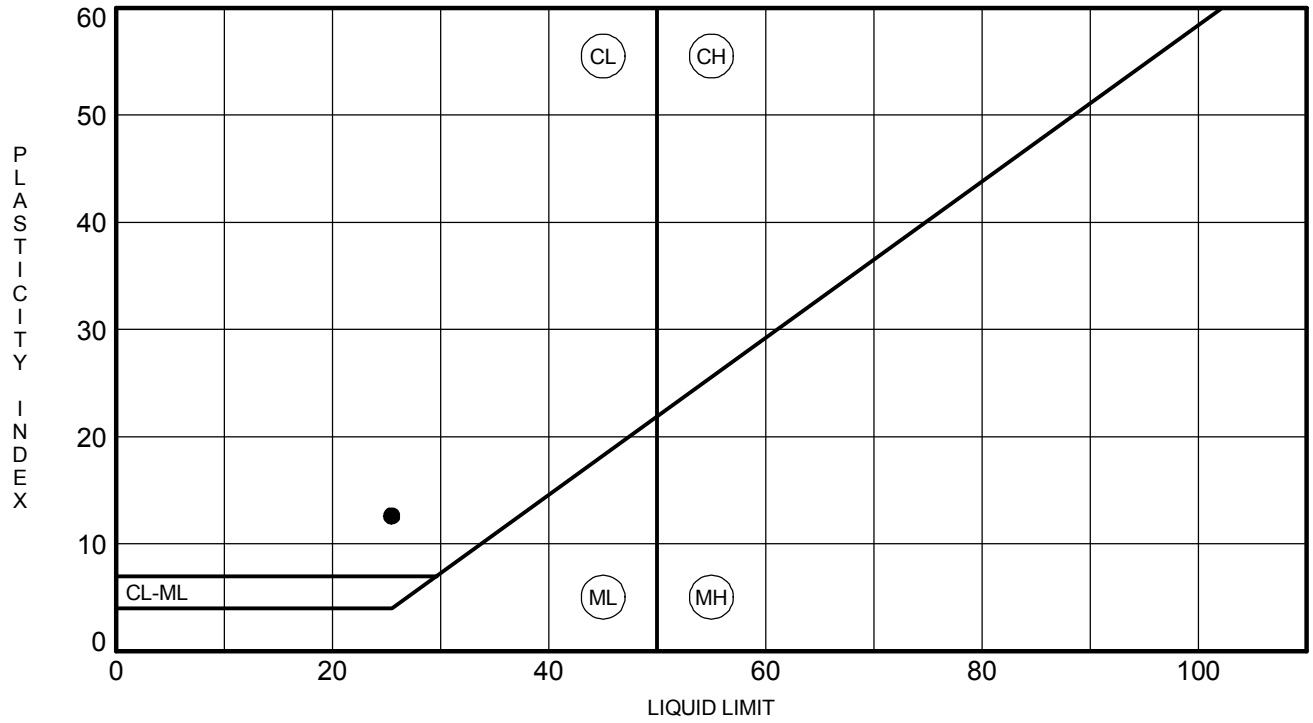
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**SR-71**	**SH-12**	**38.0'**	**18%**	**21**	**12**	**9**	**0.67**		**B. Bills**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 7/29/13

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-77 **LAB TEST PERFORMED BY** Gestra



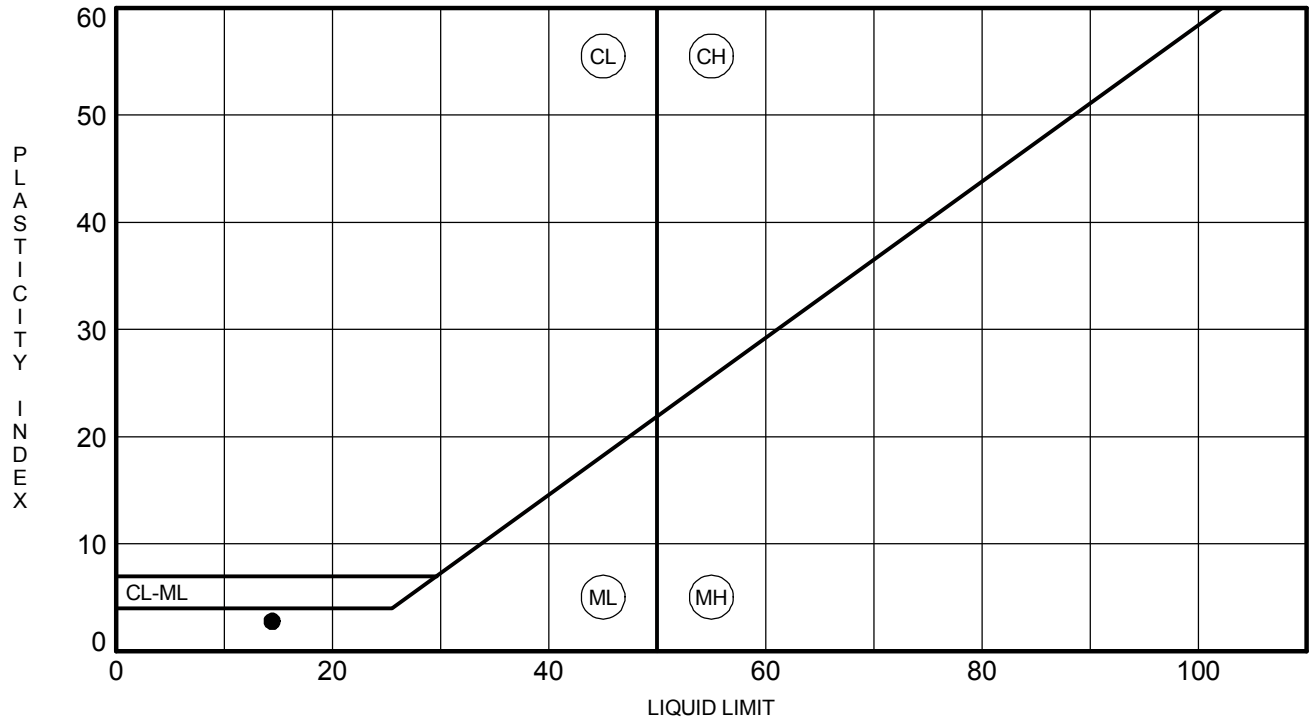
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**SR-71**	**SH-15**	**53.0'**	**16%**	**25**	**13**	**12**	**0.25**		**B. Bills**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 7/29/13

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-77 **LAB TEST PERFORMED BY** Gestra



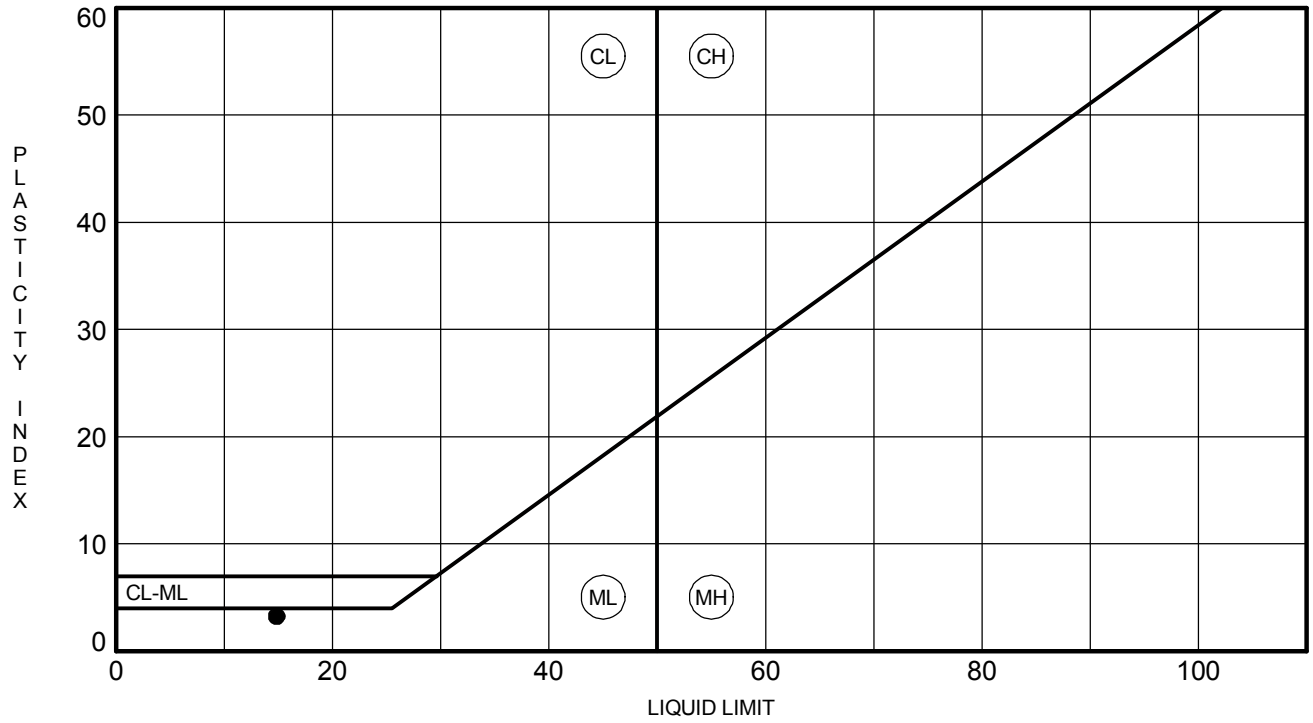
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**SR-71**	**SS-19**	**73.5'**	**17%**	**14**	**12**	**2**	**2.5**		**D. Born**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 7/29/13

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-77 **LAB TEST PERFORMED BY** Gestra



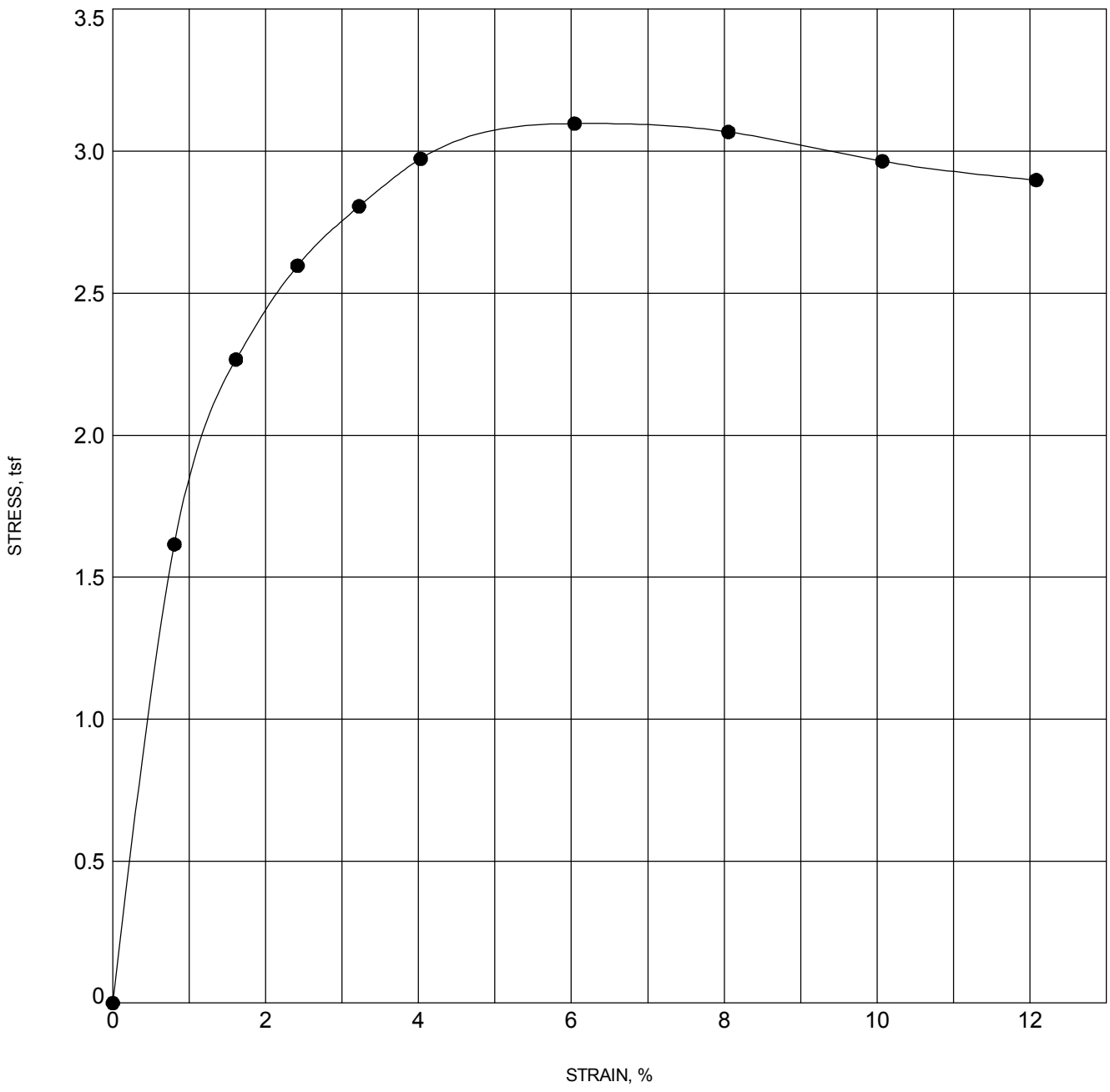
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**SR-71**	**SS-20**	**78.5'**	**19%**	**15**	**12**	**3**	**2.33**		**B. Bills**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 7/29/13

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-77 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**SR-71**	**SS-7**	**16.0'**	**14**	**3.1**	**117**	**J. Bruesewitz**	**E. Jeske**

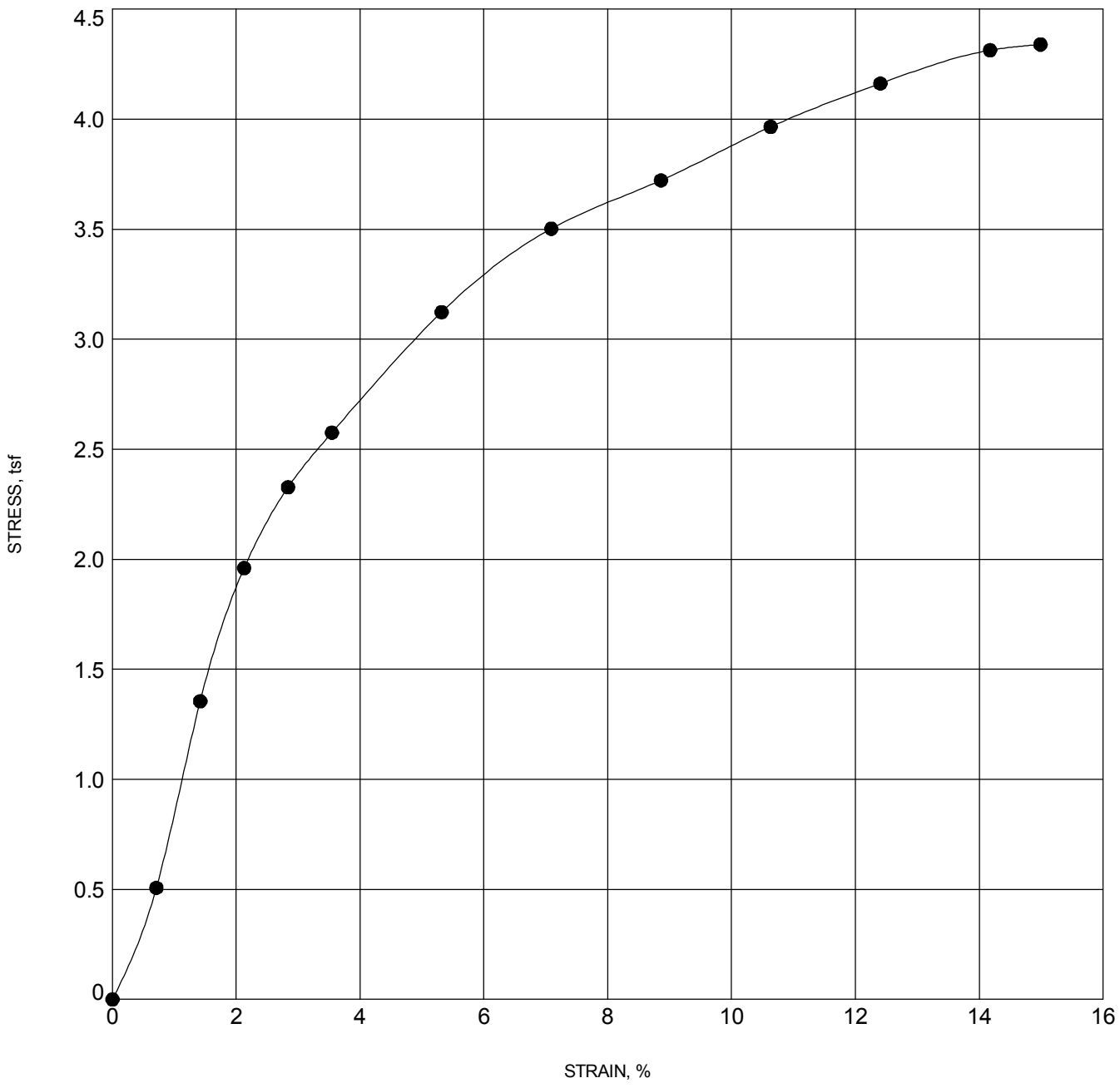
COMMENTS: Sample was short, approved by engineer

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 7/31/13

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-77 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**SR-71**	**SS-8**	**18.5'**	**19**	**4.34**	**109**	**D. Born**	**E. Jeske**

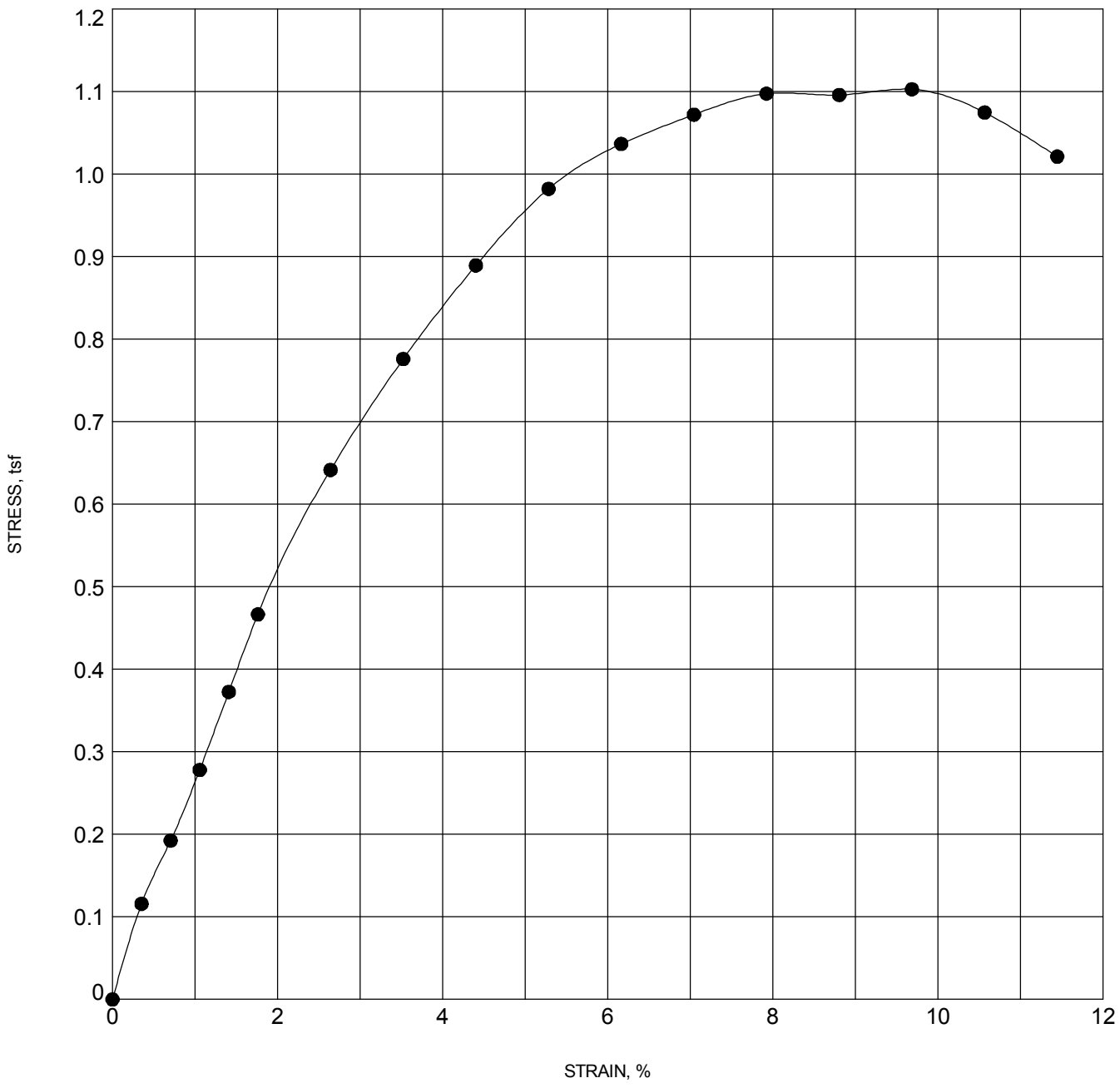
COMMENTS:

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 7/31/13

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-77 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**SR-71**	**SH-10**	**28.0'**	**20**	**1.1**	**112**	**J. Bruesewitz**	**E. Jeske**

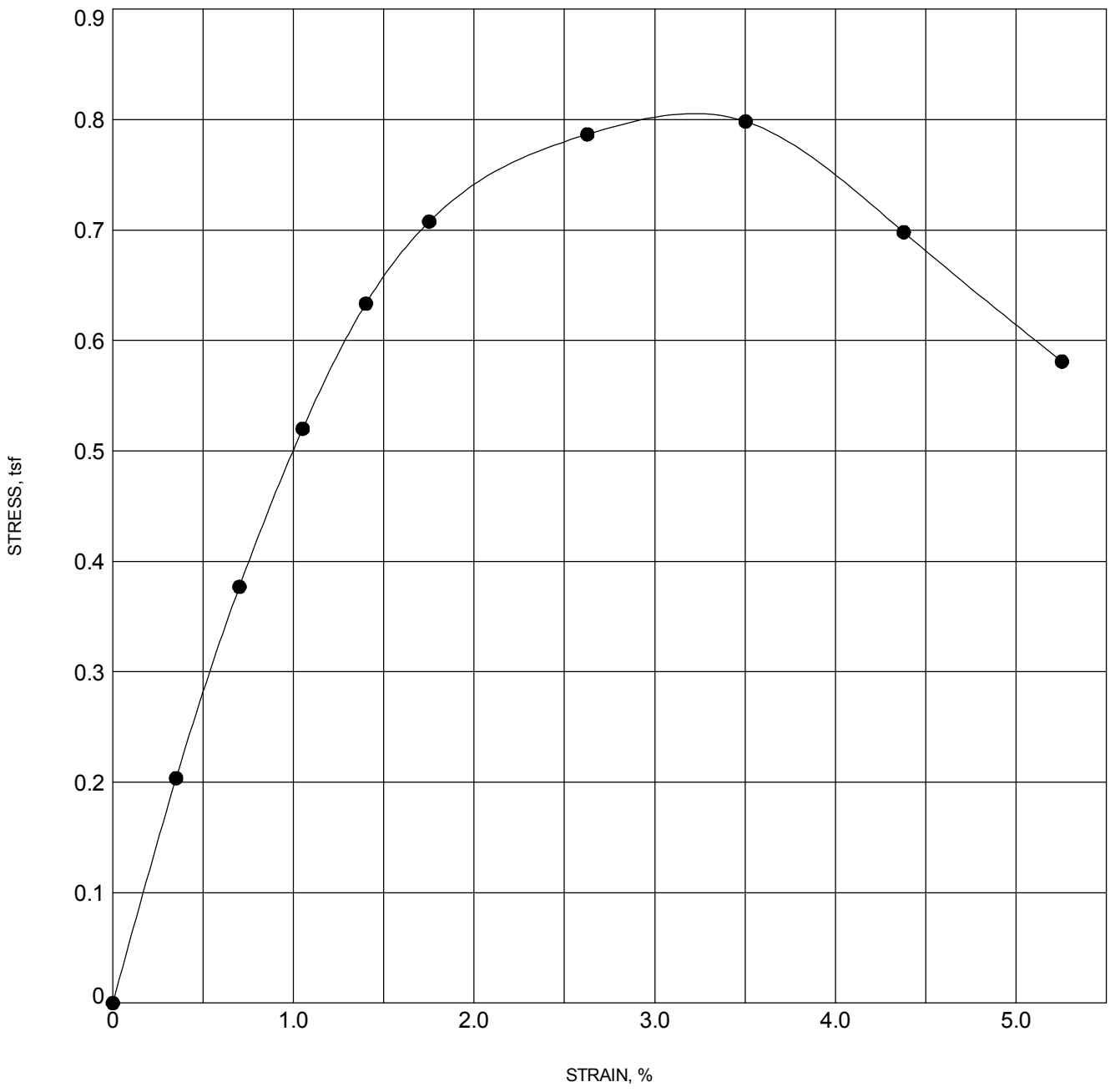
COMMENTS: Sample failed along a thin sand lens

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 7/31/13

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-77 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**SR-71**	**SH-12**	**38.0'**	**18**	**0.8**	**117**	**J. Bruesewitz**	**E. Jeske**

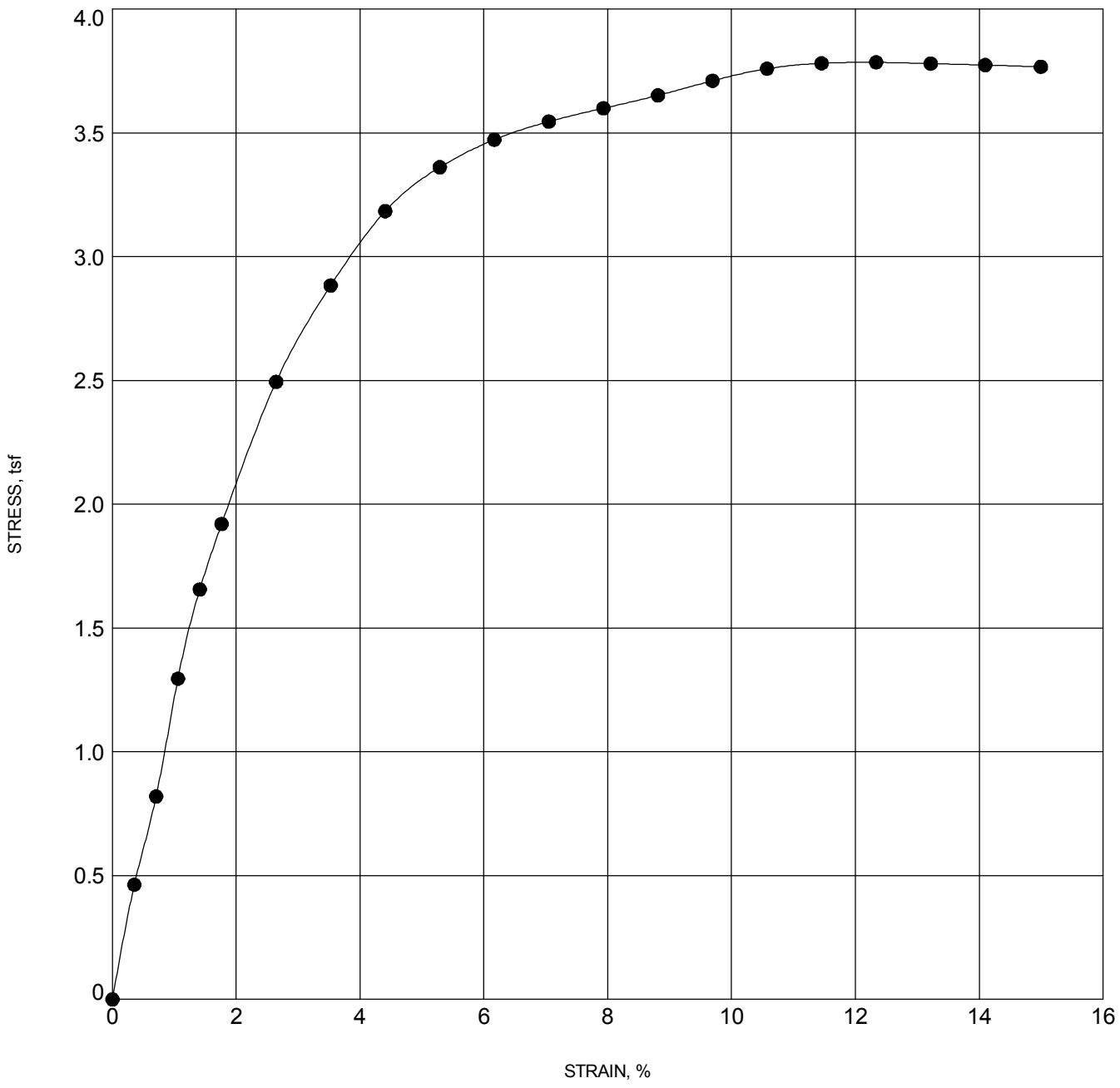
COMMENTS: Sample failed along a sand seam.

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 8/2/13

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-77 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**SR-71**	**SH-15**	**53.0'**	**16**	**3.79**	**120**	**J. Bruesewitz**	**E. Jeske**

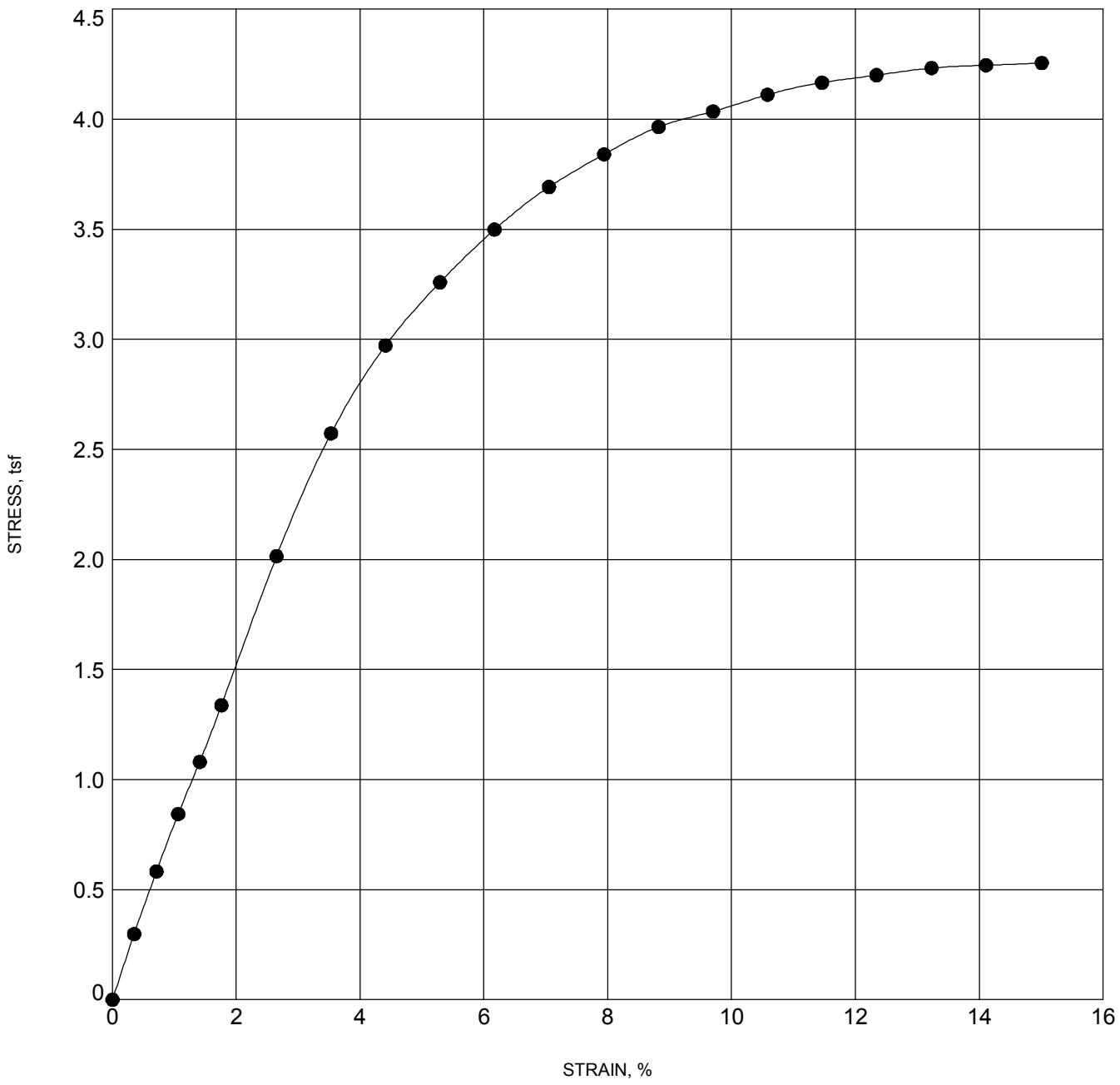
COMMENTS:

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 7/31/13

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**SR-6**	**SH-9**	**25.0'**	**15**	**4.25**	**121**	**J. Bruesewitz**	**R. Haque**

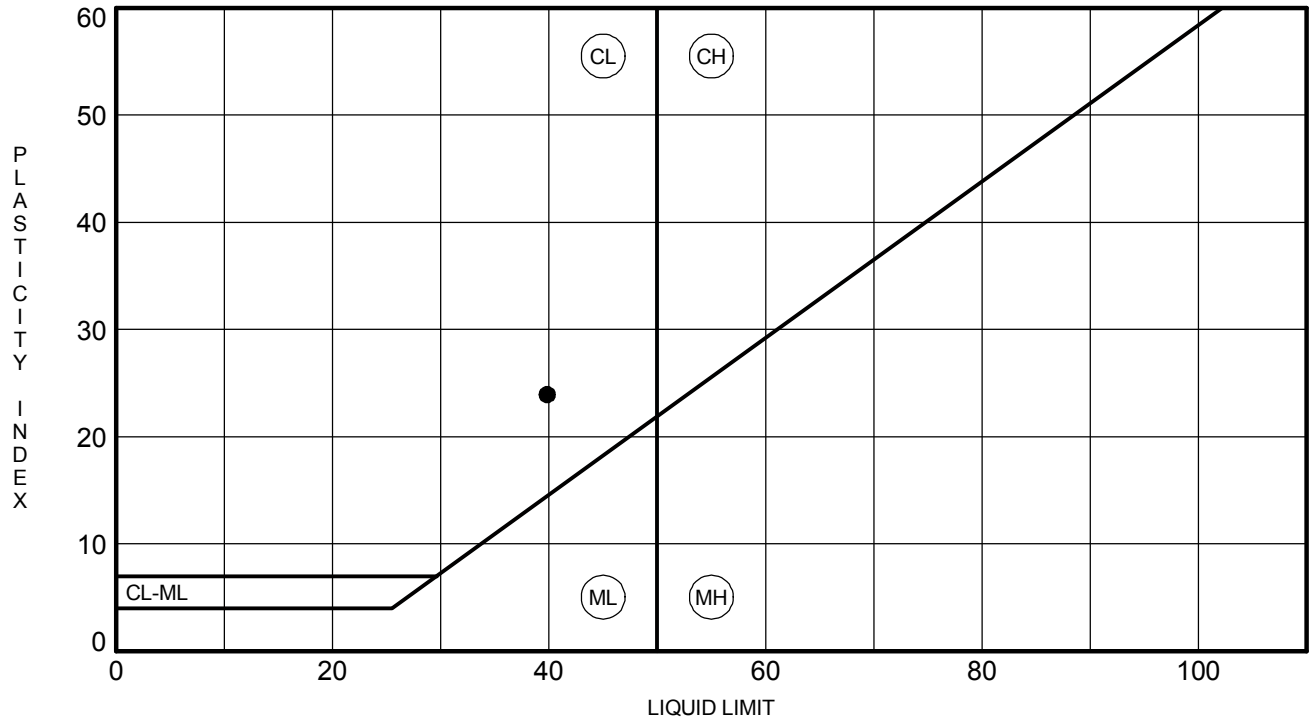
COMMENTS:

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 10/12/11

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-77 **LAB TEST PERFORMED BY** Gestra



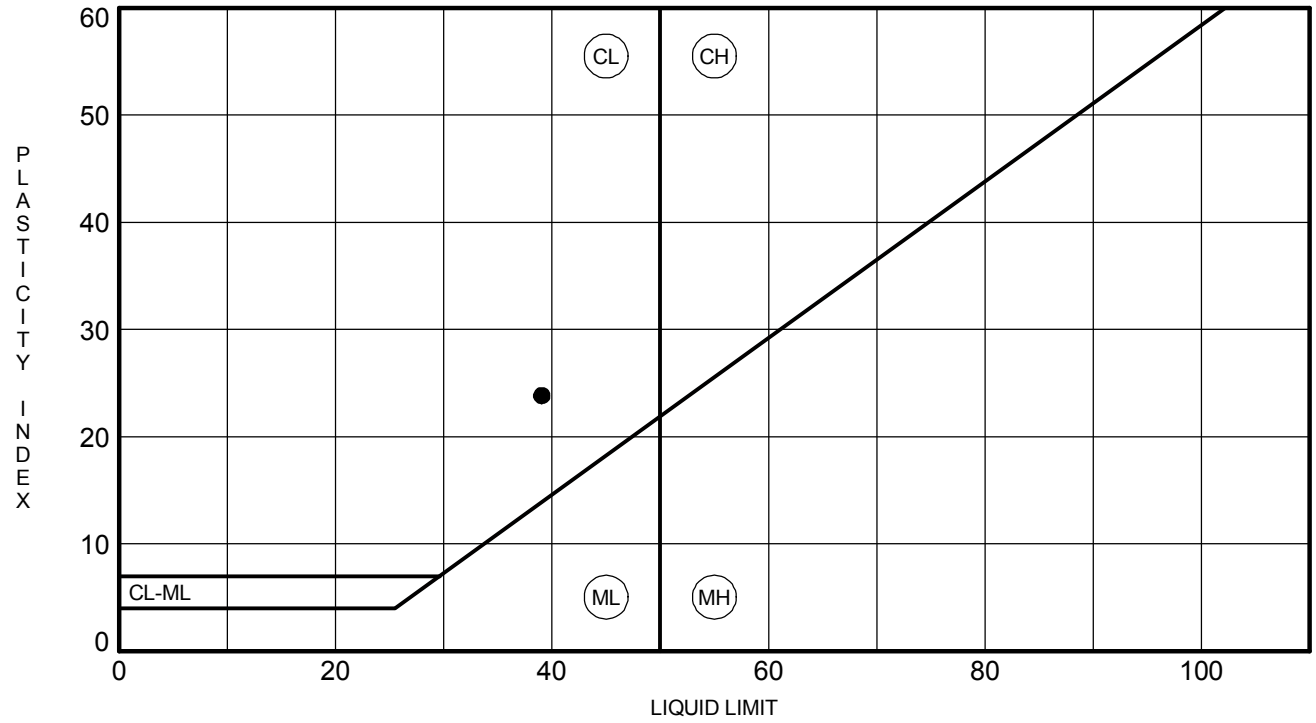
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**SB-21**	**SH-7**	**16.0'**	**20%**	**40**	**16**	**24**	**0.17**		**R. Lollar**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 6/8/12

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-77 **LAB TEST PERFORMED BY** Gestra



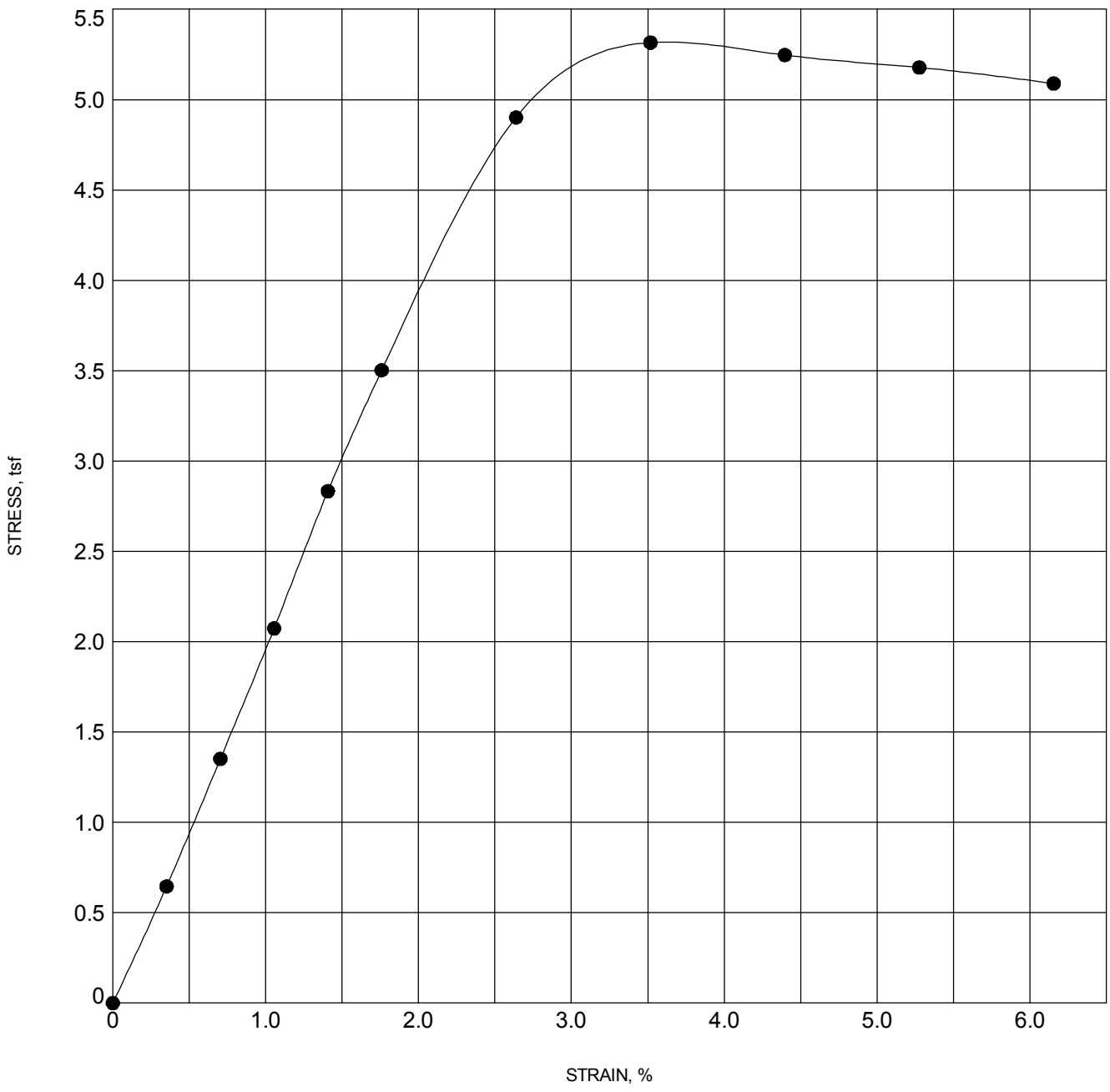
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**SB-21**	**SH-8**	**18.0'**	**19%**	**39**	**15**	**24**	**0.17**		**R. Lollar**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 6/8/12

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-77 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**SB-21**	**SH-7**	**16.0'**	**20**	**5.32**	**111**	**R. Lollar**	**E. Jeske**

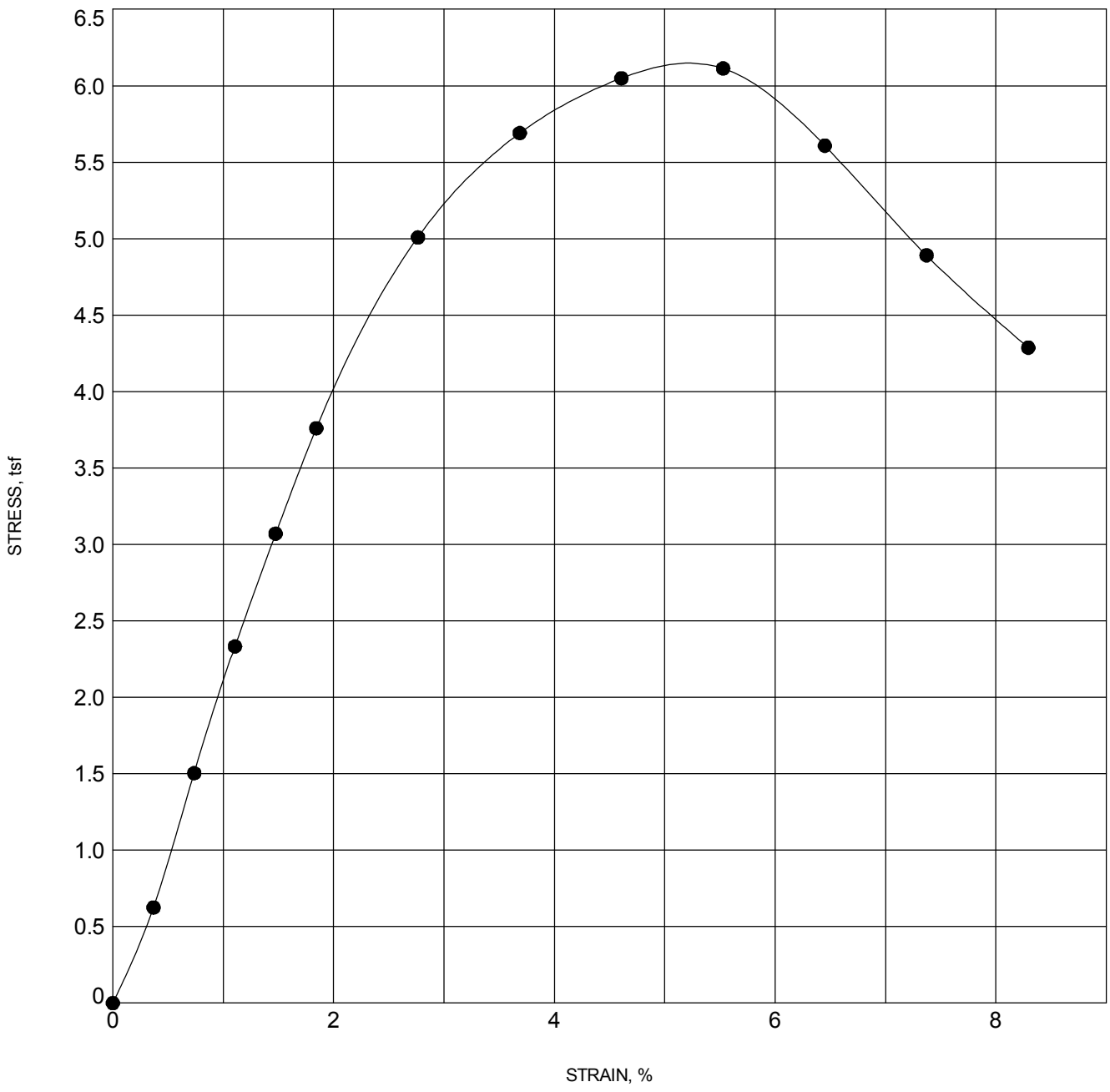
COMMENTS:

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 6/8/12

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-77 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**SB-21**	**SH-8**	**18.0'**	**19**	**6.11**	**113**	**R. Lollar**	**E. Jeske**

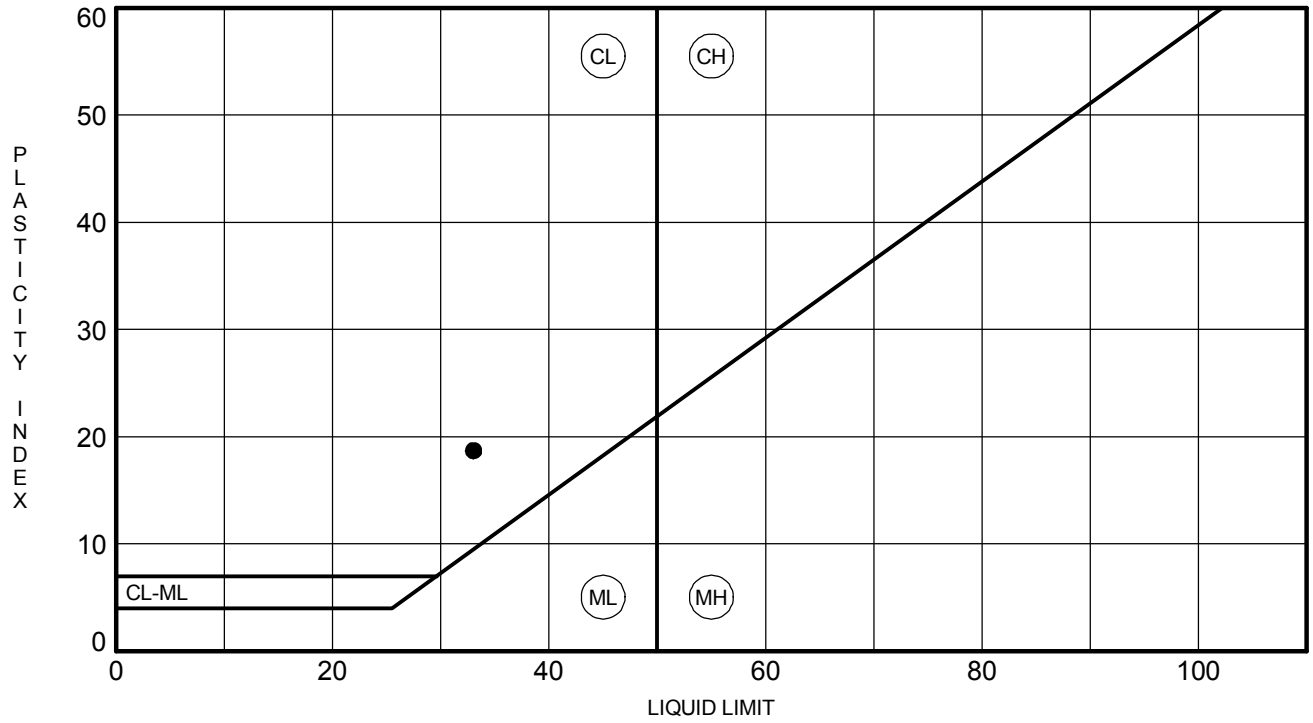
COMMENTS:

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-SOUTH LEG.GPJ Zoo Interchange 6/8/12

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



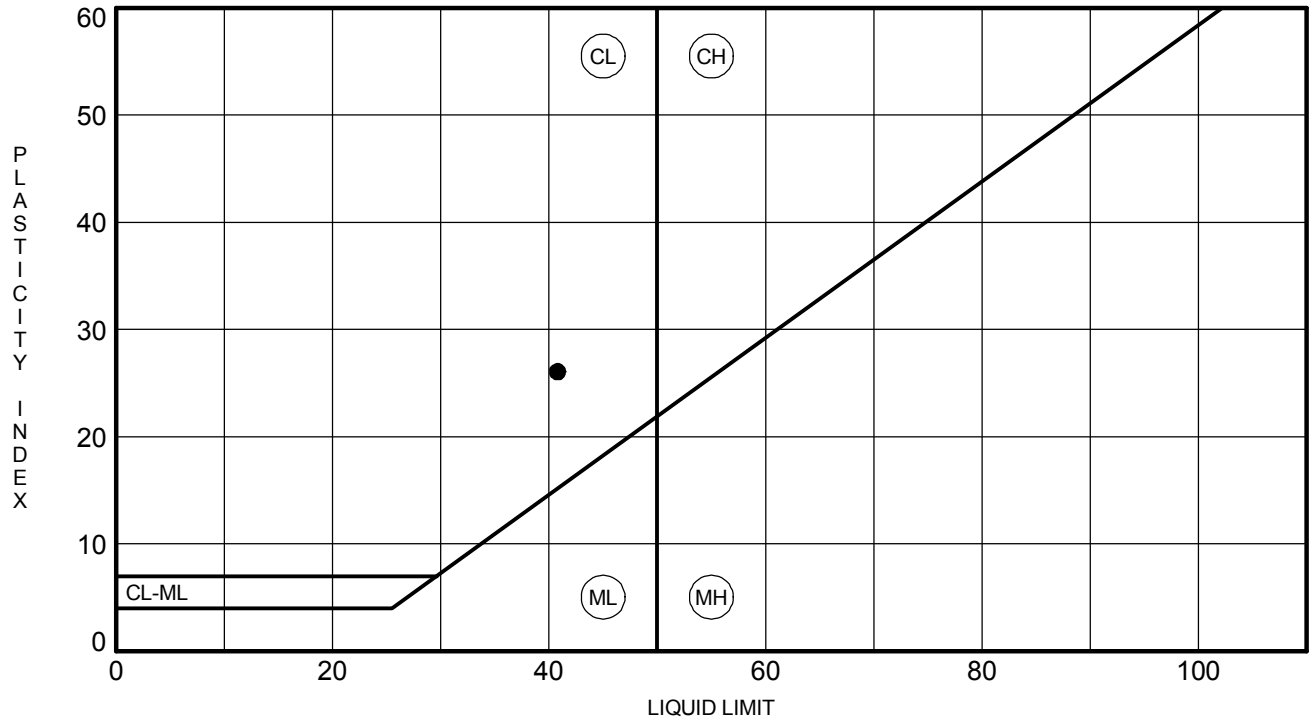
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**CB-23**	**SH-5**	**11.0'**	**19%**	**33**	**14**	**19**	**0.26**		**J. Hoheneder**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-CORE.GPJ Zoo Interchange 7/11/12

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



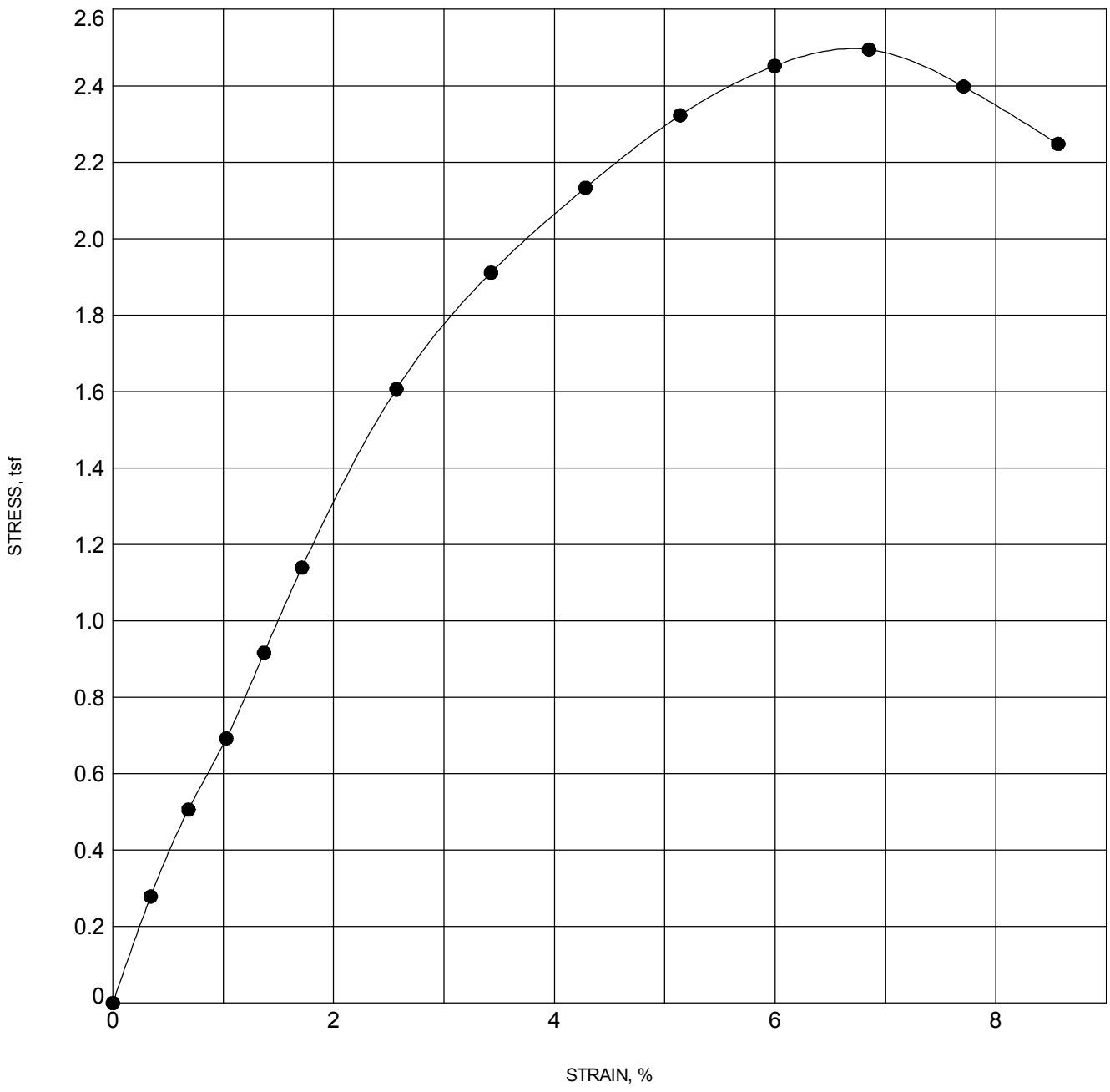
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**CB-23**	**SH-10**	**28.0'**	**21%**	**41**	**15**	**26**	**0.23**		**J. Hoheneder**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-CORE.GPJ Zoo Interchange 7/11/12

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**CB-23**	**SH-5**	**11.0'**	**19**	**2.49**	**117**	**J. Bruesewitz**	**E. Jeske**

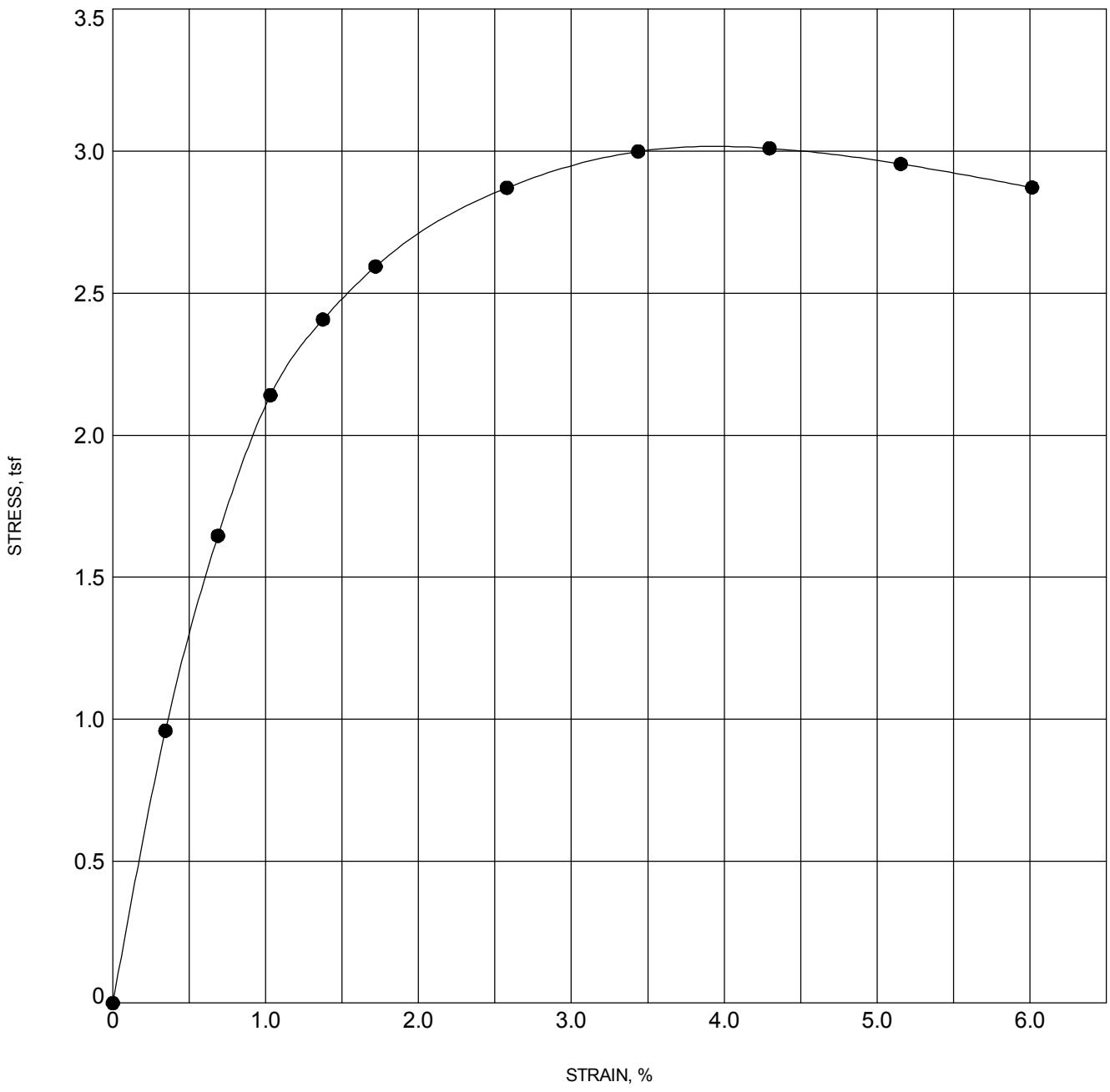
COMMENTS:

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-CORE.GPJ Zoo Interchange 7/11/12

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45 LLC

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**CB-23**	**SH-10**	**28.0'**	**21**	**3.01**	**109**	**J. Bruesewitz**	**E. Jeske**

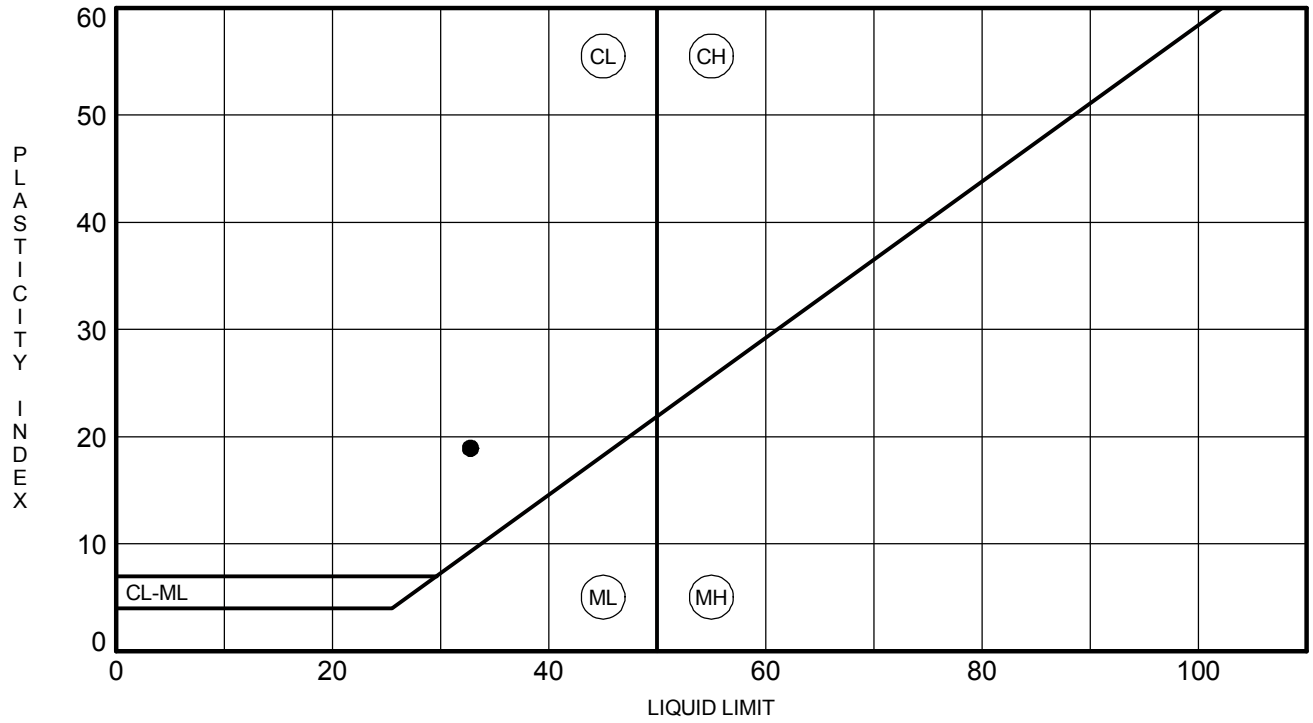
COMMENTS:

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-CORE.GPJ Zoo Interchange 7/11/12

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



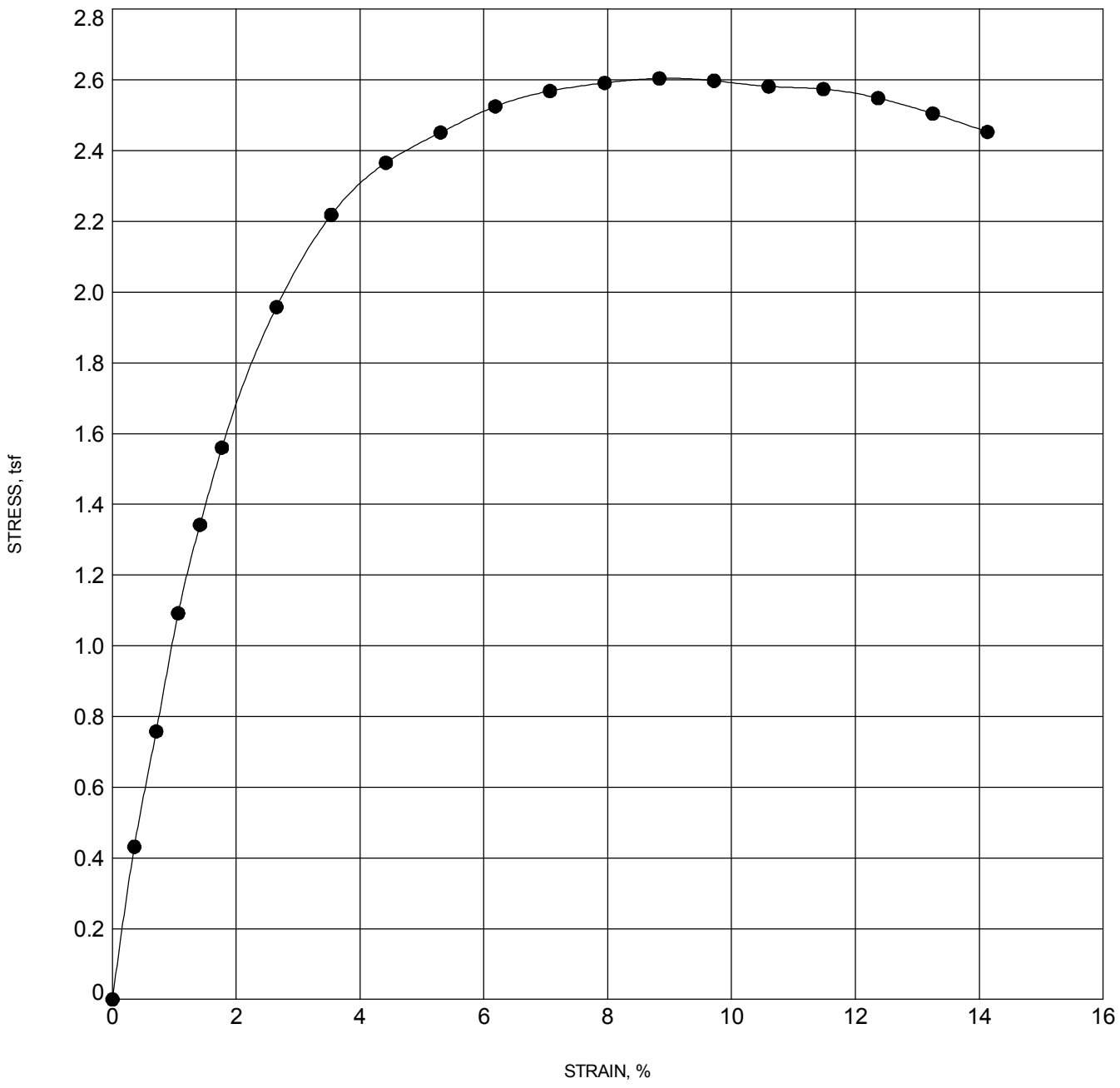
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**EB-2**	**SH-4**	**8.0'**	**19%**	**33**	**14**	**19**	**0.26**		**D. Born**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 12/20/11

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**EB-2**	**SH-4**	**8.0'**	**19**	**2.59**	**116**	**J. Bruesewitz**	**E. Jeske**

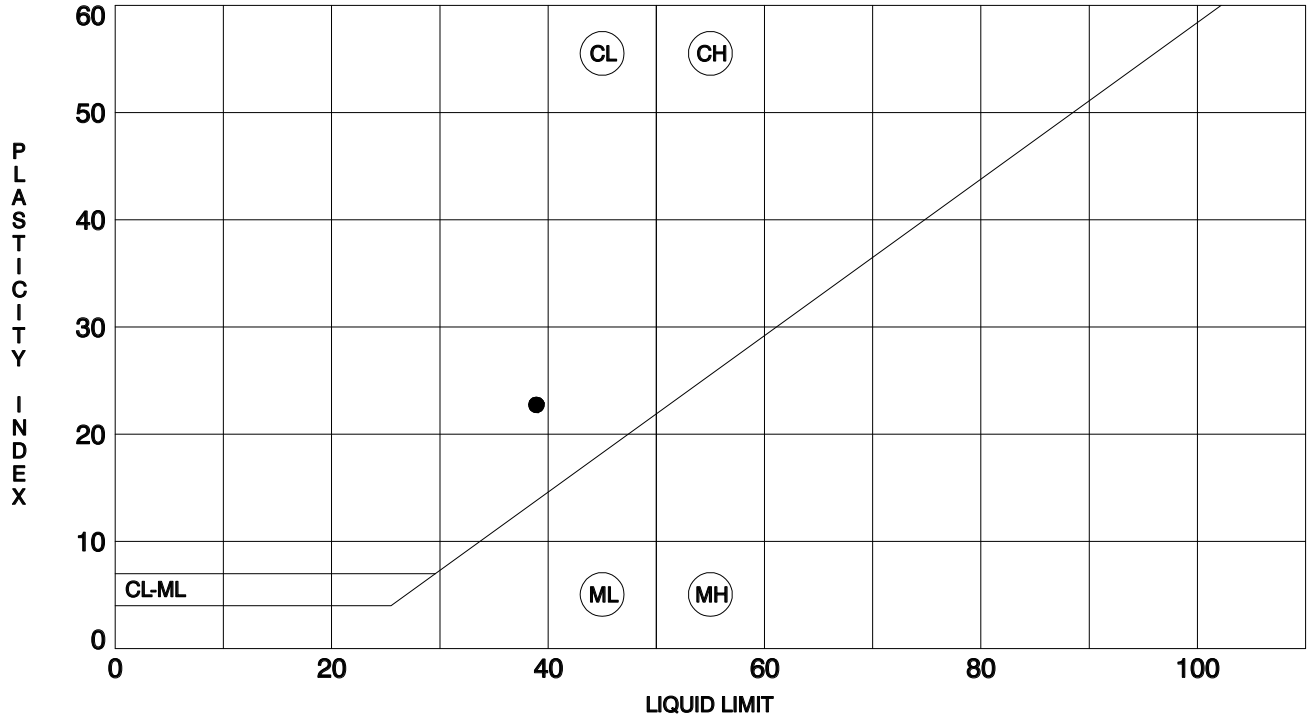
COMMENTS:

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 12/20/11

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



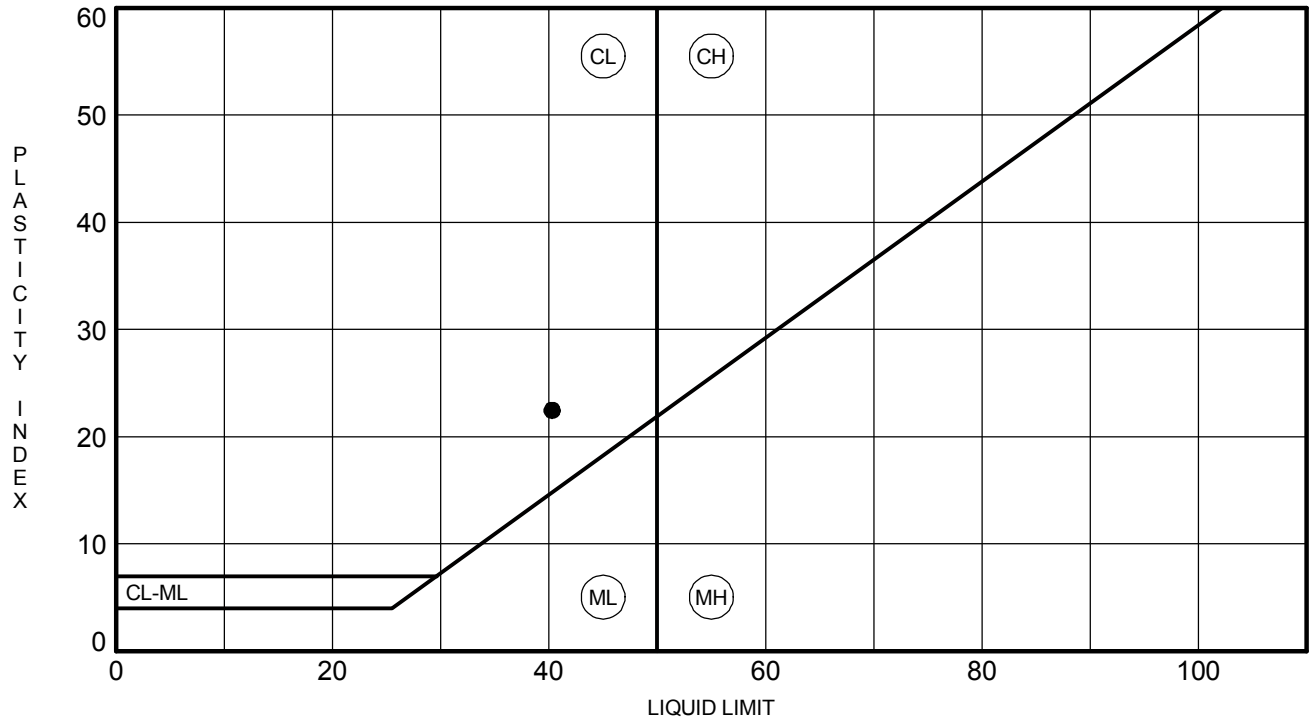
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**EH-9**	**BULK**		**16%**	**39**	**16**	**23**	**0**		**J. Bruesewitz**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\1103 9-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANG E-EAST LEG.GPJ Zoo Interchange 12/6/11

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



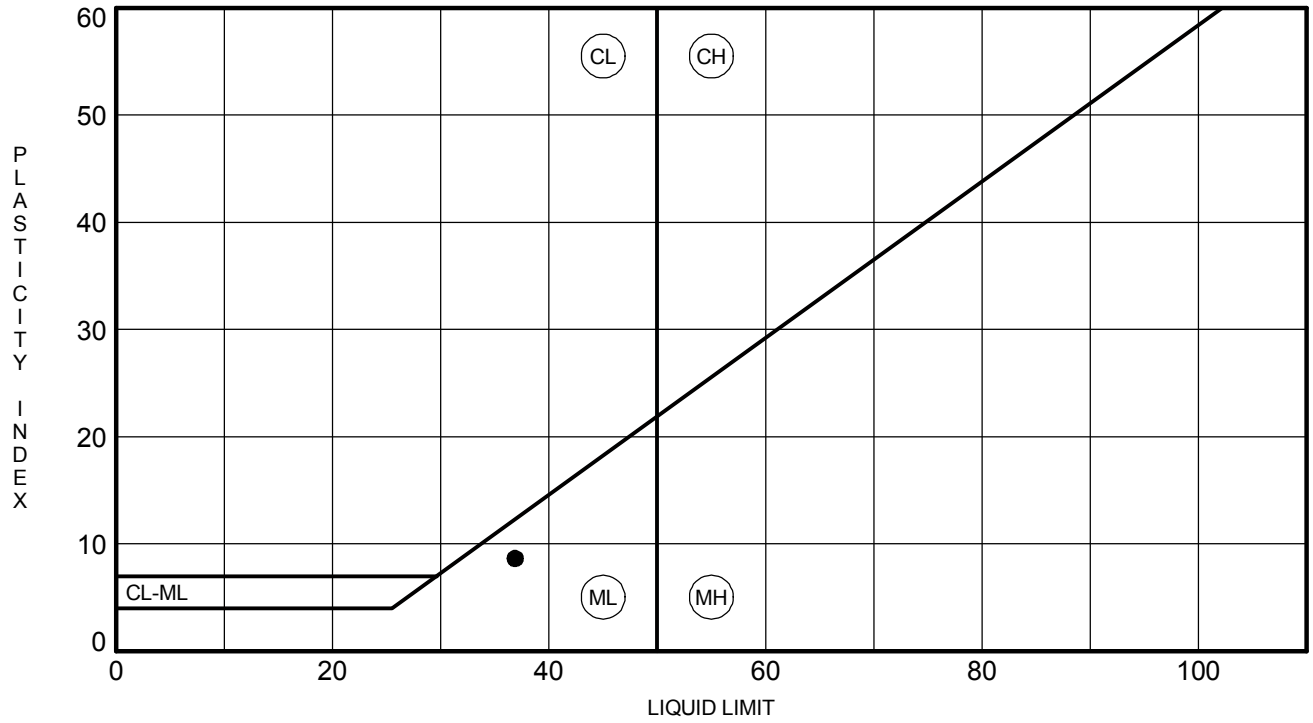
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**EB-14**	**SH-4**	**8.0'**	**20%**	**40**	**18**	**22**	**0.09**		**B. Bills**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 3/29/12

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



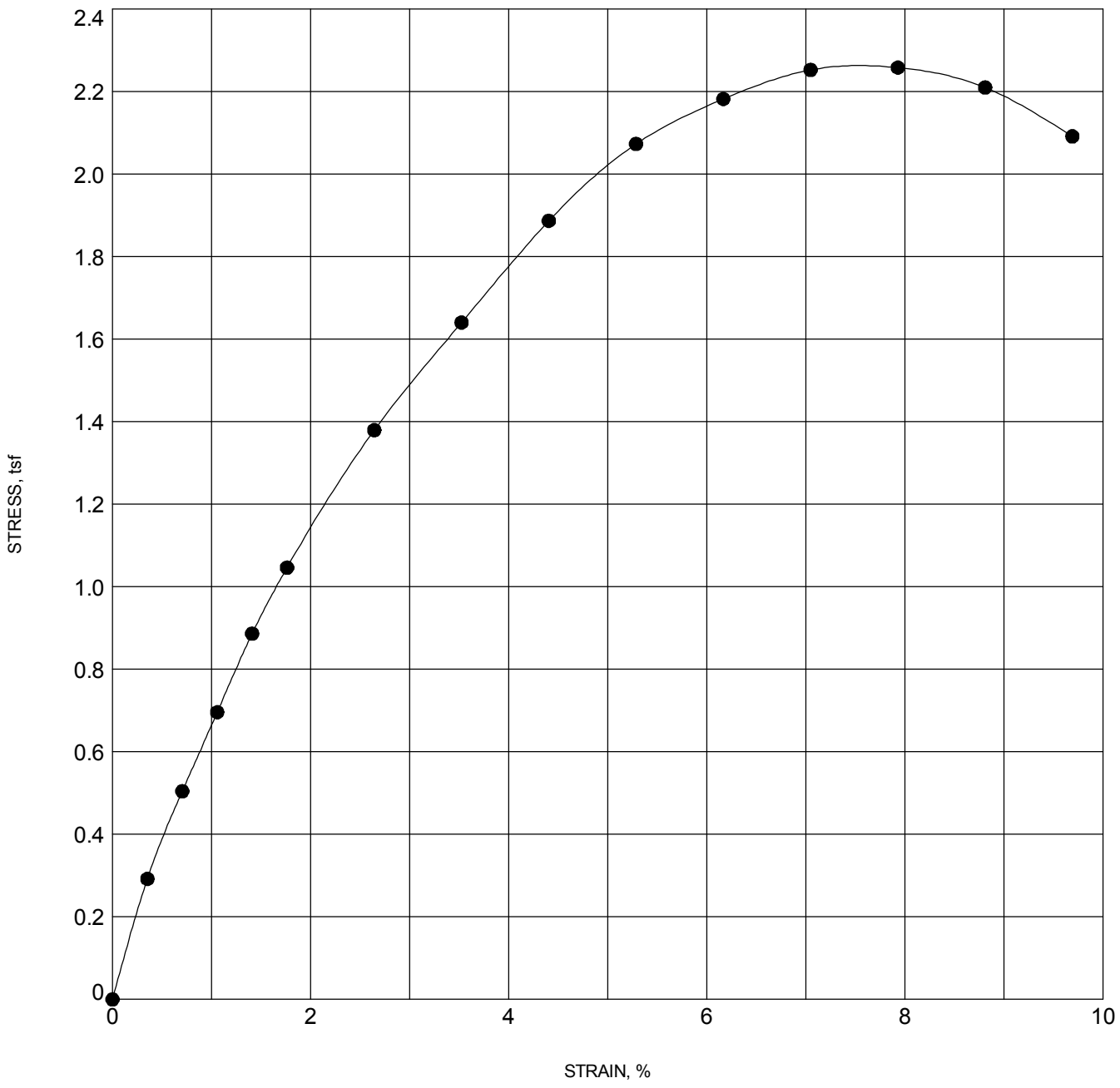
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**EB-14**	**SH-10**	**28.0'**	**29%**	**37**	**28**	**9**	**0.11**		**B. Bills**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 3/29/12

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**EB-14**	**SH-4**	**8.0'**	**20**	**2.26**	**113**	**D. Born**	**E. Jeske**

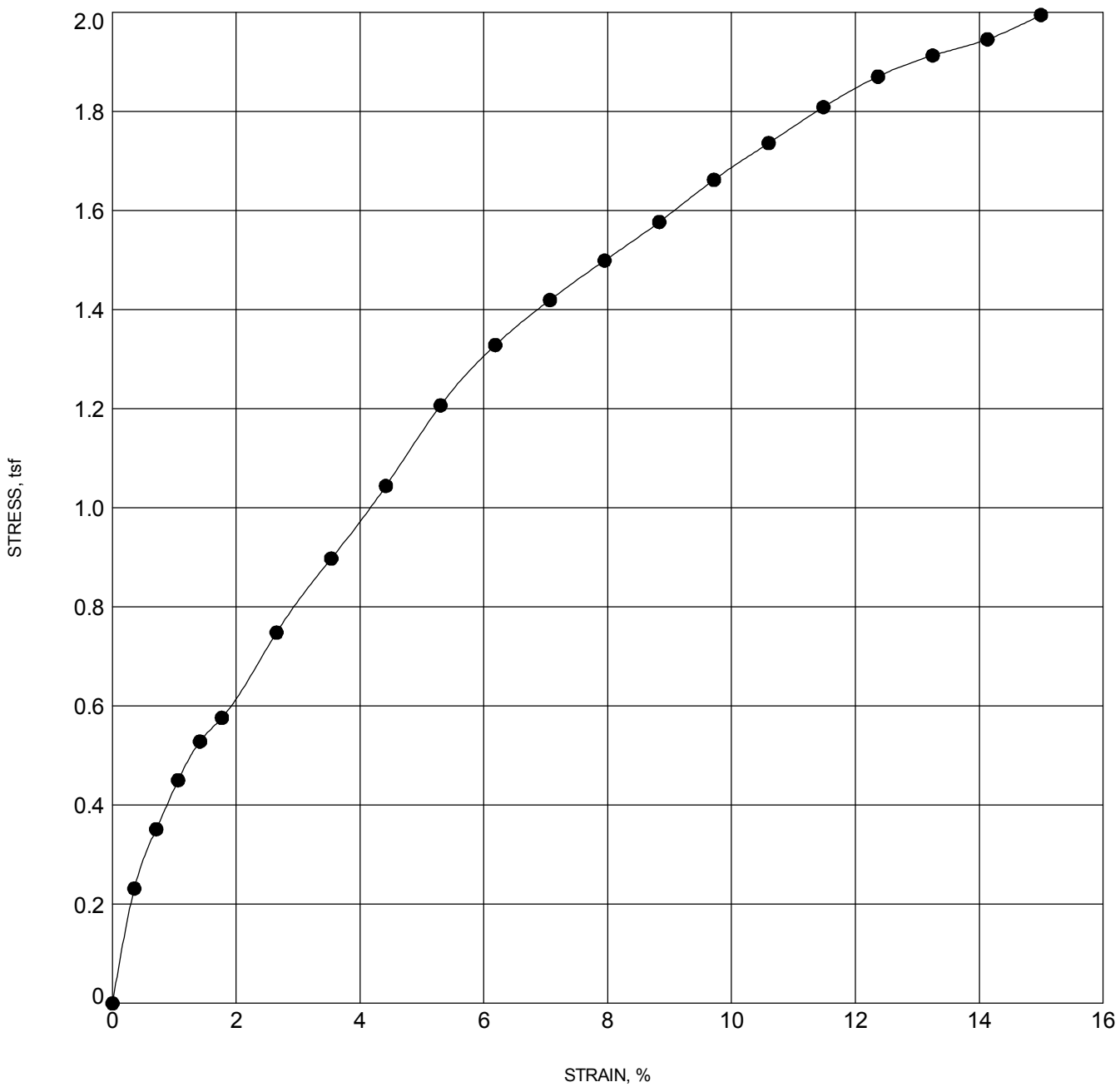
COMMENTS:

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 3/29/12

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**EB-14**	**SH-8**	**18.0'**	**19**	**2**	**112**	**D. Born**	**E. Jeske**

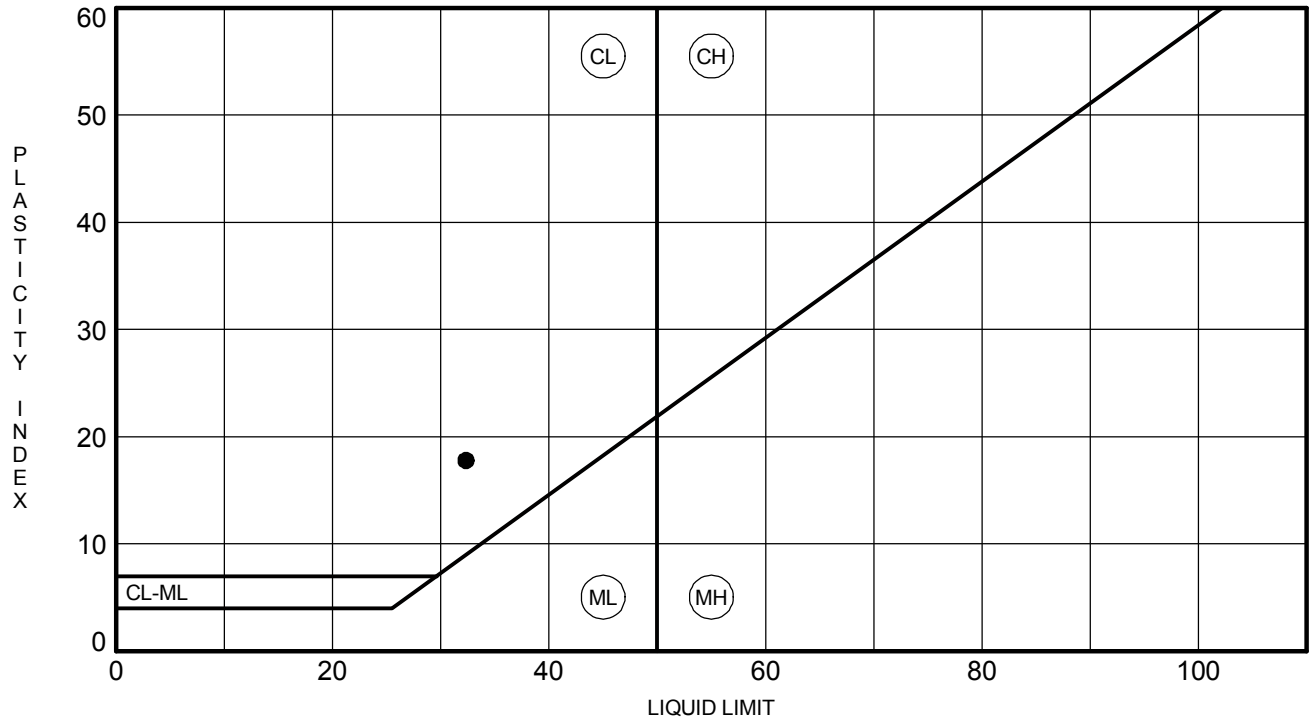
COMMENTS:

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 3/29/12

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



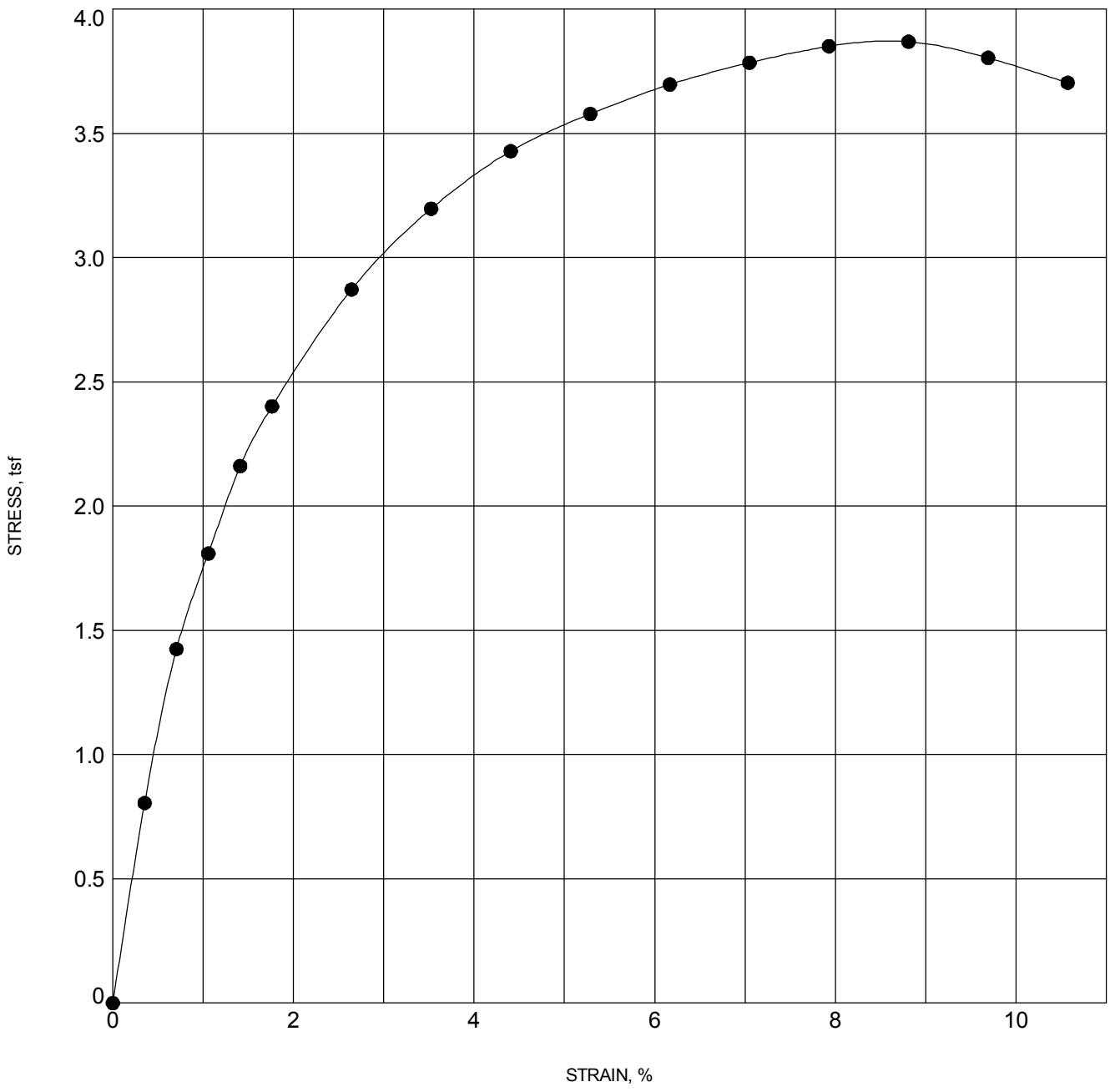
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**EB-5**	**SH-5**	**11.0'**	**17%**	**32**	**15**	**17**	**0.12**		**D. Born**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\111039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 12/20/11

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**EB-5**	**SH-5**	**11.0'**	**17**	**3.89**	**118**	**J. Bruesewitz**	**E. Jeske**

COMMENTS:

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 12/20/11

Wisconsin Testing Laboratories LLC

CALIFORNIA BEARING RATIO (CBR) TEST (AASHTO T193)

Geotechnical Investigations
Testing & Inspection of
Soil, Rock, Aggregates,
Concrete, Asphalt,
Mortar and Grout

Project Information

Project Name: Zoo Interchange — *Test Date:* 11/29/2011

WisDOT Project Number 1060-33-01 — *WTL Job Number:* 0100-11-001

Client: GESTRA Engineering, Inc. — *Client's Job Number:* 11039-10

General Sample and Test Data

Sample Identification: Soil Boring EH-25, 0-5' Depth

Sample Description: Brown Silty Clay, little fine to coarse sand, trace fine to coarse gravel

Compaction Test Method: Standard (AASHTO T99)

Maximum Dry Density: 118.2 pcf — *Optimum Moisture Content:* 13.6 percent

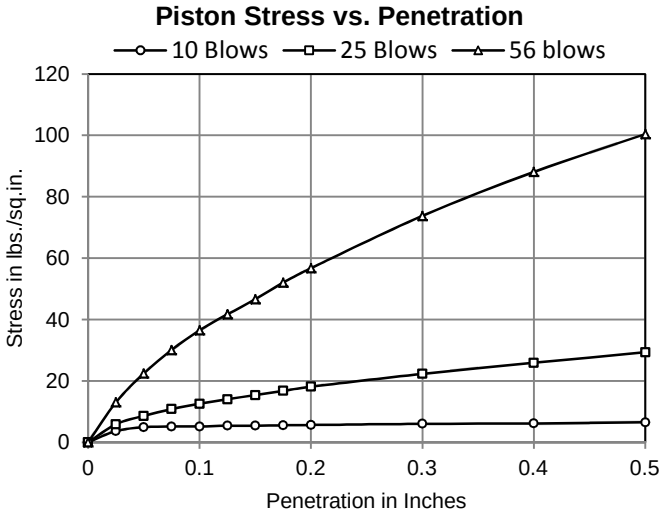
Surcharge Weight: 10 lbs.

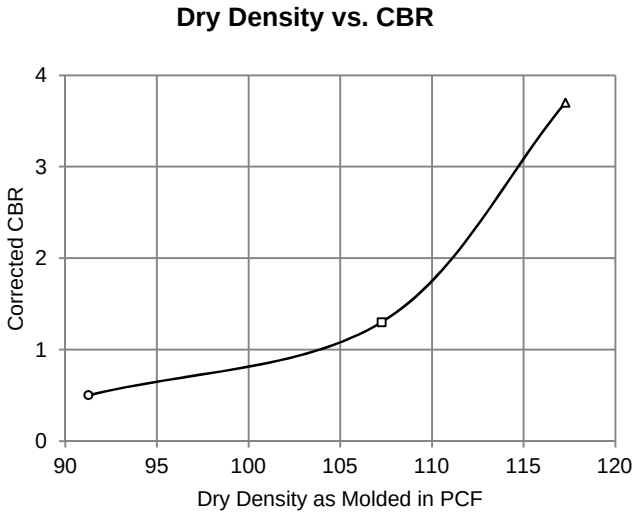
Condition Upon Penetration: Saturated

Tested By: Hitendra A. Soni, Sr. Tech. — *Checked By:* Jeffrey G. Smith, P.E., Principal Engr.

Penetration Sample Data

	Point No.1	*Point No.2*	*Point No.3*
Blows per Layer:	10	25	56
Moisture Content Before Soaking:	13.9 %	13.9 %	13.9 %
Moisture Content After Soaking, top 1":	27.7 %	21.0 %	18.1 %
Moisture Content After Soaking, average:	24.1 %	19.2 %	17.0 %
Dry Density Before Soaking:	91.3 pcf	107.2 pcf	117.3 pcf
Dry Density After Soaking:	90.3 pcf	103.9 pcf	113.1 pcf
Soaking Period:	4 days	4 days	4 days
Swell after Soaking:	0.8 %	4.4 %	3.4 %
Corrected CBR @ 0.1 Inch Penetration:	0.5	1.3	3.7
Corrected CBR @ 0.2 Inch Penetration:	0.4	1.2	3.8
California Bearing Ratio:	0.5	1.3	3.7





Wisconsin Testing Laboratories LLC

Geotechnical Investigations
Testing & Inspection of
Soil, Rock, Aggregates,
Concrete, Asphalt,
Mortar and Grout

LABORATORY MOISTURE - DENSITY RELATIONS TEST

Contracted With GESTRA Engineering, Inc. Job No. 0100-11-001

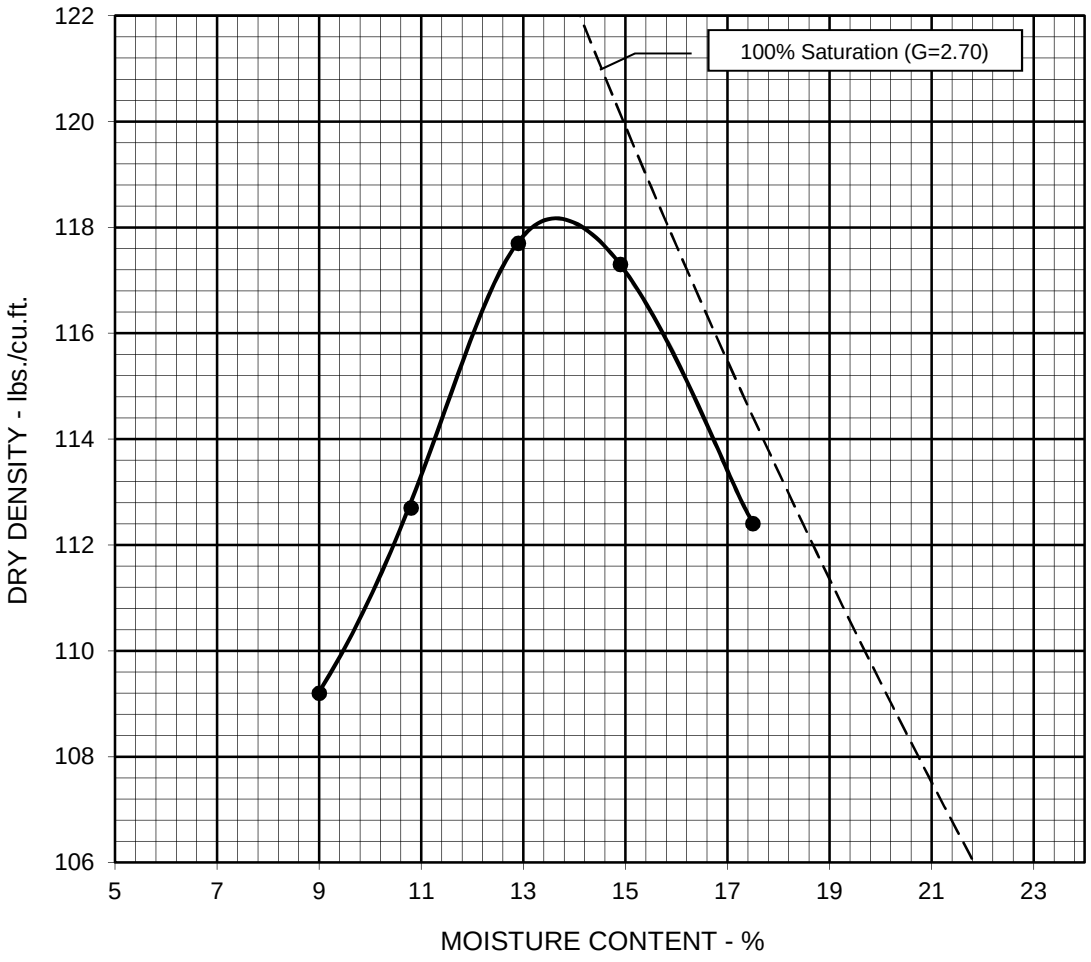
Project Zoo Interchange, Project No. 1060-33-01 Lab No. 4

Sample From Soil Boring EH-25, 0-5' Depth

Sample Description Brown Silty Clay, little sand, trace gravel, trace topsoil

Test Type Standard (AASHTO T99), Method "A" Proctor; Mold Size 4.00 in.

Hammer Wt. 5.5 lbs.; Drop 12 in., 3 layers, 25 blows/layer.



Maximum Dry Density 118.2 lbs./cu.ft. Optimum Moisture Content 13.6 %

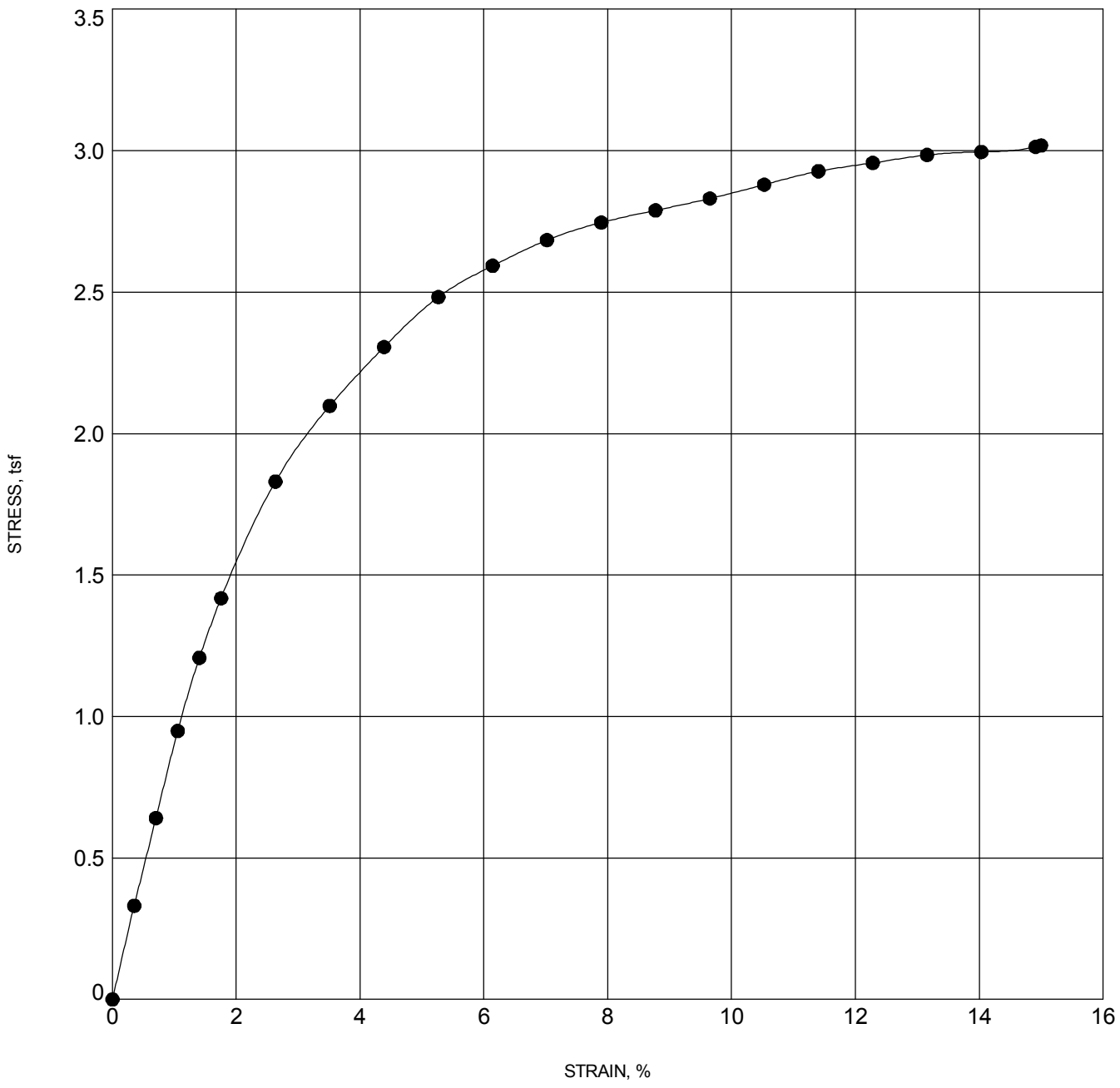
Tested By: Hitendra A. Soni, Sr. Tech. Checked By: Jeffrey G. Smith, P.E., Principal Engr.

Remarks: Date November 22, 2011

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**EH-27**	**SH-7**	**16.0'**	**23**	**3.02**	**105**	**D. Born**	**L. Gliniecki**

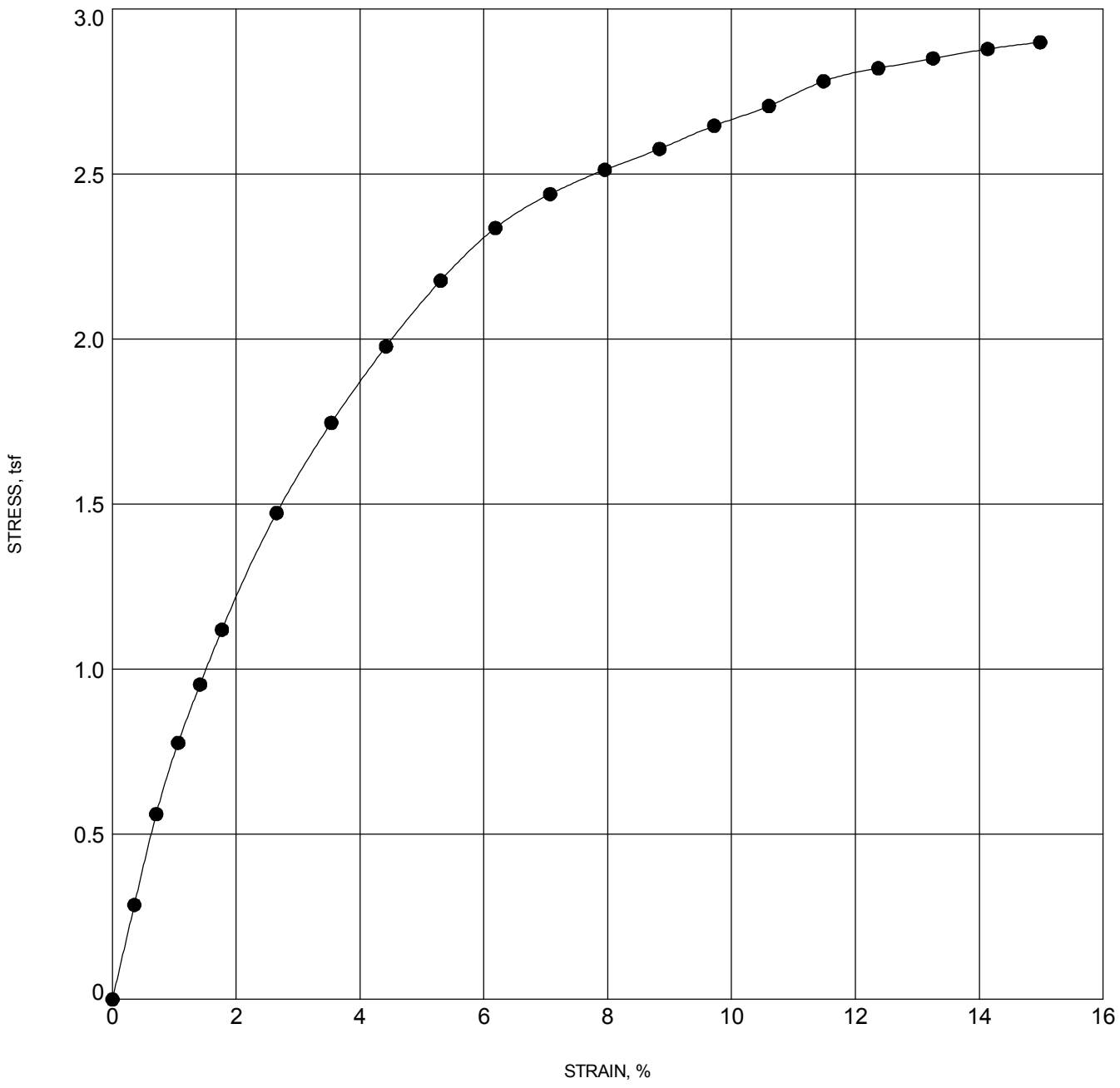
COMMENTS:

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 11/2/12

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**EH-27**	**SH-10**	**23.0'**	**21**	**2.9**	**113**	**B. Bills**	**L. Gliniecki**

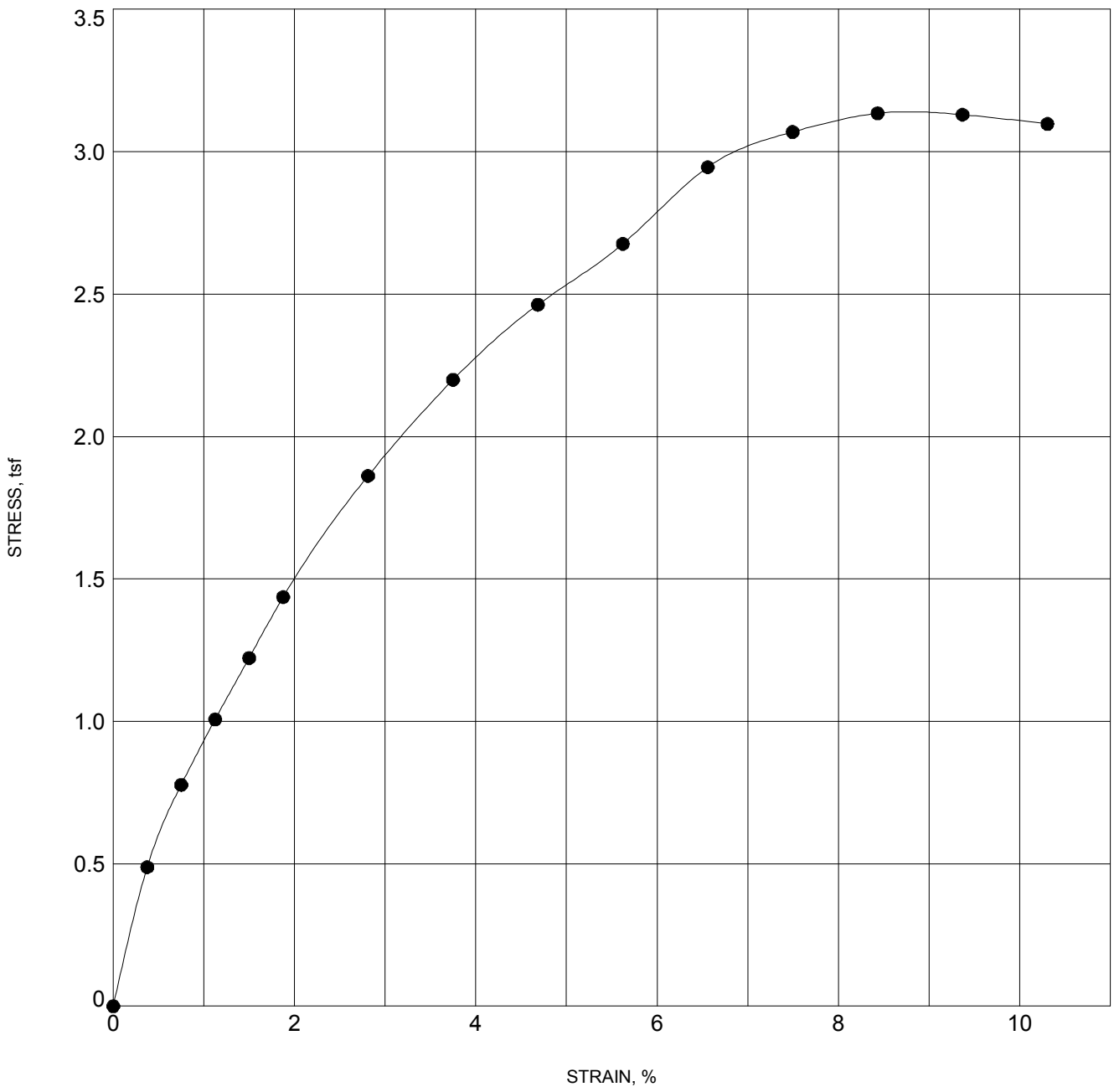
COMMENTS:

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-EAST LEG.GPJ Zoo Interchange 11/2/12

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-09 **LAB TEST PERFORMED BY** Gestra



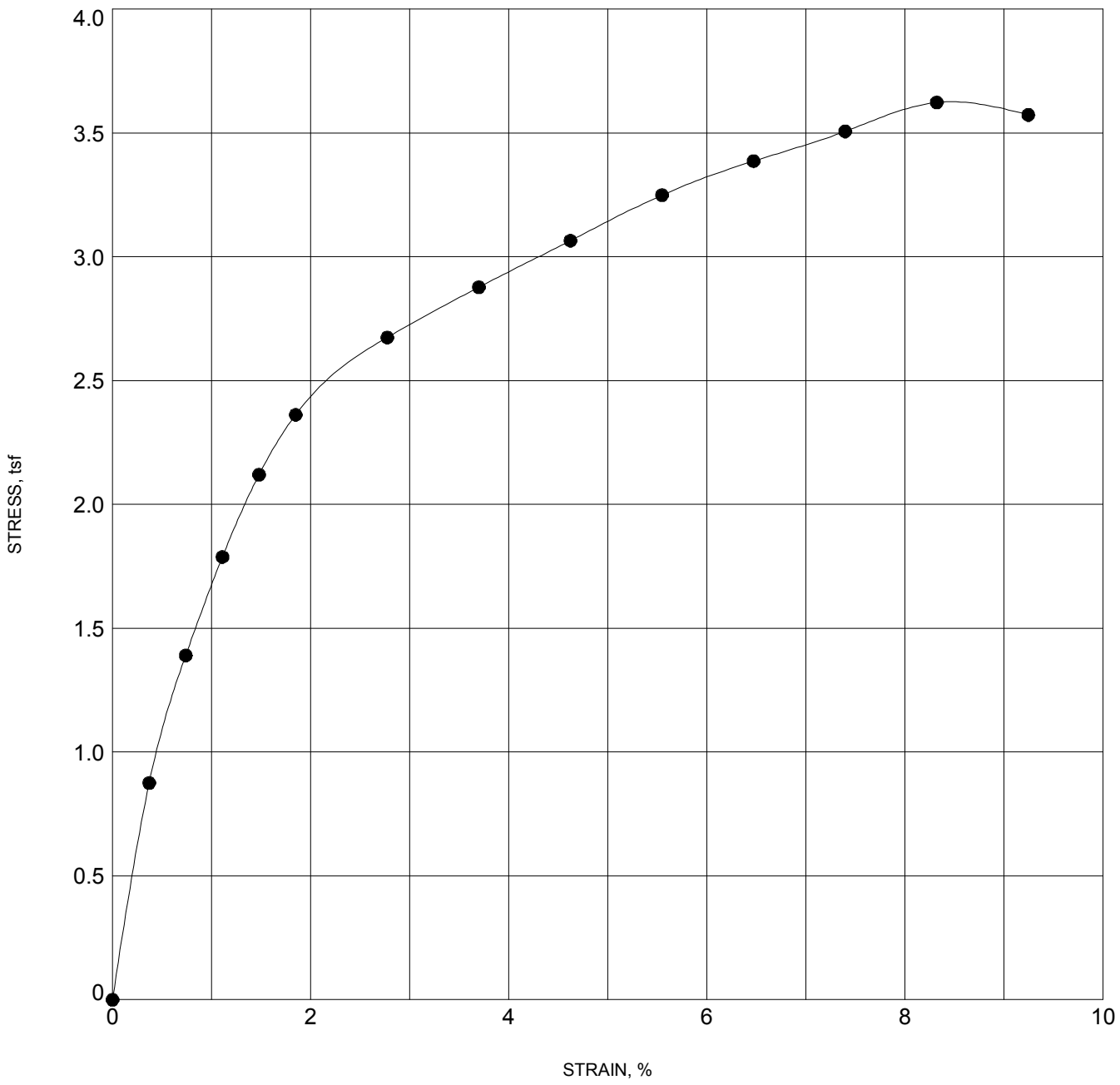
	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**WB-10**	**SH-6**	**13.5'**	**13**	**3.17**	**122**	**J. Parker**	**R. Haque**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 7/22/11

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-09 **LAB TEST PERFORMED BY** Gestra



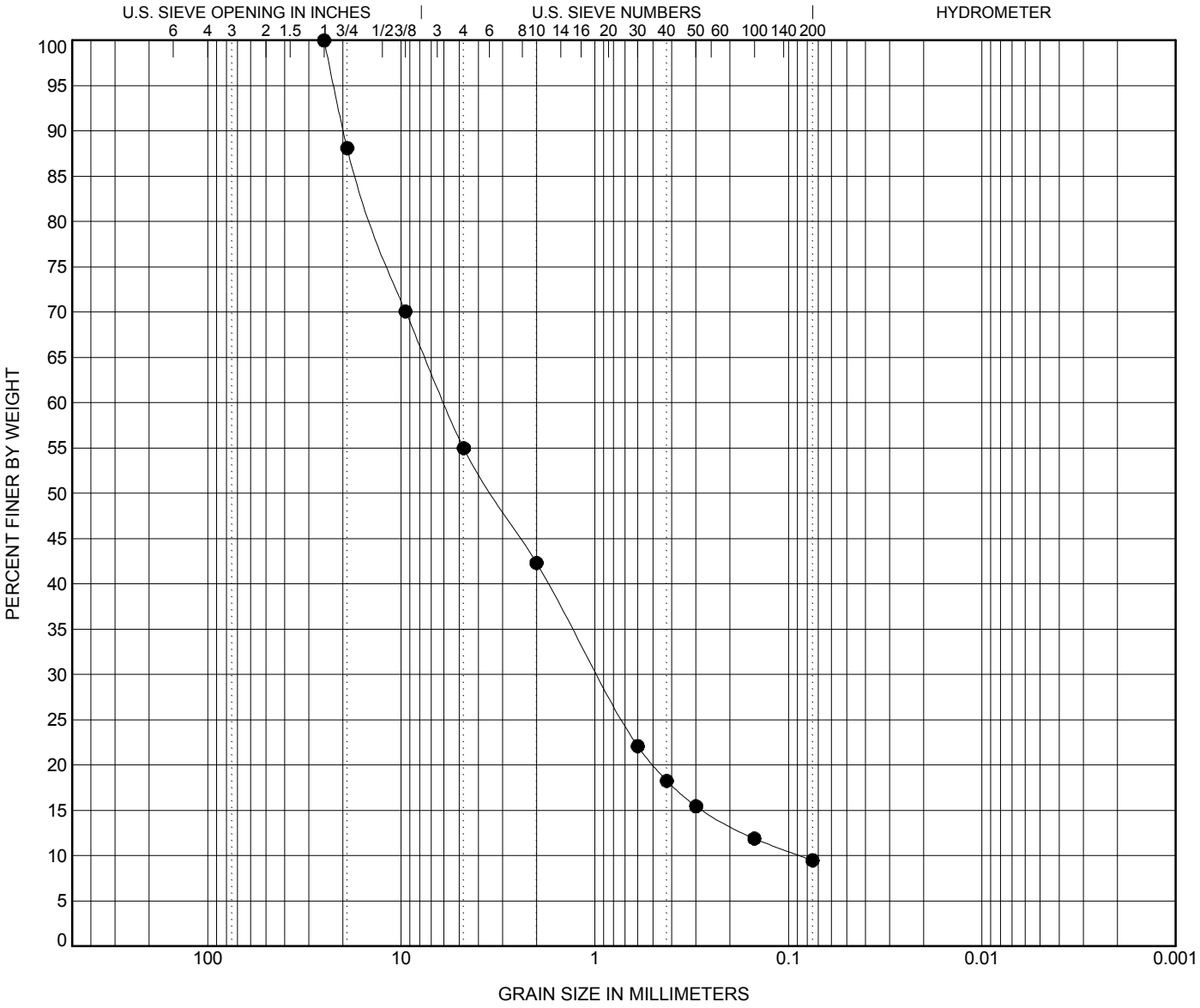
	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**WB-10**	**SH-8**	**18.5'**	**12**	**3.6**	**124**	**J. Parker**	**R. Haque**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 7/22/11

GRAIN SIZE DISTRIBUTION
(ASTM D422)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-09 **LAB TEST PERFORMED BY** Gestra



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**WB-10, SS-19**	**73.5'**					**1.78**	**69.01**

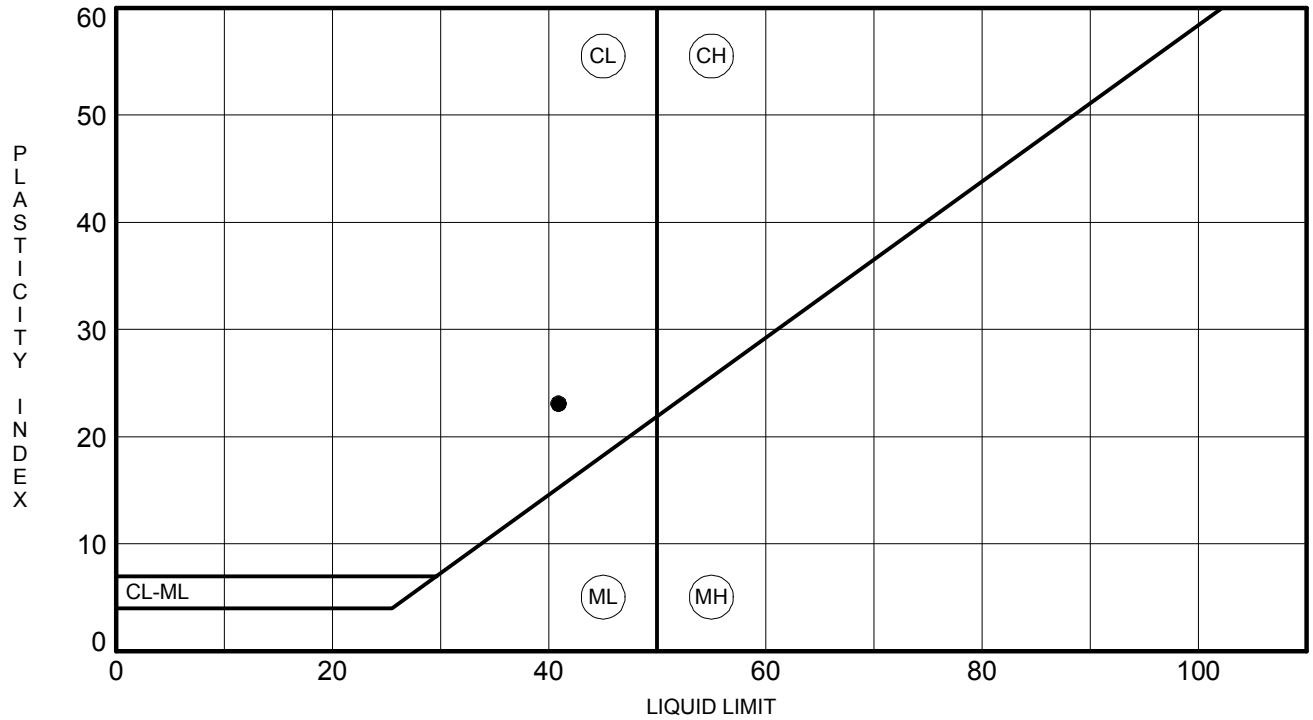
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**WB-10, SS-19**	**73.5'**	**25**	**5.977**	**0.96**	**0.087**	**45.0**	**45.5**	**9.5**	

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 7/22/11

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-09 **LAB TEST PERFORMED BY** Gestra



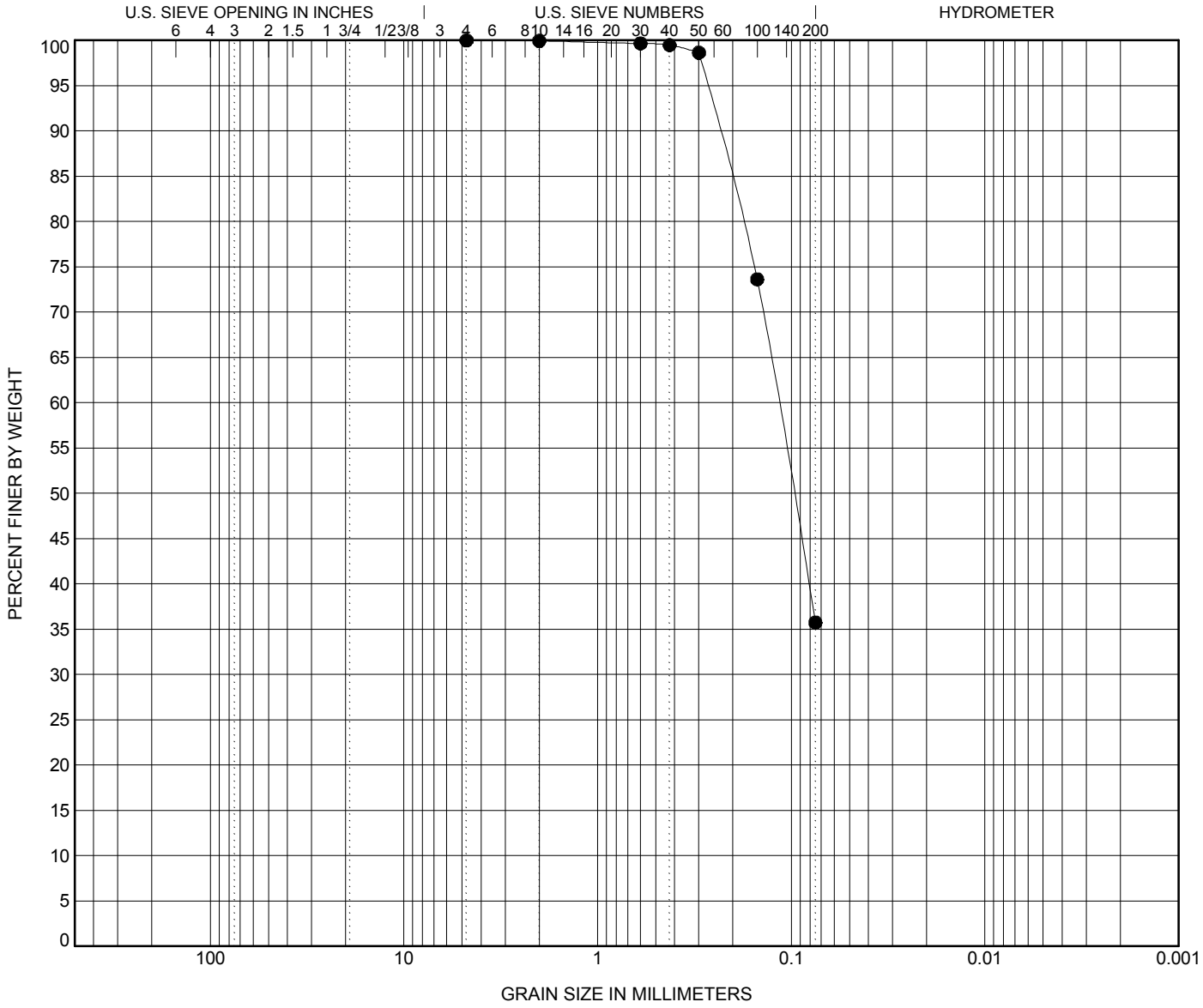
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**WB-16**	**SS-8**	**18.5'**	**19%**	**41**	**18**	**23**	**0.04**		**J. Parker**	**R. Haque**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 7/22/11

GRAIN SIZE DISTRIBUTION
(ASTM D422)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-09 **LAB TEST PERFORMED BY** Gestra



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**WB-16, SS-13**	**43.5'**						

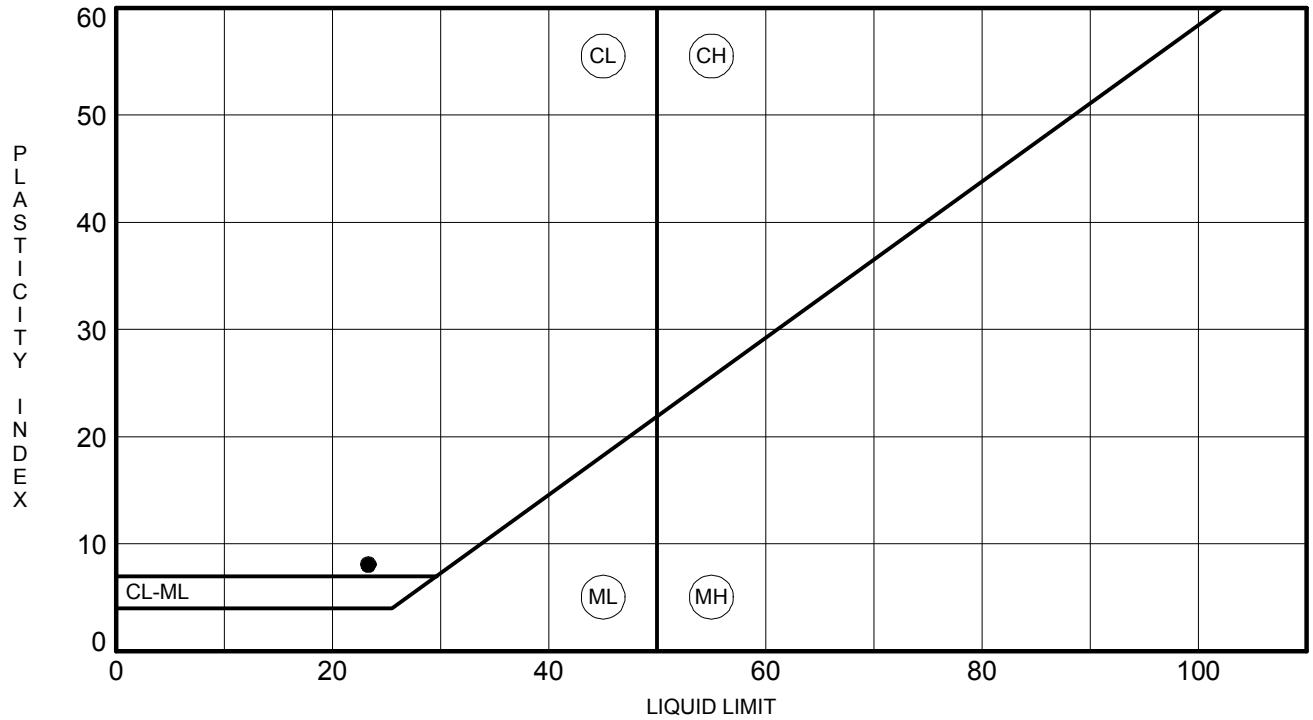
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**WB-16, SS-13**	**43.5'**	**4.75**	**0.117**			**0.0**	**64.3**	**35.7**	

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 7/22/11

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-09 **LAB TEST PERFORMED BY** Gestra



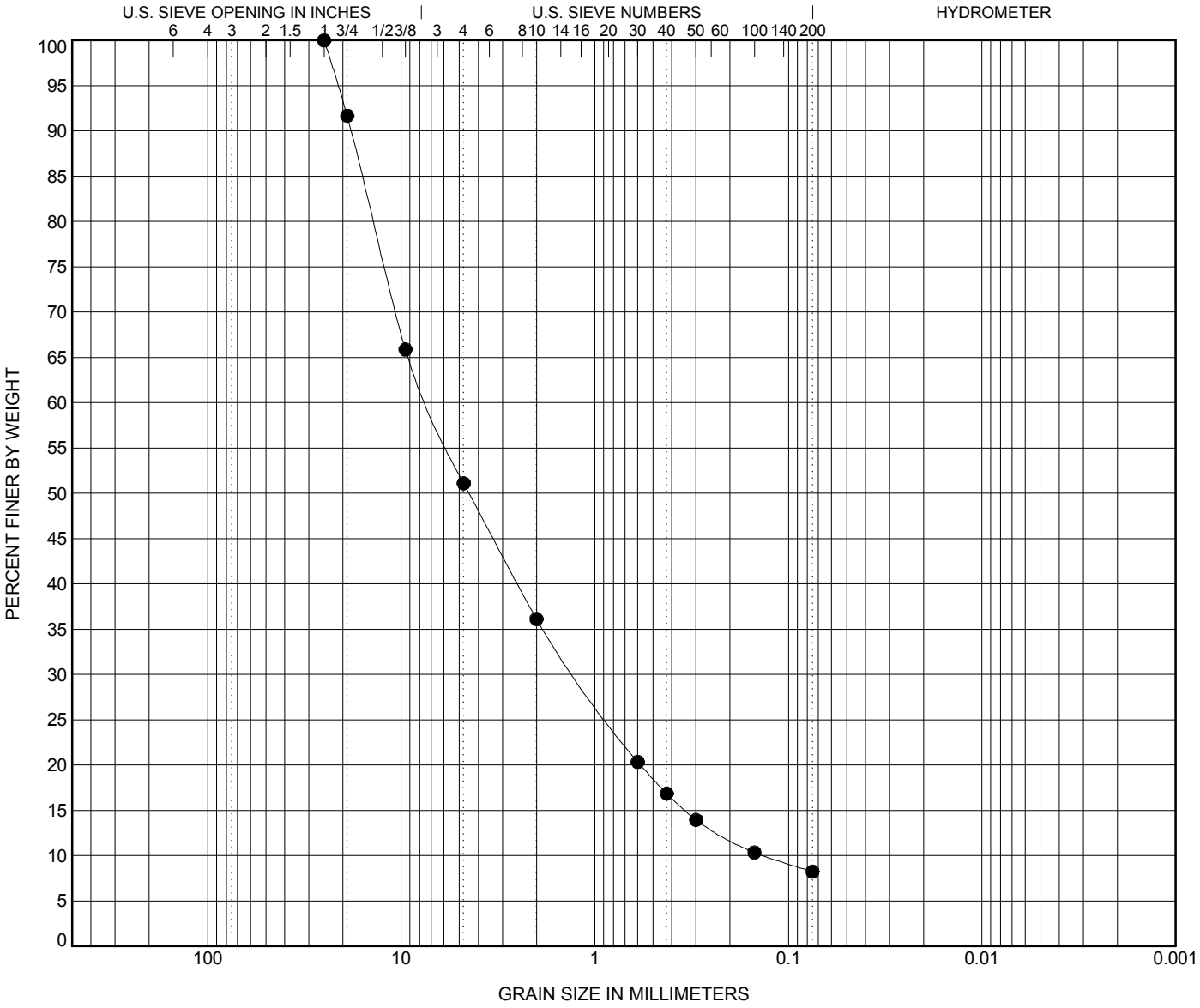
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**WB-8**	**SS-3**	**6.0'**	**16%**	**23**	**15**	**8**	**0.13**		**J. Parker**	**R. Haque**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 7/22/11

GRAIN SIZE DISTRIBUTION
(ASTM D422)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-09 **LAB TEST PERFORMED BY** Gestra



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**WB-8, SS-14**	**48.5'**					**1.64**	**54.28**

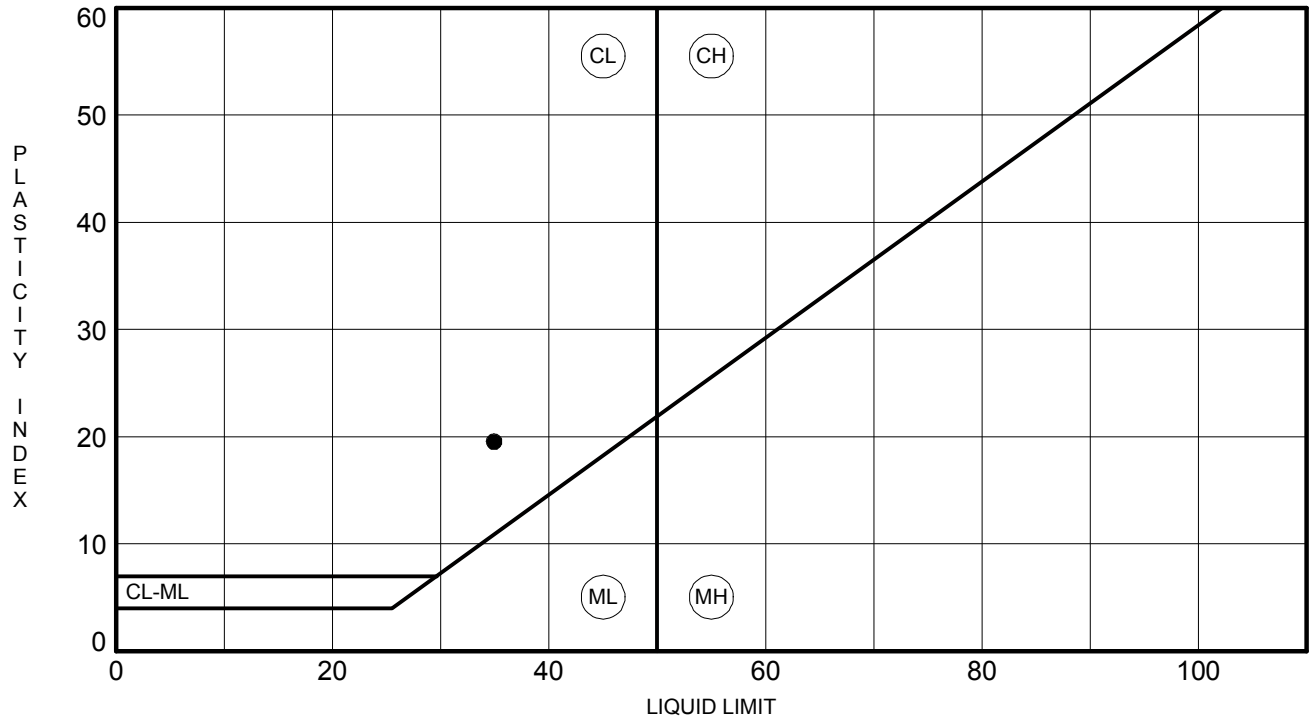
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**WB-8, SS-14**	**48.5'**	**25**	**7.206**	**1.252**	**0.133**	**48.9**	**42.9**	**8.2**	

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 7/22/11

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-09 **LAB TEST PERFORMED BY** Gestra



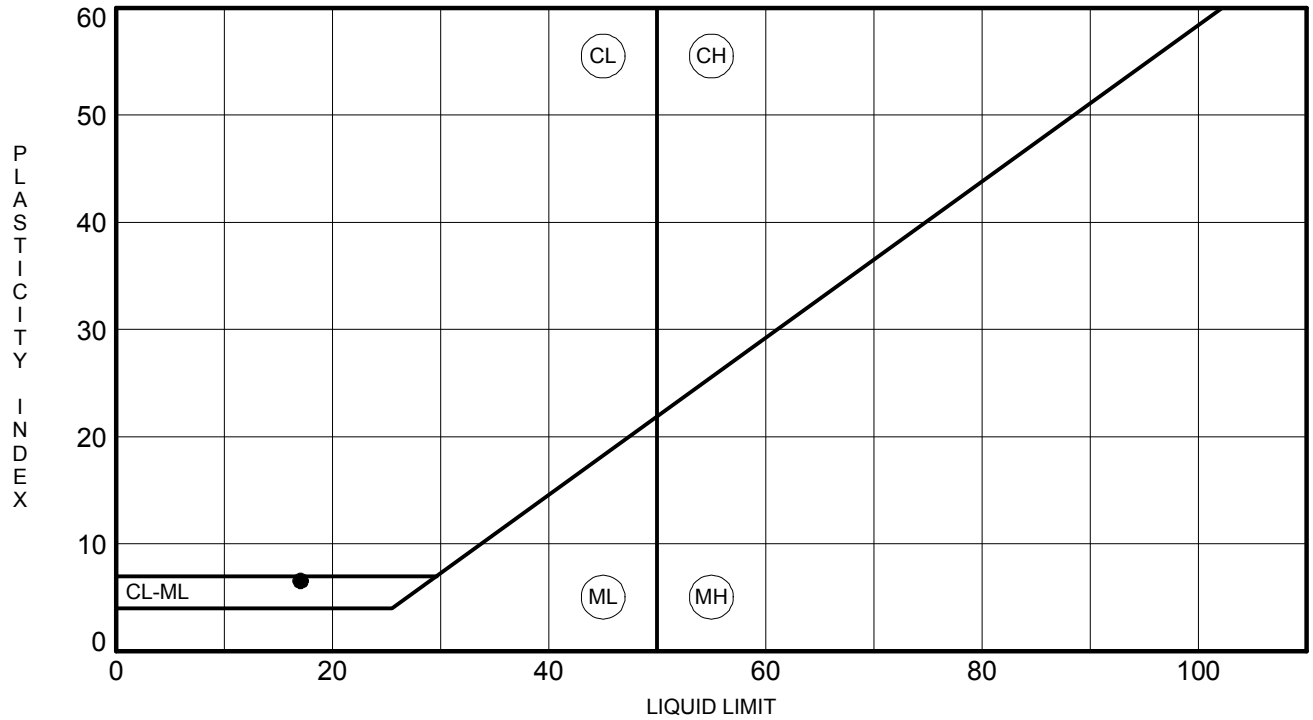
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**WB-4**	**SS-1**	**1.0'**	**14%**	**35**	**15**	**20**	**-0.05**		**J. Bruesewitz**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 7/21/11

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-09 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**WB-4**	**SS-18**	**68.5'**		**17**	**10**	**7**			**J. Bruesewitz**	**E. Jeske**

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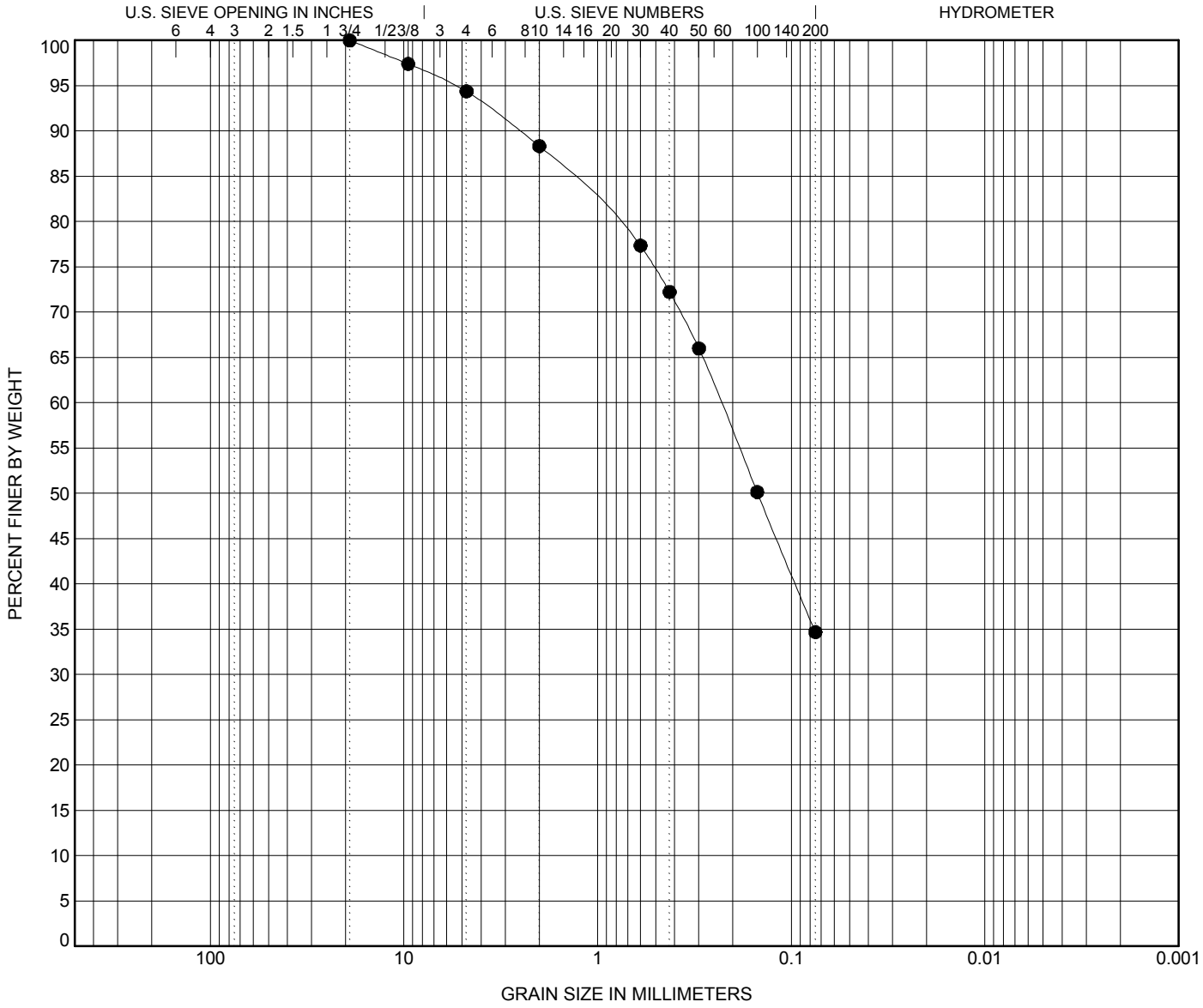
GRAIN SIZE DISTRIBUTION
(ASTM D422)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-09 **LAB TEST PERFORMED BY** Gestra



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**WB-4, SS-10**	**28.5'**						

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**WB-4, SS-10**	**28.5'**	**19.05**	**0.231**			**5.6**	**59.7**	**34.7**	

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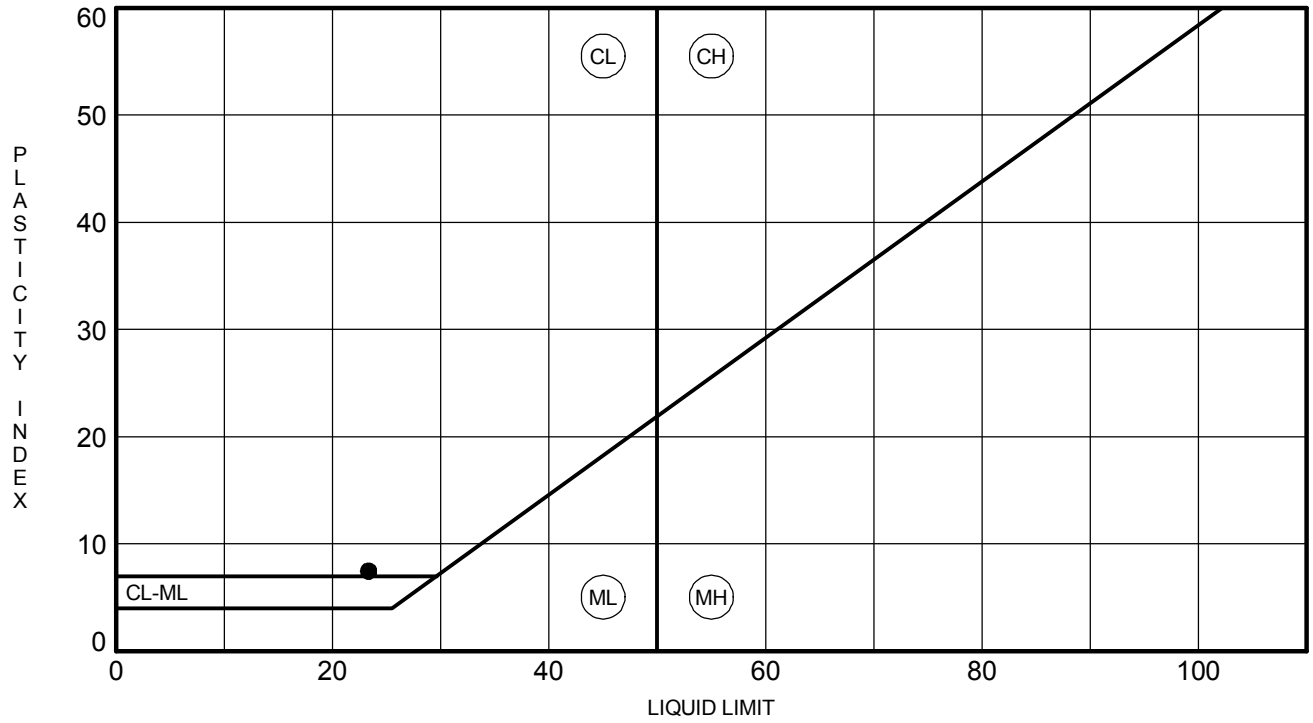
ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



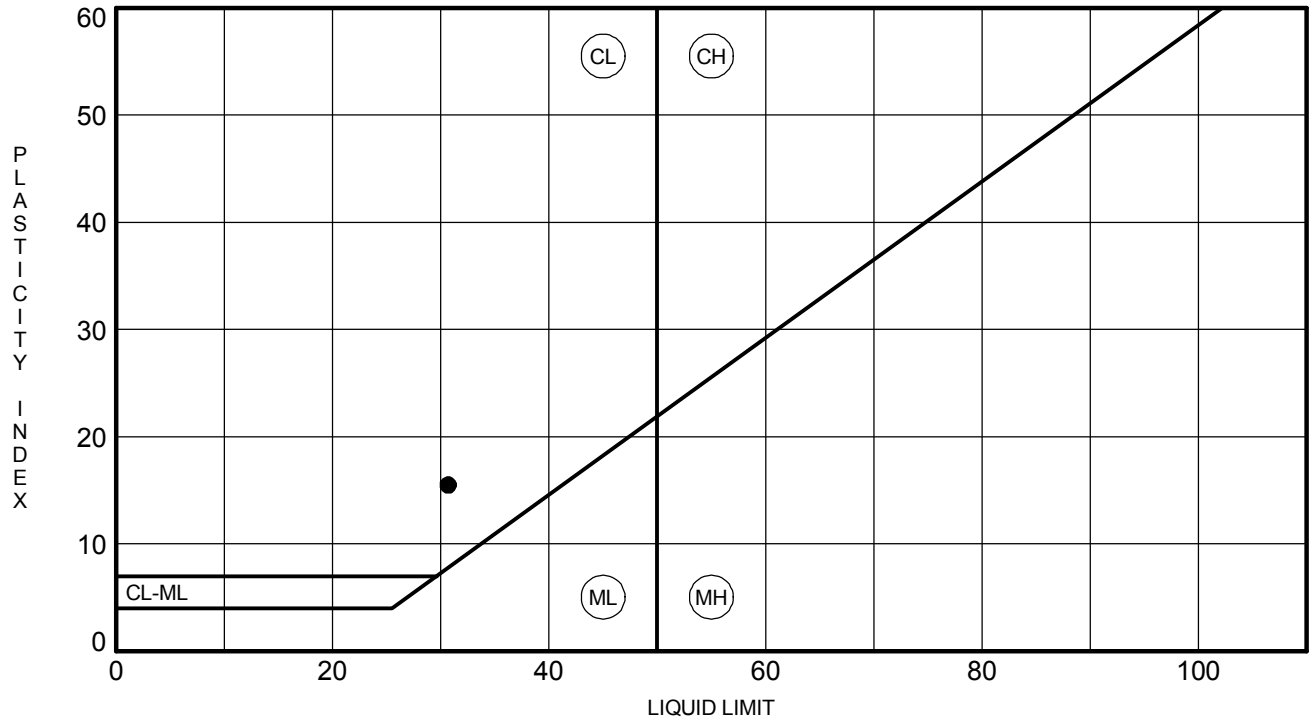
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**WB-46**	**SS-3**	**6.0'**	**13%**	**23**	**16**	**7**	**-0.43**		**D. Born**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 11/29/12

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**WB-46**	**SH-5**	**11.0'**	**12%**	**31**	**15**	**16**	**-0.19**		**D. Born**	**E. Jeske**

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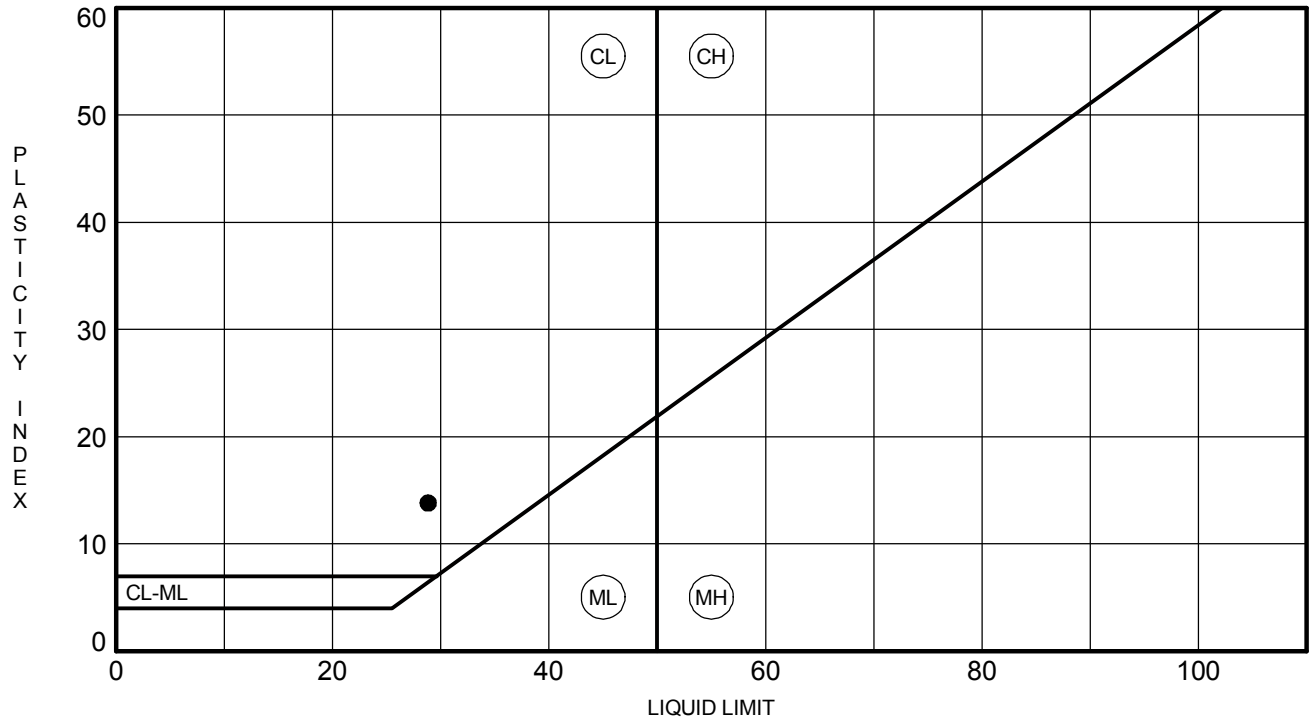
ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**WB-46**	**SS-6**	**13.5'**	**16%**	**29**	**15**	**14**	**0.07**		**D. Born**	**E. Jeske**

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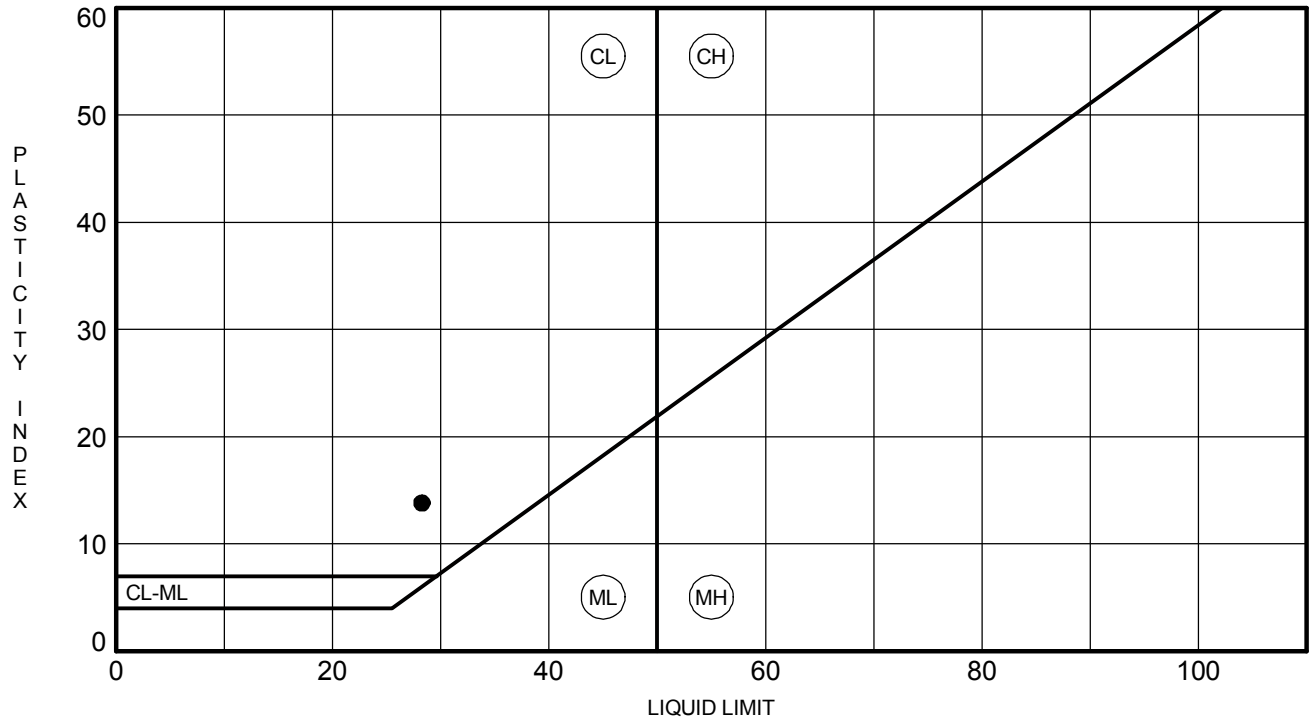
ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**WB-46**	**SS-8**	**18.5'**	**14%**	**28**	**14**	**14**	**0**		**B. Bills**	**E. Jeske**

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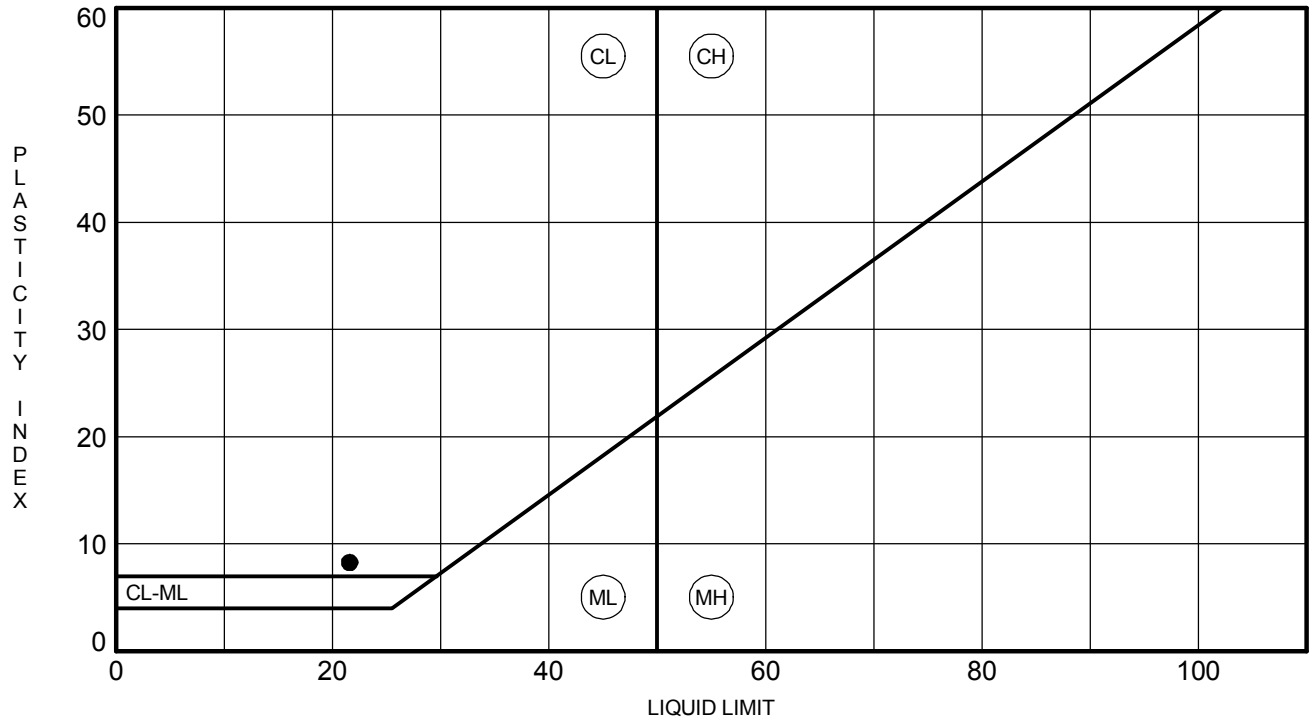
ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



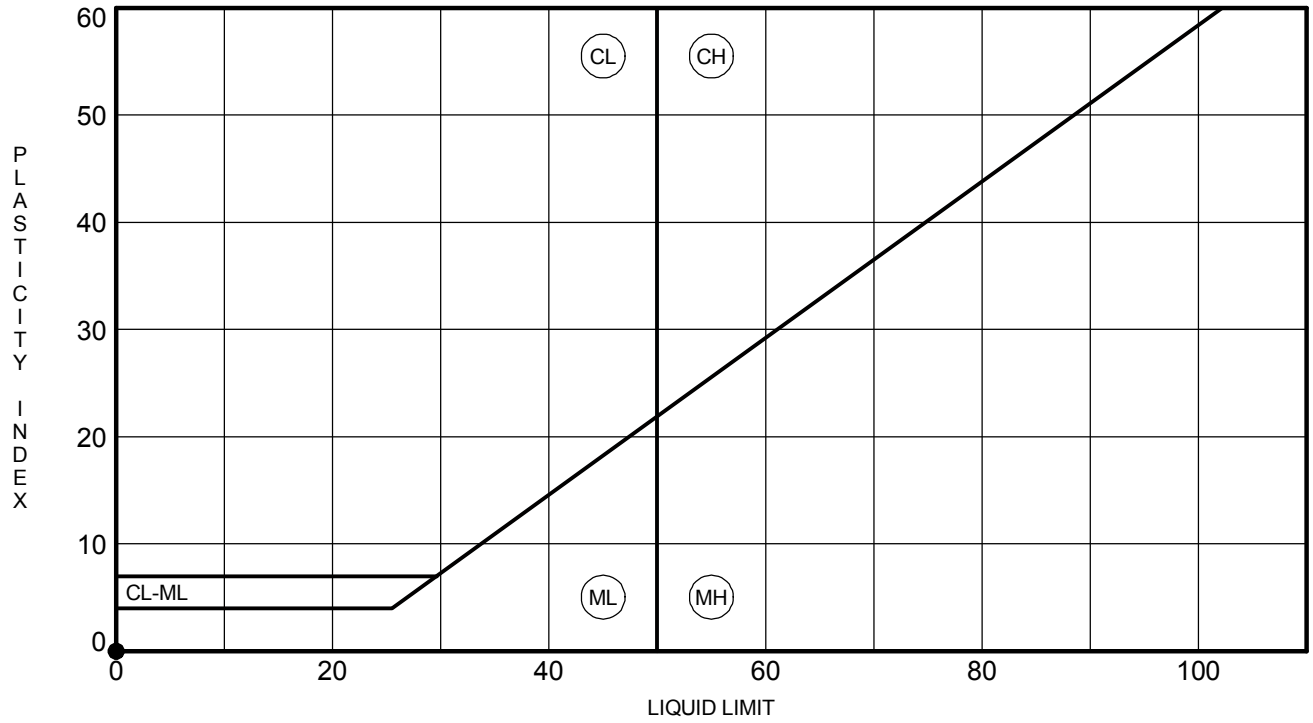
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**WB-46**	**SH-11**	**33.0'**	**13%**	**22**	**13**	**9**	**0**		**D. Born**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 11/29/12

ATTERBERG LIMITS' RESULTS
(ASTM D4318)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



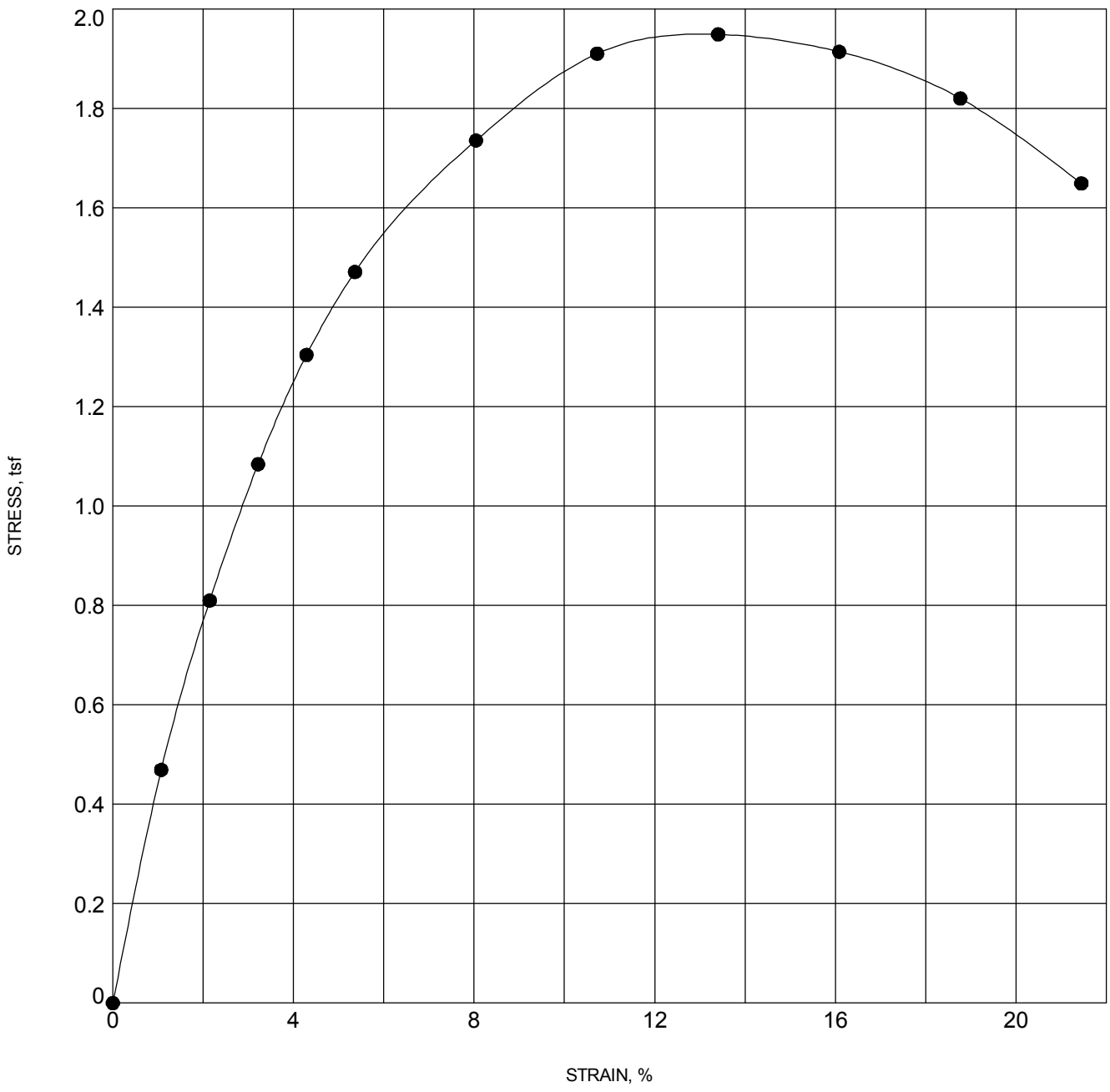
	BOREHOLE	SAMPLE	DEPTH	MC	LL	PL	PI	LI	Fines	Performed By	Checked By
●	**WB-46**	**SS-14**	**48.5'**		**NP**	**NP**	**NP**			**B. Bills**	**E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 11/29/12

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**WB-46**	**SH-5**	**11.0'**	**12**	**1.95**	**121**	**J. Bruesewitz**	**E. Jeske**

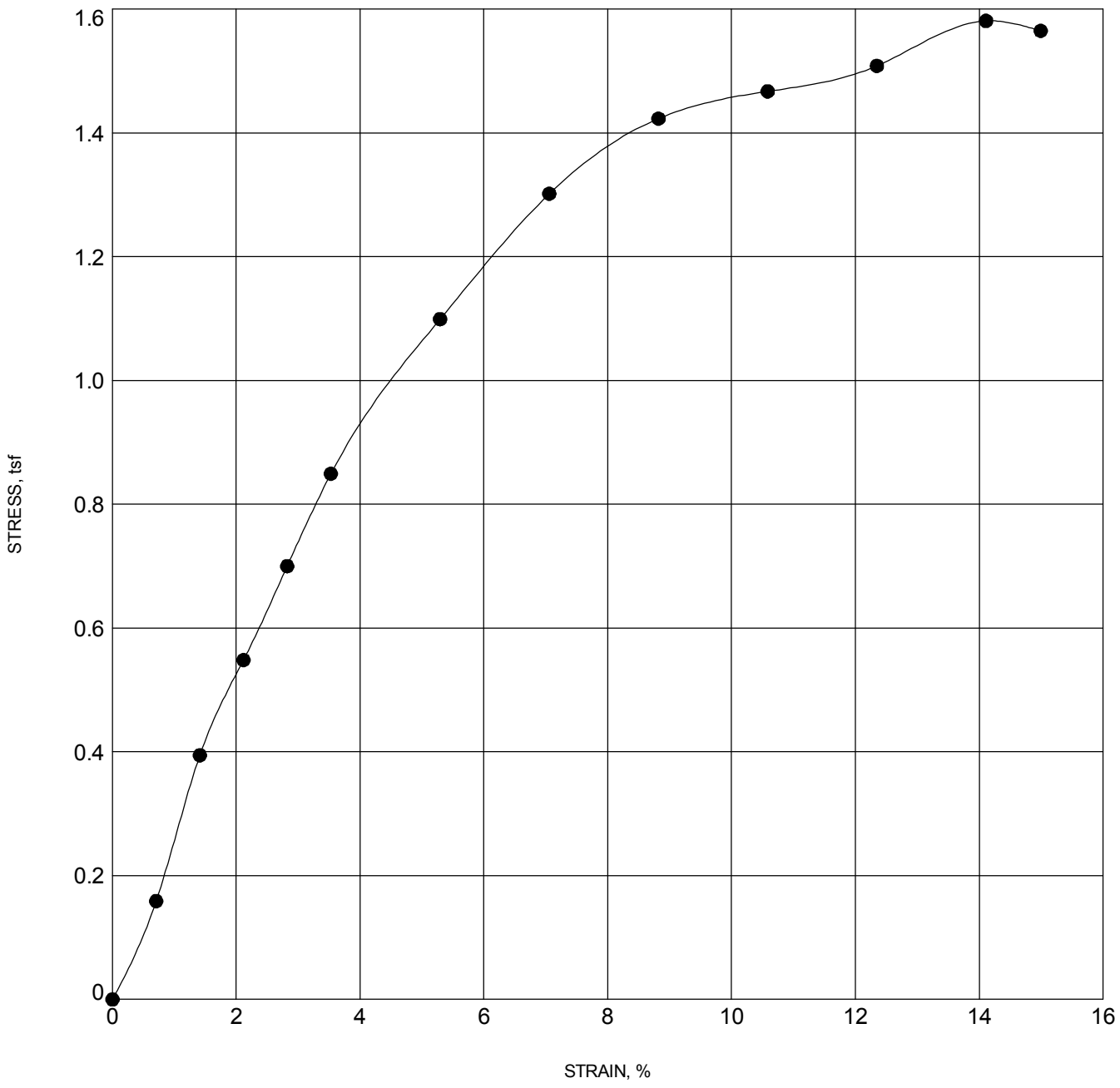
COMMENTS:

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 11/29/12

UNCONFINED COMPRESSION TEST
(ASTM D2166)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



	BOREHOLE	SAMPLE	DEPTH	MC (%)	Q_u (tsf)	γ_d (pcf)	Performed By	Checked By
●	**WB-46**	**SS-6**	**13.5'**	**16**	**1.58**	**120**	**B. Bills**	**E. Jeske**

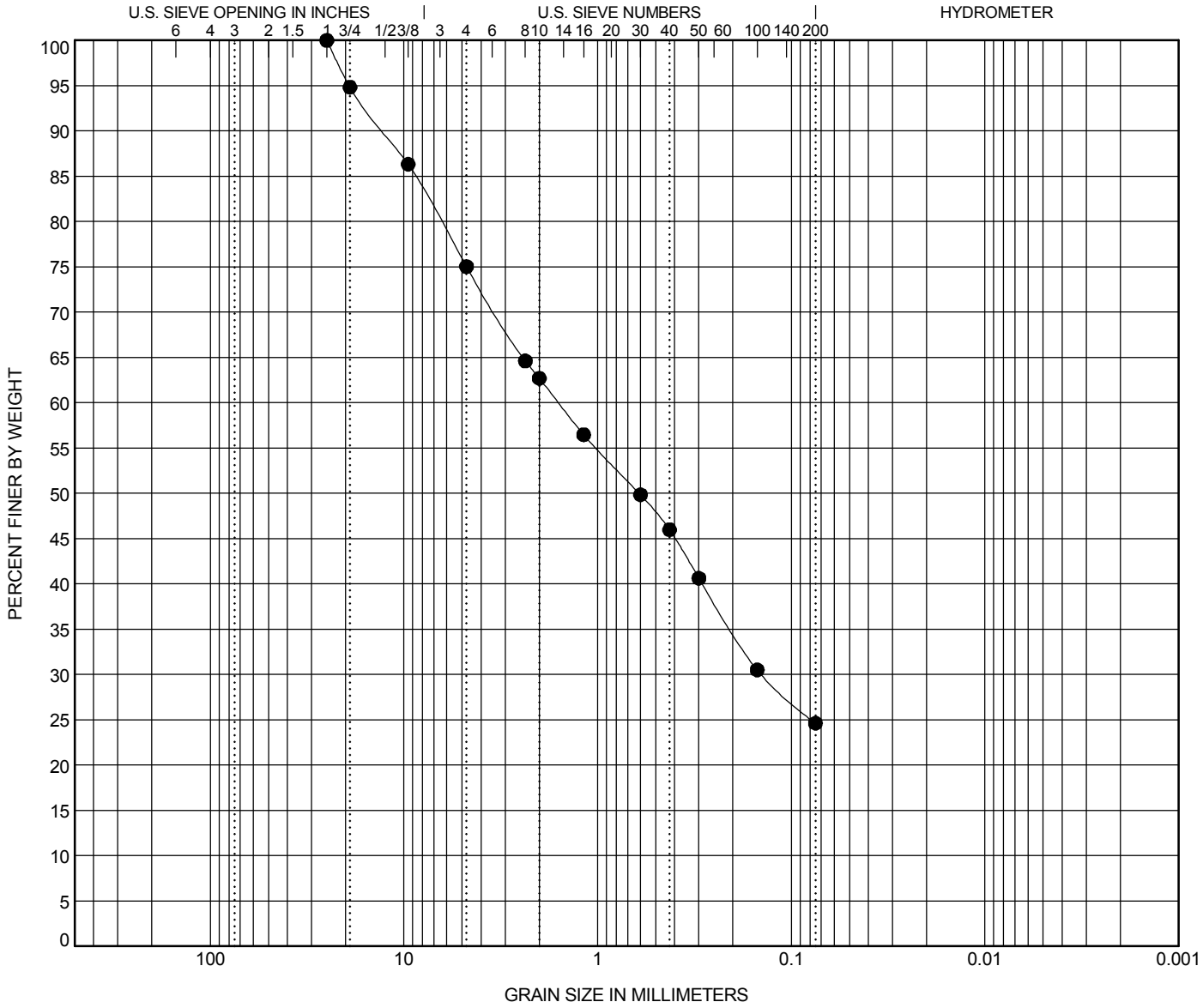
COMMENTS:

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 11/29/12

GRAIN SIZE DISTRIBUTION
(ASTM D422)

PROJECT NAME Zoo Interchange **CONSULTANT** Forward 45

PROJECT No 1060-33-01 **LAB TEST PERFORMED BY** Gestra



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● **WB-46, SS-13**	**43.5'**	**SILTY SAND WITH GRAVEL(SM)**					

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **WB-46, SS-13**	**43.5'**	**25**	**1.59**	**0.141**		**25.0**	**50.4**	**24.6**	

PERFORMED BY: B. Bills **CHECKED BY: E. Jeske**

\\GESTRASERVER-11\REPORT\2011\GEO-MILWAUKEE-10\11039-10 (ZOO INTERCHANGE)\GINT TEMPLATE\ZOO INTERCHANGE-WEST LEG.GPJ Zoo Interchange 11/29/12