Midwest Testing
LABORATORY, INC.
A Terracon COMPANY

November 10, 2011

Great Western Builders
72 South State Avenue
Dickinson, ND 58601

Attn: Pat Bren

P: [701] 483 9040
F: [701] 264 9673
E: pbren@f5equipment.com

RE: County Line Industrial Park
Stark County, North Dakota
MTL Project No M2115332

Dear Pat:

As requested, on November 2, 2011, we advanced four soil test borings for the above-referenced project. Two copies of our report are provided for your use. This work was conducted in general accordance with our proposal P-M2110270, dated September 14, 2011, and your signed Agreement for Services dated, October 28, 2011. The purpose of these borings was to provide a general description of the soil and groundwater conditions at the boring locations.

The project site is located within the NE¼ of Section 4, Township 140N, Range 96W in Stark County, North Dakota. This site is approximately 2300 feet south of the intersection of 30th Street SW and North Dakota State Highway 22 on the west side of the highway. This area is currently under development with site grading occurring during our investigation. Site topography consists of gently rolling terrain. Surface elevations at our test boring locations varied by approximately eight feet.

Test borings advanced for the project encountered relatively uniform soil conditions. Medium to high plasticity clays were the predominant soils identified within our borings. These cohesive soils consisted of both lean clays and fat clays containing varying amounts of sand. These soils were generally of a brown color when first encountered changing to grayish brown to gray with depth. Field consistencies ranged from medium stiff to very stiff, but generally of a stiff to very stiff consistency.

The borings were observed while drilling and after completion for the presence and level of groundwater. Groundwater was not observed in the borings while drilling or for the short duration that the borings were allowed to remain open. However, this does not necessarily

mean the borings terminated above groundwater. Due to the low permeability of the soils encountered in the borings, a relatively long period of time may be necessary for a groundwater level to develop and stabilize in a boring hole in these materials. Long term observations and piezometers or observation wells sealed from the influence of surface water are often required to define groundwater levels in materials of this type.

Groundwater level fluctuations occur due to seasonal variations and the amount of rainfall, runoff, and other factors not evident at the time of the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater fluctuations should be considered when developing the design and construction plans for the project.

Several samples of the soils encountered were selected for laboratory analysis. The testing program consisted of the determination of the soil's index properties including moisture content, dry density, and Atterberg limits. All test results are included on the attached boring logs opposite the samples on which they were performed.

As requested, the investigation completed and comments provided are factual in nature. Should you have any questions or wish to discuss these findings further, please contact us.

As previously stated, logs of the borings describing the soil conditions encountered are attached. Charts illustrating soil classifications and descriptive terminology are also included. Also, attached is a sketch indicating the test boring locations. Surface elevations at our test boring locations were provided by your office.

Should you have any questions or if we may be of further service, please contact us.

Sincerely,

MIDWEST TESTING LABORATORY

Steven S. Smith

Steven S. Smith, P.E.

SSS/cb

Attachments: test boring logs (4)
soil classification
descriptive terminology
test boring layout

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1805 Hancock Dr, PO Box 2084
Bismarck, ND 58502-2084
Phone (701) 258-2833 Fax (701) 258-2857

JOB NO.: M2115332 LOG OR TEST BORING NO.: 1 VERTICAL SCALE: 1"=3'

PROJECT: County Line Industrial Park, Dickinson, North Dakota

DEPTH IN FEET	SOIL DESCRIPTION SURFACE ELEVATION: **2465.5**	SAMPLE NO.	SAMPLE TYPE	N	LABORATORY TESTS: MOISTURE	DENSITY	LL/PL	Q_u (psf)
	FILL-LEAN CLAY WITH SAND-brown, very stiff, surface vegetation in upper 2" (CL)	1	SS	16				
2½	FILL-FAT CLAY-brownish gray, medium stiff (CH)	2	SS	6				
4½	LEAN CLAY-brown to light brown, stiff to very stiff, sand lenses @ 8½' (CL)	3	SS	9	25			
		4	SS	12				
		5	SS	18	28	96	48/19	
11	FAT CLAY-grayish brown, stiff to medium stiff (CH)	6	SS	11				
		7	SS	14				
		8	SS	8				
21	END OF BORING							

WATER LEVEL DATA

DATE	TIME	CAVE IN DEPTH	WATER LEVEL
11-2-11	14:45	HSA 19½'	None
11-2-11	14:50	18'	None

BORING DATA

STARTED: 11-2-11 **COMPLETED:** 11-2-11 @ 14:45

METHOD USED: 3¼" ID HSA 0-19½'

CREW CHIEF: M. Roberts

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JOB NO.: M2115332 LOG OR TEST BORING NO.: 2 VERTICAL SCALE: 1"=3'

PROJECT: County Line Industrial Park, Dickinson, North Dakota

DEPTH IN FEET	SOIL DESCRIPTION SURFACE ELEVATION: 2470.4	SAMPLE NO.	SAMPLE TYPE	N	LABORATORY TESTS MOISTURE	DENSITY	LL/PL	Q_u (psf)
	LEAN CLAY WITH SAND-brown, very stiff, surface vegetation in upper 2" (CL)	1	SS	18				
2	FAT CLAY-brown, stiff (CH)	2	SS	11				
4	LEAN CLAY WITH SAND-brown, medium stiff (CL)	3	SS	7	30	93	48/19	
6	FAT CLAY-grayish brown, stiff to very stiff (CH)	4	SS	10				
		5	SS	12	30			
		6	SS	15				
		7	SS	13				
		8	SS	19				
21	END OF BORING							

WATER LEVEL DATA

DATE	TIME	CAVE IN DEPTH	WATER LEVEL
11-2-11	15:35	HSA 19½'	None
11-2-11	15:40	18'	None

BORING DATA

STARTED: 11-2-11 **COMPLETED:** 11-2-11 @ 15:35

METHOD USED: 3¼" ID HSA 0-19½'

CREW CHIEF: M. Roberts

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JOB NO.: M2115332 LOG OR TEST BORING NO.: 3 VERTICAL SCALE: 1"=3'

PROJECT: County Line Industrial Park, Dickinson, North Dakota

DEPTH IN FEET	SOIL DESCRIPTION SURFACE ELEVATION: 2463.8	SAMPLE NO.	SAMPLE TYPE	N	LABORATORY TESTS: MOISTURE	DENSITY	LL/PL	Q_u (psf)
	LEAN CLAY WITH SAND-dark brown to brown, very stiff to medium stiff, surface vegetation in upper 2" (CL)	1	SS	20				
		2	SS	10				
		3	SS	6				
		4	SS	13	25			
9	FAT CLAY-grayish brown, stiff (CH)	5	SS	14	30	93	66/21	
12	FAT CLAY-gray, very stiff (CH)	6	SS	17				
		7	SS	19				
		8	SS	18				
21	END OF BORING							

WATER LEVEL DATA

DATE	TIME	CAVE IN DEPTH	WATER LEVEL
11-2-11	16:50	HSA 19½'	None
11-2-11	16:35	17'	None

BORING DATA

STARTED: 11-2-11 **COMPLETED:** 11-2-11 @ 16:50

METHOD USED: 3¼" ID HSA 0-19½'

CREW CHIEF: M. Roberts

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JOB NO.: M2115332 LOG OR TEST BORING NO.: 4 VERTICAL SCALE: 1"=3'

PROJECT: County Line Industrial Park, Dickinson, North Dakota

DEPTH IN FEET	SOIL DESCRIPTION SURFACE ELEVATION: 2472.4	SAMPLE NO.	SAMPLE TYPE	N	LABORATORY TESTS MOISTURE	DENSITY	LL/PL	Q_u (psf)
	LEAN CLAY WITH SAND-brown, very stiff to stiff, surface vegetation in upper 2" (CL)	1	SS	17				
		2	SS	15				
4	FAT CLAY-grayish brown, stiff to very stiff (CH)	3	SS	15	27	94	65/19	
		4	SS	15	25			
		5	SS	19				
		6	SS	16				
		7	SS	19				
		8	SS	20				
21	END OF BORING							

WATER LEVEL DATA

DATE	TIME	CAVE IN DEPTH	WATER LEVEL
11-2-11	17:25	HSA 19½'	None
11-2-11	17:30	18'	None

BORING DATA

STARTED: 11-2-11 **COMPLETED:** 11-2-11 @ 17:25

METHOD USED: 3¼" ID HSA 0-19½'

CREW CHIEF: M. Roberts

Classification of Soils For Engineering Purposes

ASTM:D 2487-98

				Soil Classification	
	Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]			Group Symbol	Group Name[B]
Coarse-Grained Soils More than 50% retained on No. 200 Sieve	Gravels More than 50% coarse fraction retained on No. 4 Sieve	Clean Gravels Less than 5% fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$[E]	GW	Well graded gravel[F]
			$Cu < 4$ and/or $1 > Cc > 3$[E]	GP	Poorly graded gravel[F]
		Gravels with Fines More than 12% fines[C]	Fines classify as ML or MH	GM	Silty gravel[F,G,H]
			Fines classify as CL or CH	GC	Clayey gravel[F,G,H]
	Sands 50% or more of coarse fraction passes No. 4 Sieve	Clean Sands Less than 5% fines	$Cu \geq 6$ and $1 \leq Cc \leq 3$[E]	SW	Well-graded sand[I]
			$Cu < 6$ and/or $1 > Cc > 3$[E]	SP	Poorly graded sand[I]
		Sands with Fines More than 12% fines[D]	Fines classify as ML or MH	SM	Silty sand[G,H,I]
			Fines classify as CL or CH	SC	Clayey sand[G,H,I]
Fine-Grained Soils 50% or more passes the No. 200 Sieve	Silts and Clays Liquid limit less than 50	Inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K,L,M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K,L,M]
		Organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay[K,L,M,N] / Organic silt[K,L,M,O]
	Silts and Clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line	CH	Fat clay[K,L,M]
			PI plots below "A" line	MH	Elastic silt[K,L,M]
		Organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OH	Organic clay[K,L,M,P] / Organic silt[K,L,M,Q]
Highly organic soils	Primary organic matter, dark in color, and organic odor			PT	Peat
Fibric Peat > 67% Fiber	Hemic Peat 33%-67% Fibers				Sapric Peat < 33% Fibers

[A] Based on the material passing the 3-in. (75mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols:
- GW-GM well-graded with silt
- GW-GC well-graded gravel with clay
- GP-GM poorly graded gravel with silt
- GP-GC poorly graded gravel with clay

[D] Sands with 5 to 12% fines require dual symbols:
- SW-SM well-graded sand with silt
- SW-SC well-graded sand with clay
- SP-SM poorly graded sand with silt
- SP-SC poorly graded sand with clay

[E] $Cu = D_{60} / D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines, are organic, add " with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in hatched area, soil is CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel", whichever is predominant.

[L] If soil contains ≥ 30% plus no. 200, predominantly sand, add "sandy" to group name.

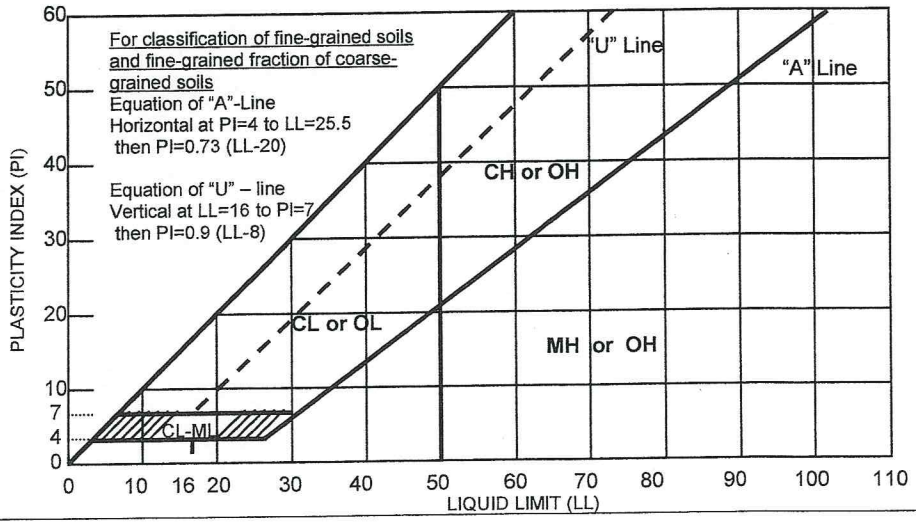
[M] If soil contains ≥ 30% plus no. 200, predominantly gravel, add "gravelly" to group name.

[N] PI≥ 4 and plots on or above "A"line.

[O] PI<4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



DESCRIPTIVE TERMINOLOGY

RELATIVE DENSITY

Term	"N" Value
Very Loose	0-4
Loose	5 – 9
Medium Dense	10 – 30
Dense	31 – 50
Very Dense	Greater than 50

CONSISTENCY OF COHESIVE SOILS

Term	"N" Value
Very soft	Less than 2
Soft	2 – 4
Medium stiff	5 – 8
Stiff	9 – 15
Very Stiff	16 – 30
Hard	Greater than 30

RELATIVE PROPORTIONS

Term	Range
Trace	0 – 5%
A Little	5 – 15%
With	15 – 50%

DRILLING & SAMPLING SYMBOLS

Symbol	Definition
FA	Flight Auger
SS	Split Spoon
TW	Thin-Walled Tube
HSA	Hollow Stem Auger
N	Penetration Resistance: blows required to drive a two-inch OD split spoon sampler one foot by means of a 140-pound hammer falling 30 inches

THICKNESS OF SOIL INTRUSIONS

Term	Range
Lense / Lamination	0 – 1/8"
Seam	1/8" – 1"
Layer	1" – 12"

PARTICLES SIZES

Term	Range
Boulders	Over 12"
Cobbles	3"– 12"
Gravel	
Coarse	3/4" – 3"
Fine	#4 – 3/4"
Sand	
Coarse	#4 - #10
Medium	#10 - #40
Fine	#40 - #200
Silt	#200 – 0.005 mm
Clay	Less than 0.005 mm

Note: Sieve sizes shown are U.S. Standard

LABORATORY TEST SYMBOLS

Symbols	Definition
LL	Liquid Limit, %
PL	Plastic Limit, %
Q_u	Unconfined Compressive Strength, psf
Additional insertions in Q_u column	
G	Specific Gravity
SL	Shrinkage Limit, %
pH	Hydrogen Ion Content-Meter Method
O	Organic Content, % - Combustion Method
M.A.	Grain Size Analysis - Mechanical Method
Hyd.	Grain Size Analysis - Hydrometer Method
C	One-Dimensional Consolidation
Q_c	Triaxial Compression
K	Coefficient of Permeability

WATER LEVEL INFORMATION

Water levels shown on the boring logs are levels measured in the borings at the time and under the conditions noted. In sand, the indicated levels can be considered reliable. In clay soil, it is not possible to determine the ground water level within the normal scope of a test boring investigation, except where lenses or layers of more pervious water-bearing soils are present. Even then, a long period of time may be necessary to reach equilibrium. Therefore, the position of the water level noted on the boring logs for cohesive or mixed-texture soils may not indicate the true level of the ground water table.

SOIL STRATIFICATION BOUNDARIES

The soil stratification lines shown on the boring logs indicate the approximate boundary between different soil types. In the field, the transition between soil types may be gradual.

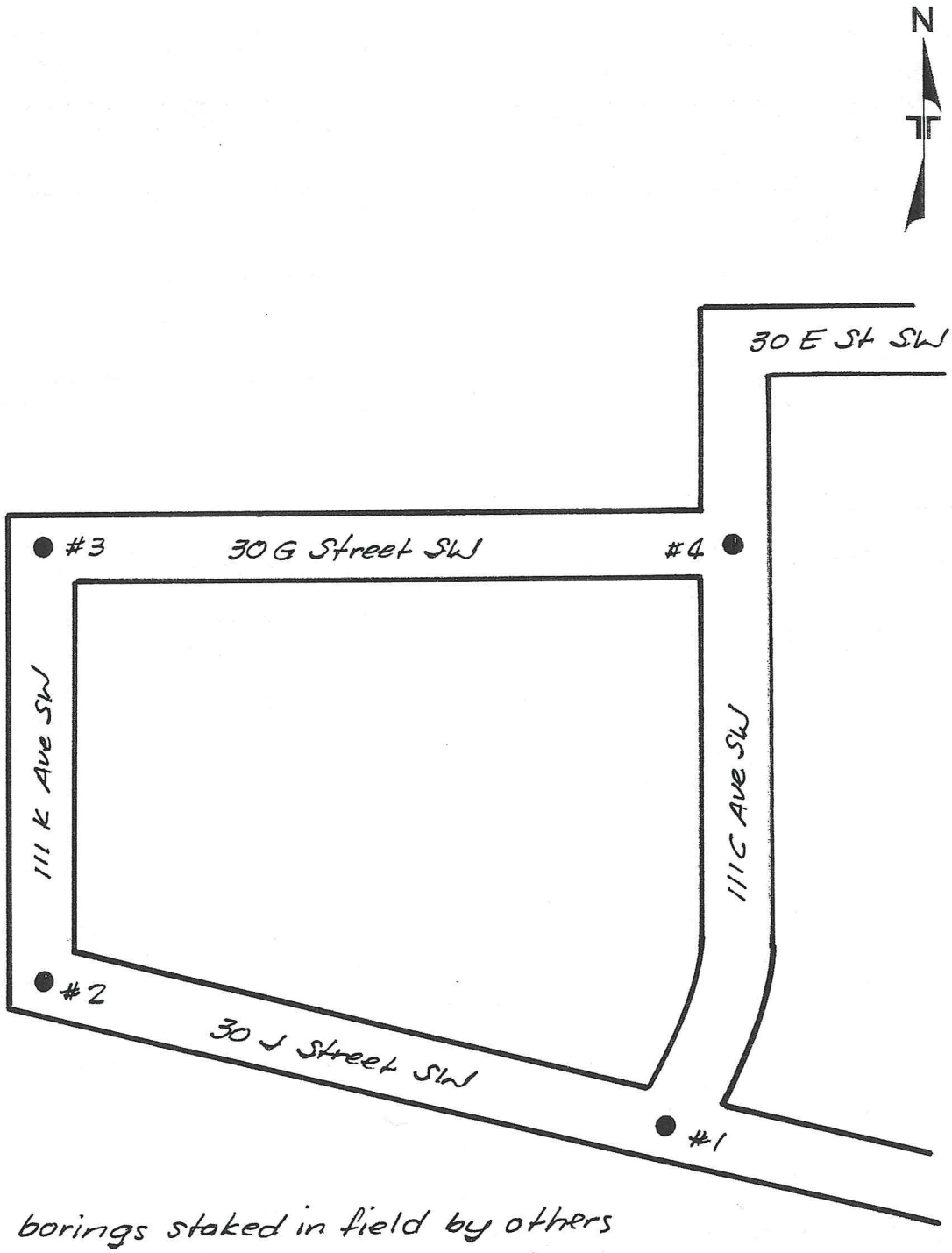


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Manager: SS	Project No. M2115332	Midwest Testing LABORATORY, INC. A Terracon COMPANY 1605 Hancock Drive PO Box 2084 Bismarck, North Dakota 58502 PH. (701) 258-2833 FAX. (701) 258-2857	BORING LOCATION DIAGRAM	FIG No.
Drawn by: SS	Scale: N.T.S		County Line Industrial Park Stark County, North Dakota	A-1
Checked by: CC				
Approved by: SS	Date: 11/4/2011			