2.f. Physical Factors – Geotechnical Report

Provide a geotechnical report consisting of at least six (6) soil borings at a minimum of twenty-five (25) feet depth. The report must include information on the existing and normal water table along with data on any known subterranean streams or related conditions along with recommendations and suggestions for the type of foundation.

See attached Geotechnical Report by Mid-State Engineering & Testing dated June 6, 2013.

MID-STATE
ENGINEERING & TESTING

REPORT OF GEOTECHNICAL INVESTIGATION

PROJECT HONOR
FEASIBILITY STUDY
KEARNEY, NEBRASKA

M.S. PROJECT NO. 133-01-20
JUNE 6, 2013
A-7200

Prepared for:

City of Kearney
PO Box 1180
Kearney, NE. 68848

TABLE OF CONTENTS

APPENDICES

MID-STATE
ENGINEERING &
TESTING, INC.

REPORT OF GEOTECHNICAL INVESTIGATION

PROJECT HONOR
FEASIBILITY STUDY
KEARNEY, NEBRASKA

M.S. PROJECT NO. 133-01-20
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INTRODUCTION

This report presents the results of the feasibility study performed at the site of a proposed Project Honor facility in Kearney, NE. The proposed site is located near the intersection of N. Webb Road and W. Capital Ave. This report was authorized by Mr. Mike Morgan of City of Kearney based on our written proposal dated May 17th, 2013.

Included in this investigation were six (6) soil borings, laboratory testing, and a report of conclusions and recommendations. The scope of our report was limited to the following:

- Identify in-situ soil conditions.
- Evaluating the engineering properties of the subgrade soils.
- Providing preliminary foundation design options.
- Evaluating soil bearing capacity and settlement.
- Providing recommendations for earthwork and soil related construction with respect to the soils encountered.

This report was prepared by Mid-State Engineering and Testing, Inc., by a professional engineer registered in the State of Nebraska. Recommendations are based on the applicable standards of the profession at the time of this study. This study has been prepared for the exclusive use of the City of Kearney for specific application to the planned development. All work was conducted in accordance with generally accepted soil and foundation engineering practices.

11 EAST 11TH STREET
KEARNEY, NEBRAKSA 68847
PHONE (308)-237-0187

279 ROAD D
COLUMBUS, NEBRASKA 68601
PHONE (402)-562-7824

PROPOSED CONSTRUCTION

The proposed new Veterans facility site consists of an approximate 75 acre parcel located east of Cherry Avenue on 56th Street. While exact size, configuration and location of the Veterans Home has not yet been determined, it is assumed the structure will be a one or two story, slab on grade, masonry and/or steel frame structure. Also included in the development will be concrete or asphalt parking and drive areas located around the facility.

At this time, exact floor and foundation loads are not known, however structural loads are not expected to exceed about 150 kips for isolated columns and 6 klf for walls.

The proposed site is relatively level and currently used for row crop production. To provide positive drainage off and away from the facility, it's expected finish floor elevations will be established about 2 to 4 feet above existing grades.

FIELD WORK

The field investigation was conducted on May 21st, 2013. The exploratory program consisted of six (6) soil borings, each extending to a depth of 25 feet below existing site elevations. Soil borings were completed with a Mobil B-50 truck-mounted rotary drilling rig using 4 ½-inch continuous flight augers. Boring locations are noted on the included Site Plan (Appendix A).

Soil samples were obtained at the sampling intervals noted on the Boring Logs (Appendix B). Recovered samples were extruded in the field, sealed in plastic containers, labeled, and protected for transportation to the laboratory for testing. Undisturbed samples, designated "U" samples were obtained with a 3.0-inch (outside diameter), thin-walled, tube samplers hydraulically pushed in general accordance with ASTM D1587-00 (Thin Walled Tube Sampling of Soils). Split-barrel samples, designated "S" samples, were obtained while performing Standard Penetration Tests (SPT) with a 1.50-inch (inside diameter), thick-walled sampler driven in accordance with ASTM D1586-84 (Penetration Test and Split-Barrel Sampling of Soils). The N-value, reported in blows per foot, equals the number of blows required to drive the split-barrel sampler over the last 12-inches of a normal 18-inch sampling interval.

The field boring logs were prepared by an experienced soils engineer in accordance with ASTM D2488-00, (Description of Soils by the Visual-Manual Procedure). Stratification lines represent the approximate boundary between soil types. In situ, the transition between sediments may be gradual.

LABORATORY TESTING

The field boring logs were reviewed to outline the depth, thickness, and extent of each soil stratum encountered. Based on site stratigraphy and the construction proposed, a testing program was established to evaluate the engineering properties of the bearing strata. Specific tests performed include:

- Moisture Contents
- Unit Weight Determinations
- Unconfined Compression Tests
- One Dimensional Consolidation Tests
- #200 Washed Sieve Analysis
- Atterberg Limits Testing

All tests were conducted in general accordance with current ASTM or state-of-the-art test procedures. Laboratory test results are presented in Appendix C.

Moisture contents and unit weight determinations were used to determine the overall uniformity/variability of the soils for the evaluation of bearing capacity and settlement.

Unconfined compression tests define the stress versus strain characteristics and related shear strengths of the soil.

The One-Dimensional Consolidation test defines the load/settlement relationship of the bearing soils.

Atterberg limits and the #200 washed sieve analysis were used to determine plasticity characteristics and to classify the soils using the Unified Soil Classification System (USCS).

Based on the results of this testing program, the field logs were reviewed and supplemented as shown in Appendix B. These final logs represent our interpretation of the field logs and reflect the additional information gained from the laboratory testing program.

SITE CONDITIONS

The proposed parcel is relatively level consisting of ag land currently being used for row crop production. Currently there is approximately 2 feet of variance in elevation across the site, with general site drainage towards the southeast. No sign of prior development was noted on the surface of the site.

SOIL CONDITIONS

This site is situated just adjacent to the Historic Platte River flood plain. The generalized subsurface profile for this area consists of wind deposited Loessal soils atop water deposited soils of various ages. To the depth investigated, the soils encountered on this site consist of development zone soils (approximately 6 inches) which overlies cohesive Fill material and Colluvial sediments. Below these materials, wind deposited Peorian Age Loess deposits and Aeolian Sands were encountered atop Alluvial Sand.

Fill material was encountered below the development zone in boring locations DH-2 thru DH-5, extending to depths of 5, 3, 1 and 3 feet, respectively. These deposits were described as dark grey brown, grey brown and dark brown, moist, firm to stiff, lean clays with trace amounts of fine sand and gravel. It appears this fill is the result of land leveling performed to allow for gravity irrigation. In the areas sampled these sediments exhibit the following range in in-situ engineering properties:

Moisture Content (%)	20 – 24
Dry Unit Weight (pcf)	86 - 100
Unconfined Compressive Strength (tsf)	11.4
Plastic Index	21

Based on Atterberg Limits testing and visual evaluation, these deposits classified as moderately plastic lean clays (CL).

Colluvial deposits were encountered directly below the development zone in boring locations DH-1 and DH-6 and the surface fill material in boring location DH-4, extending to depths of about 3 ½, 3 and 4 feet below existing grades. These sediments were described as dark grey brown and dark olive brown, moist, firm, lean clays. These sediments exhibit the following in-situ engineering properties:

Moisture Content (%)	24
Dry Unit Weights (pcf)	100

These deposits visually classify as moderately plastic lean (CL) soils.

Altered Loess (Peorian Age) deposits were encountered below the Fill material and Colluvial deposits in all 6 borings, extending to depths of 12 to 24 feet below existing grades. These sediments were described as light brown, olive, light grey brown, olive grey and light grey, moist to very moist, firm to stiff, lean clays with trace fine sands. Specific in-situ engineering properties are as follows:

Moisture Contents (%)	17 – 32
Dry Unit Weight (pcf)	83 – 99
Plastic Index (PI)	17
Percent Passing #200 Sieve (%)	97 – 98
Unconfined Compressive Strength (tsf)	0.6 – 3.4

Based on Atterberg Limits testing and visual evaluation, these deposits classified as low to moderately plastic lean clays (CL) with trace fine sands.

Alluvial sands were encountered below the wind deposited Loessal soils and Aeolian sands and extending, beyond the bottom of the 25 foot borings. These sediments were described as light grey brown and light brown, slightly moist, firm, poorly graded sands. Specific in-situ engineering properties are as follows:

Moisture Contents (%) 2
Material Passing #200 Sieve (%) 3
SPT Blow Counts (N) ..... 15 – 33

Based on laboratory testing and visual evaluation, these deposits classified non plastic poorly graded fine sand (SP).

GROUNDWATER

At the time of drilling, groundwater was not encountered within the maximum 25 foot boring depths and consequently not expected to significantly impact the slab on grade construction expected at this time. It must be recognized, however, that fluctuations in groundwater level may occur due to seasonal variations in rainfall, surface runoff, temperature, or other factors not evident at the time measurements were made.

Based on the site proximity to the Platte River, seasonal fluctuation on the order of 2 to 4 feet are typical in this region. Seasonal high groundwater levels typically occur in the spring prior to the start of the irrigation season. Long term monitoring would be required to determine seasonal and historical high water levels.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

Based on the soil conditions indicated, this site appears well suited for the planned development. The site soils are generally capable of supporting most one and two story structures and groundwater was not encountered across the site and is not expected to impact the anticipated construction. Based on the elevation variance across the site, site grading will be required to level the site and provide surface drainage away from the structure.

In summarizing, site stratagraph consist of cohesive soils extending about to 14 feet in the southeastern borings and up to 24 feet in the northwestern borings. The site soils generally consist of cohesive lean clay soil which overlie relatively clean, fine Alluvial sands. Groundwater was not encountered within the 25 foot boring at the time of drilling and is not expected to be a factor for construction of the slab on grade structure.

The primary concern for site development is the surface fill which isn't up to industry standard for commercial development. Depending on the final building location, some removal and replacement may be required. Due to the limited extent of this material it's expected it will have minimal impact on project development. We recommend, all subgrades and excavations should be observed

by the engineer prior to placing fill, backfilling excavations or concrete placement. Without detailed loading conditions and an exact location of the structure, generally the primary concerns for site development are the variable soil conditions across the site and the cohesive nature of upper site soils.

While building elevations have not yet been determined, it is anticipated the site will be elevated a minimum of 2 to 3 feet to provide drainage off and away from the proposed structure. Consequently, it appears foundation elements will bear within the cohesive soils present across the site.

Due to the cohesive nature of the upper site soils, clean sand fill is not recommended for use as structural fill below exterior building foundations and parking and drive areas. Any open graded granular fill at the surface can result in perched water within the fill which leads to excessive/progressive frost heave and softening of the bearing soils. While groundwater does not appear to be a major concern, due to the cohesive nature of the site soils, we recommend a perimeter drain tile system and waterproofing be provided for any below grade structures (pools, basements, elevator pit, etc.).

Recommendations regarding these and other aspects of this project are included in the following sections of this report.

FOUNDATION ANALYSIS

If the recommendations presented in this report are followed, this site appears suitable for use of a conventional shallow foundation system for most one and two story structures. The selection of an allowable soil bearing pressure for foundation design must fulfill two requirements. First, structural loads must be sufficiently less than the ultimate bearing capacity of the foundation to insure stability. Second, settlement must not exceed an amount, which will produce adverse behavior of the superstructure.

In order to meet the previous criteria, we have explored both the bearing capacity and load settlement characteristics of the on-site soil, assuming maximum loads of 6 klf for walls and 150 kips for isolated column footings. A maximum total settlement of 1 inch and differential settlements of ½ to 5/8 inch are generally considered acceptable and were used in our analysis. The allowable bearing pressure is expressed in terms of the net pressure transferred to the soil.

The final foundation design will be dependent on the actual foundation loads and site specific soil conditions. At this time, it appears the majority of the site is capable of supporting most one or two story structure with minimal site improvements. Based on the soil conditions indicated in this preliminary evaluation a soil bearing capacity on the order of 2000 to 3000 psf is indicated for most light to moderate foundation loads (5 klf wall loads and 100 kip column loads). Heavier loads may require several feet of structural fill below the footings to reduce potential settlement and increase the design soil bearing capacity.

We recommend exterior footings and footings in unheated areas be founded at a minimum depth of 40 inches below surrounding grade for frost protection. Interior footings may be placed directly below the floor slab. All footings will require steel reinforcement and should conform to local code sizes.

EARTHWORK AND EXCAVATIONS

Prior to overall site grading, we recommend all topsoil and vegetation be stripped from site. In addition we recommend an additional 1 foot of old fill material (if encountered) be removed and the resultant subgrade scarified, moisture condition and recompacted in the presence of the Engineer. Any instability detected during performance of this work will need to be addressed as recommended by the soils engineer.

At this time it is unknown weather structural fill for this project will be obtained from an on-site or off-site borrow source. It's expected that all on-site soils will be suitable for use as structural fill for this project. We recommend structural fill for this project consist of select clean lean clay soils having a Plastic Index between 12 and 25.

We recommend fill and backfill material below foundations and floor slabs be placed in loose lifts of 8-inches or less, with each lift compacted with a sheepsfoot type compactor. Based on expected structural loads, we recommend structural fill be compacted to a minimum of 95 percent of the material's standard proctor maximum dry density (ASTM D698-00). For ease of construction, we recommend soil moisture at the time of compaction be controlled within -3 and +3 percent of optimum.

Vertical cuts and excavations may stand for short periods but should not be considered stable in any case. The soils encountered in the soil borings classify as type B and C soils according to OSHA's Construction Standards for Excavations. In general, the maximum allowable slope for shallow excavations in a type B soil is 1H:1V and a type C soil is 1½H:1V. Trenching and excavation activities should conform to federal and local regulations. Based on the soil conditions encountered, vertical excavations will be acceptable for cuts up to six (6) feet.

FLOOR SLAB SUBGRADES

Based on the soil conditions indicated, we recommend providing a minimum of eighteen (18) inches of select structural fill below floor slabs. Structural fill will need to consist of materials placed as outlined in the "Earthwork and Excavations" section of this report. More stringent requirements may be required if design loads exceed those indicated at this time.

PAVEMENT SUBGRADES

Pavement performance is directly affected by the degree of compaction, uniformity, and stability of subgrade soils. This is particularly important where heavy traffic is expected. Based on traffic

consisting of light truck and car traffic with the occasional heavy truck, we recommend providing a minimum of 18 inches of structural fill below all exterior parking and drive areas.

We recommend structural fill below paving be compacted to a minimum of 95 percent of the material's standard Proctor maximum dry density (ASTM D-698), with soil moisture controlled between +/- 3% of optimum (ASTM D-698). We recommend structural fill consist of materials as outlined in the "Earthwork and Excavations" section of this report.

Based on our experience with similar sites and the proposed site covering a vast area with variable soil conditions (Fill and Natural soils) at the surface, we recommend all excavated subgrades be proof-rolled in the presence of the engineer prior to placing structural fill below pavement sections. Instability issues detected will need to be addressed as directed by the engineer.

For a subgrade consisting of the recommended select lean clay soils, a soaked CBR of four (4) and a corresponding modulus of subgrade reaction (k for pavements) of 125 pci is recommended for pavement design. Pavement thickness should be determined based on traffic volume and standard pavement design procedures. In no instance should concrete paving be less than 6 inches in thickness.

We recommend Portland cement concrete be air-entrained (5 – 7 ½ percent) and have a minimum compressive strength of 4000 psi (600 psi flexural strength). State of Nebraska Type 47B concrete has proven to be very durable in this area.

SURFACE DRAINAGE

The success of a shallow foundation system is contingent upon keeping the subgrade soils at relatively constant moisture content and by not allowing surface drainage to migrate to bearing soils. Positive surface drainage away from structures must be maintained at all times.

During construction, temporary grades should be established to prevent runoff from entering excavations or footing trenches. Backfill should be placed when structural strength requirements are met and should be graded to drain away from the construction zone. Due to the moisture sensitive nature of bearing soils across this site, sand backfill should not be allowed on this project.

The final grade of foundation backfill and any overlying pavement should have a positive slope away from foundation walls on all sides. A minimum slope of 1-inch per foot for the first 5 to 10 feet is recommended. The slope may be decreased if the ground surface adjacent to foundations is covered with concrete slabs or asphalt pavement. A minimum slope of 2% is recommended for all other areas of the site. Pavements and exterior slabs next to structures should be carefully sealed against moisture intrusion at the joints.

GENERAL COMMENTS

The intent of this evaluation was to obtain a general representation of the Geologic/Engineering characteristics of the site soils relative to the planned development.

The analysis and recommendations submitted in this report are based, in part, on the data obtained from the six (6) soil borings. The information compiled in this report was conducted in a large parcel of land with no specific building location specified at this time. Based on the variable soil conditions present across the site, we recommend a formal Geotechnical evaluation be completed once a specific design location and structural loads have been determined.

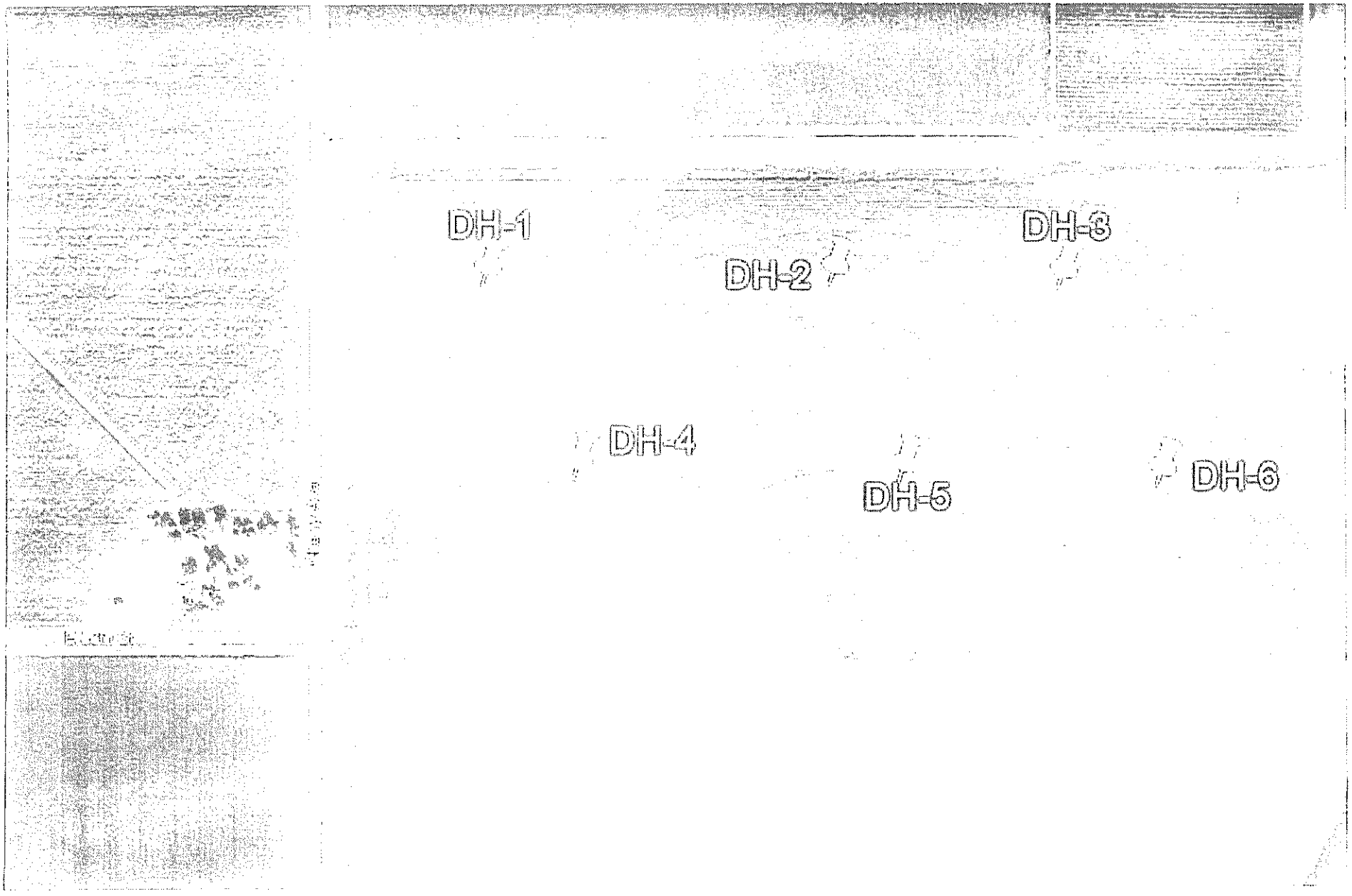
Respectfully submitted,
Mid-State Engineering and Testing, Inc.

Scott A. Barnett, P.E.
Nebraska Reg. #E-13769

Reviewed by;

Jim Musilek, P.E.
Nebraska Reg.# E-5935

APPENDIX A
BORING LOCATION PLAN



MID-STATE
ENGINEERING & TESTING
11 EAST 11TH STREET
KEARNEY, NE 68847

BORING LOCATION PLAN

PROPOSED VETERANS HOME
KEARNEY, NEBRASKA
M.S. PROJECT NO. 133-01-20

APPENDIX B
BORING LOGS

MID-STATE ENGINEERING & TESTING, INC.

BORING LOG

PROJECT: Veterans Home
LOCATION: Kearney, Nebraska
JOB NO.: 133-01-20
DATE: 5/21/2013

DRILL HOLE NO.	LOCATION OF DRILL HOLE	ELEVATION	DATUM	TOTAL DEPTH
DH-1	N 40 43' 50.80" W 99 01' 30.30"			25.0'

WATER LEVEL OBSERVATIONS			TYPE OF SURFACE	DRILLER
WHILE DRILLING	END OF DRILLING	HOURS	Corn Field	Mid-State Engineering
			DRILLING METHOD	LOGGER
None			4" Continuous Flight Auger	Jim Musilek

DEPTH FT	SAMPLE NO. & TYPE	N° BLOWS / FT	REC %	COLOR	MOIST	CONS.	SOIL TYPE (Class)	GEOLOGIC DESCRIPTION & OTHER REMARKS	MOIST %	DRY WEIGHT PCF	QU TSF	DEPTH FT
								Topsoil				
	U-1			Dk Gr Brn	Moist	Firm	CL	**COLLUVIAL DEPOSITS** w/ Roots and Root Holes				
				Dark Olive Brown		Stiff						
	U-2			Light Brn	Moist	Stiff	CL	**ALTERED LOESS (Peorian Age)** w/ Root Holes, Rust Stains, Calcium Concretions	16.3	82.7	1.1	
5												5
					Very Moist							
	U-3											
10									28.7	97.3		10
						Firm						
	U-4											
15									25.6	89.3		15
				Olive				w/ More Rust				
	U-5											
20									28.9			20
				Light Grey Brown	Slightly Moist	Firm	SP/SM	**ALLUVIAL SAND** Fine Sand				
							SP					
25	S-6	12/12/14 (26)										25
								Bottom of Hole 25.0'				
30												30
35												35

MID-STATE ENGINEERING & TESTING, INC.

BORING LOG

PROJECT	Veterans Home
LOCATION	Kearney, Nebraska
JOB NO.	133-01-20
DATE	5/21/2013

DRILL HOLE NO.	LOCATION OF DRILL HOLE	ELEVATION	DATUM	TOTAL DEPTH
DH-2	N 40 43' 50.80" W 99 01' 18.20"			25'

WATER LEVEL OBSERVATIONS			TYPE OF SURFACE	DRILLER
WHILE DRILLING	END OF DRILLING	HOURS	Corn Field	Mid-State Engineering
			DRILLING METHOD	LOGGER
None			4" Continuous Flight Auger	Jim Musilek

DEPTH FT.	SAMPLE NO. & TYPE	N" BLOWS / FT	REC %	COLOR	MOIST	CONS.	SOIL TYPE (Class)	GEOLOGIC DESCRIPTION & OTHER REMARKS	MOIST %	DRY WEIGHT PCF	QU TSF	DEPTH FT.
								Topsoil				
	U-1			Dark Grey Brown	Moist	Stiff	CL	**OLD FILL MATERIAL** w/ Trace Gravel				
	U-2			Grey Brn					19.5	86.2	1.4	
5				Light Grey Brown	Moist	Stiff	CL	**ALTERED LOESS (Peorian Age)** w/ Rust Stains Carbon Spots				5
	U-3											
10									24.6	92.9		10
	U-4											
15									25.2	95.5		15
				Olive Grey	Very Moist	Firm		More Rust				
	U-5											
20									28.5	93.9		20
	S-6	10/11/13 (24)		Light Brn	Slightly Moist	Firm	SP	**ALLUVIAL SAND**				
25												25
								Bottom of Hole 25'				
30												30
35												35

MID-STATE ENGINEERING & TESTING, INC.

BORING LOG

PROJECT	Veterans Home
LOCATION	Kearney, Nebraska
JOB NO.	133-01-20
DATE	5/21/2013

DRILL HOLE NO.	LOCATION OF DRILL HOLE	ELEVATION	DATUM	TOTAL DEPTH
DH-3	N 40 43' 50.70" W 99 01' 1030"			25'

WATER LEVEL OBSERVATIONS			TYPE OF SURFACE	DRILLER
WHILE DRILLING	END OF DRILLING	HOURS	Corn Field	Mid-State Engineering
			DRILLING METHOD	LOGGER
None			4" Continuous Flight Auger	Jim Musilek

DEPTH FT.	SAMPLE NO. & TYPE	N" BLOWS / FT	REC %	COLOR	MOIST	CONS.	SOIL TYPE (Class)	GEOLOGIC DESCRIPTION & OTHER REMARKS	MOIST %	DRY WEIGHT PCF	QU TSF	DEPTH FT.
								Topsoil				
	U-1			Dark Brn	Moist	Firm	CL	**OLD FILL MATERIAL**	24.2			
	U-2			Light Grey Brown	Moist	Stiff	CL	**ALTERED LOESS (Peorian Age)** w/ Rust Stains Calcium Concretions Carbon Spots	22.4	95.7	1.9	
5												5
	U-3								28.6			
10												10
				Light Brn	Slightly Moist	Firm	SP	**ALLUVIAL SAND** Fine Grained Sand				
	S-4	8/16/17 (33)										
15												15
	S-5	6/7/8 (15)							1.6			
20												20
	S-6	8/9/13 (22)										
25												25
								Bottom of Hole 25'				
30												30
35												35

MID-STATE ENGINEERING & TESTING, INC.

BORING LOG

PROJECT	Veterans Home
LOCATION	Kearney, Nebraska
JOB NO.	133-01-20
DATE	5/21/2013

DRILL HOLE NO.	LOCATION OF DRILL HOLE	ELEVATION	DATUM	TOTAL DEPTH
DH-4	N 40 43' 45.70 W 99 01' 27.20"			25'

WATER LEVEL OBSERVATIONS			TYPE OF SURFACE	DRILLER
WHILE DRILLING	END OF DRILLING	HOURS	Corn Field	Mid-State Engineering
			DRILLING METHOD	LOGGER
None			4" Continuous Flight Auger	Jim Musilek

DEPTH FT.	SAMPLE NO. & TYPE	N" BLOWS / FT	REC %	COLOR	MOIST	CONS.	SOIL TYPE (Class)	GEOLOGIC DESCRIPTION & OTHER REMARKS	MOIST %	DRY WEIGHT PCF	QU TSF	DEPTH FT.
				Dark Brn	Moist	Firm	CL	Topsoil				
				Dark Brn	Moist	Firm	CL	FILL MATERIAL				
	U-1			Dark Brn	Moist	Firm	CL	**COLLUVIAL DEPOSITS**				
				Light Brn Grey	Moist	Stiff	CL	**ALTERED LOESS (Peorian Age)** w/ Rust Stains Carbon Spots	20.0	99.4	3.4	
5	U-2											5
	U-3			Light Grey	Very Moist				24.2	97.4		
10												10
	U-4								27.8			
15												15
				Olive Gr								
	U-5								31.5	88.8		
20												20
25	S-6	15/12/13 (25)		Light Brn	Slightly Moist	Firm	SP	**ALLUVIAL SAND**				25
								Bottom of Hole 25'				
30												30
35												35

MID-STATE ENGINEERING & TESTING, INC.

BORING LOG

PROJECT	Veterans Home
LOCATION	Kearney, Nebraska
JOB NO.	133-01-20
DATE	5/21/2013

DRILL HOLE NO.	LOCATION OF DRILL HOLE	ELEVATION	DATUM	TOTAL DEPTH
DH-5	N 40 43' 45.60" W 99 01' 15.80"			25'

WATER LEVEL OBSERVATIONS			TYPE OF SURFACE	DRILLER
WHILE DRILLING	END OF DRILLING	HOURS	Corn Field	Mid-State Engineering
			DRILLING METHOD	LOGGER
None			4" Continuous Flight Auger	Jim Musilek

DEPTH FT.	SAMPLE NO. & TYPE	N° BLOWS / FT	REC %	COLOR	MOIST	CONS.	SOIL TYPE (Class)	GEOLOGIC DESCRIPTION & OTHER REMARKS	MOIST %	DRY WEIGHT PCF	QU TSF	DEPTH FT.
							CL	**Topsoil**				
	U-1			Dark Grey Brown	Moist	Firm	CL	**OLD FILL MATERIAL** w/ Trace Gravel	24.2	99.7		
5	U-2			Light Grey Brown	Very Moist	Firm	CL	**ALTERED LOESS (Peorian Age)** w/ Rust and Carbon Spots	28.9	87.0	0.6	5
10	U-3								30.1	89.9	0.9	10
				Light Brn	Slightly Moist	Firm	SP	**ALLUVIAL SAND** Fine Grained				
15	S-4	8/7/13 (20)										15
20	S-5	8/12/18 (30)										20
25	S-6	10/10/13 (23)										25
								Bottom of Hole 25'				
30												30
35												35

MID-STATE ENGINEERING & TESTING, INC.

BORING LOG

PROJECT: Veterans Home
LOCATION: Kearney, Nebraska
JOB NO.: 133-01-20
DATE: 5/21/13

DRILL HOLE NO	LOCATION OF DRILL HOLE	ELEVATION	DATUM	TOTAL DEPTH
DH-6	N 40 43' 45.5" W 99 01' 06.90"			25'

WATER LEVEL OBSERVATIONS			TYPE OF SURFACE	DRILLER
WHILE DRILLING	END OF DRILLING	HOURS	Corn Field	Mid State Engineering
			DRILLING METHOD	LOGGER
None			4" Contiunious Flight Auger	Jim Musilek

DEPTH FT.	SAMPLE NO. & TYPE	N" BLOWS / FT	REC %	COLOR	MOIST	CONS.	SOIL TYPE (Class)	GEOLOGIC DESCRIPTION & OTHER REMARKS	MOIST %	DRY WEIGHT PCF	QU TSF	DEPTH FT.
								Topsoil				
	U-1			Dark Grey Brown	Moist	Firm	CL	**COLLUVIAL DEPOSITS** w/ Carbon and Rust Stains	26.0			
5	U-2			Light Grey Brown	Moist	Stiff	CL	**ALTERED LOESS (Peorian Age)** w/ Rust	25.5	92.3	1.0	5
10	U-3			Light Grey	Very Moist	Firm			28.4	92.8		10
					Moist							
15	U-4			Light Brn	Slightly Moist	Firm	SP	**ALLUVIAL SAND** Fine Grained	21.8	98.9		15
20	S-5	7/8/11 (19)										20
25	S-6	9/10/12 (22)							20.0			25
								Bottom of Hole 25'				
30												30
35												35

APPENDIX C
SUMMARY OF SOILS TEST

MID-STATE ENGINEERING & TESTING, INC.

SUMMARY OF SOILS TESTING

PROJECT	Proposed Veterans Home
LOCATION	Kearney, Nebraska
JOB NO.	133-01-20
DATE	5/24/2013

DRILL HOLE NO.	SAMPLE NO.	SAMPLE DEPTH (ft.)	WATER CONTENT %	DENSITY WET (pcf)	DENSITY DRY (pcf)	VOID RATIO (e)	SAT (%)	UNCONFINED COMPRESSION QU (tsf)	UNCONFINED COMPRESSION Strain (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	%PASS #200 SIEVE	CLASS.	SPT BLOW COUNTS	REMARKS
DH-1	U-1	1/2 - 2'														
	U-2	3 1/2 - 5'	16.7	96.6	82.7	1.037	44	1.1	0.8							
	U-3	8 1/2 - 10'	23.7	120.4	97.3	0.732	87									
	U-4	13 1/2 - 15'	25.6	112.1	89.3	0.887	78									
	U-5	18 1/2 - 20'	28.9													
	S-6	23 1/2 - 25'													26	
DH-2	U-1	1/2 - 2'								41	20	21		CL		
	U-2	3 1/2 - 5'	19.5	103.0	86.2	0.955	55	1.4	1.6							
	U-3	8 1/2 - 10'	24.6	115.7	92.9	0.814	82			38	21	17		CL		
	U-4	13 1/2 - 15'	25.2	119.6	95.5	0.764	89									
	U-5	18 1/2 - 20'	28.5	120.7	98.9	0.794	97									
	S-6	23 1/2 - 25'													24	
DH-3	U-1	1/2 - 2'	24.2													
	U-2	3 1/2 - 5'	22.4	117.2	95.7	0.761	80	1.9	2.5							
	U-3	8 1/2 - 10'	28.6													
	S-4	13 1/2 - 15'													33	
	S-5	18 1/2 - 20'	1.6										3.1		15	Washed Sieve Analysis
	S-6	23 1/2 - 25'													22	

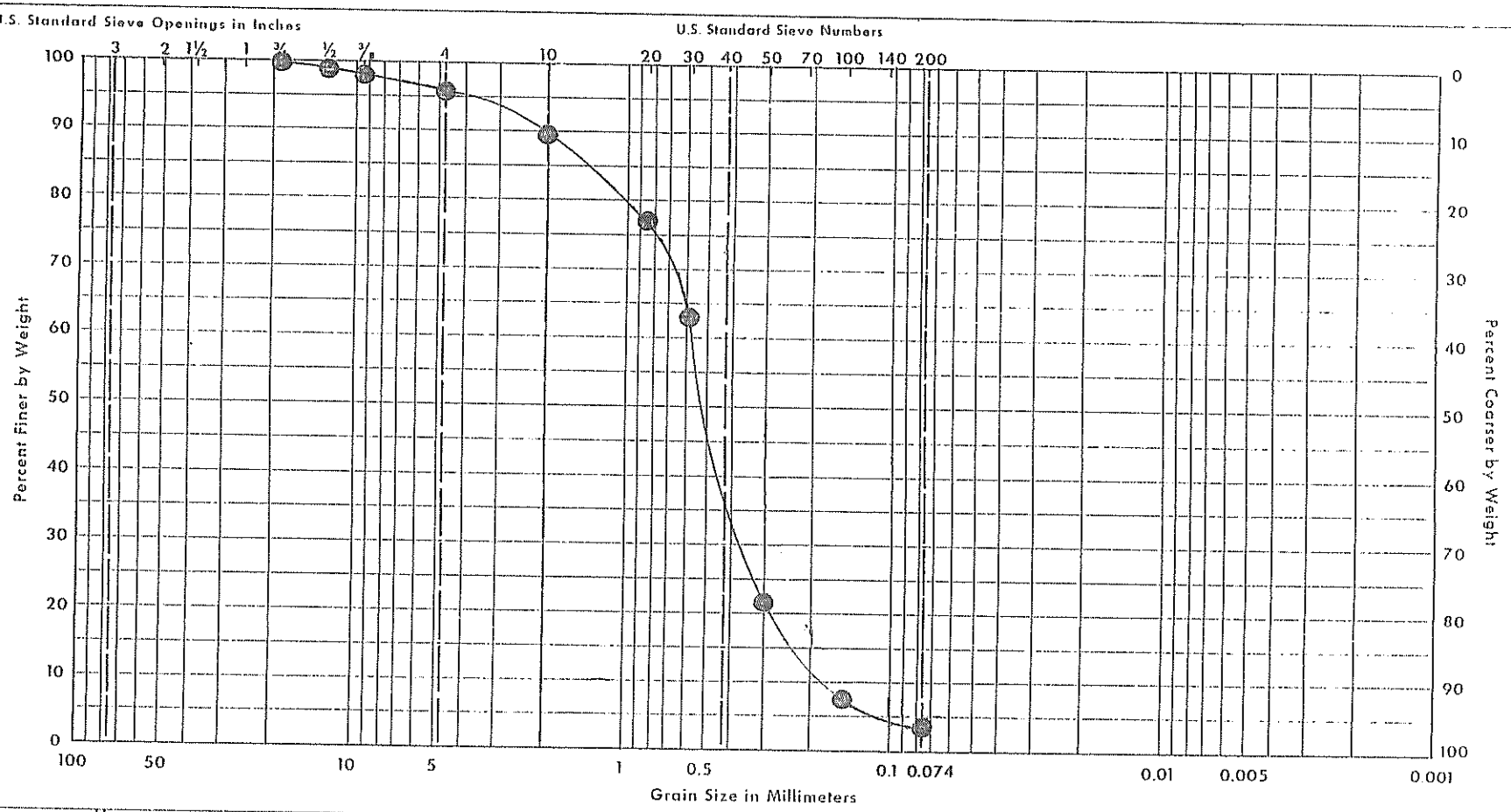
MID-STATE ENGINEERING & TESTING, INC.

SUMMARY OF SOILS TESTING

PROJECT	Proposed Veterans Home
LOCATION	Kearney, Nebraska
JOB NO.	133-01-20
DATE	5/24/2013

DRILL HOLE NO.	SAMPLE NO.	SAMPLE DEPTH (ft.)	WATER CONTENT %	DENSITY WET (pcf)	DENSITY DRY (pcf)	VOID RATIO (e)	SAT (%)	UNCONFINED COMPRESSION QU (tsf)	UNCONFINED COMPRESSION Strain (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PL	ATTERBERG LIMITS PI	%PASS #200 SIEVE	CLASS.	SPT BLOW COUNTS	REMARKS
DH-4	U-1	1/2 - 2'														
	U-2	3 1/2 - 5'	20.0	119.3	99.4	0.695	78	3.4	2.1				97.3			
	U-3	8 1/2 - 10'	24.2	121.0	97.4	0.730	89									
	U-4	13 1/2 - 15'	27.8													
	U-5	18 1/2 - 20'	31.5	116.8	88.8	0.897	95									
	S-6	23 1/2 - 25'													25	
DH-5	U-1	1/2 - 2'	24.2	123.8	99.7	0.690	95									
	U-2	3 1/2 - 5'	28.9	112.1	87.0	0.937	83	0.6	8.0				98.4			
	U-3	8 1/2 - 10'	30.1	117.0	89.9	0.874	93	0.9	6.3							
	S-4	13 1/2 - 15'													20	
	S-5	18 1/2 - 20													30	
	S-6	23 1/2 - 25													23	
DH-6	U-1	1/2 - 2'	26.0													
	U-2	3 1/2 - 5'	22.5	113.1	92.3	0.825	74	1.0	1.3							
	U-3	8 1/2 -10'	28.4	119.2	92.8	0.816	94									
	U-4	13 1/2 - 15'	21.8	120.4	98.9	0.704	84									
	S-5	18 1/2 - 20'													19	
	S-6	23 1/2 - 25'	2.0												22	

GRAIN SIZE ANALYSIS CURVES



UNIFIED	GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	FINES	
AASHO	GRAVEL		COARSE SAND	FINE SAND	SILT	CLAY

Drill Hole	Sample No.	Sample Depth	LL	PL	PI	Water Cont.%	Classification
DH-3	S-5	18½-20'	NP	NP	NP	1.6	w/o 1" Stone

Project: Veterans Home

Date: 5/24/13 Job No: 133-01-20

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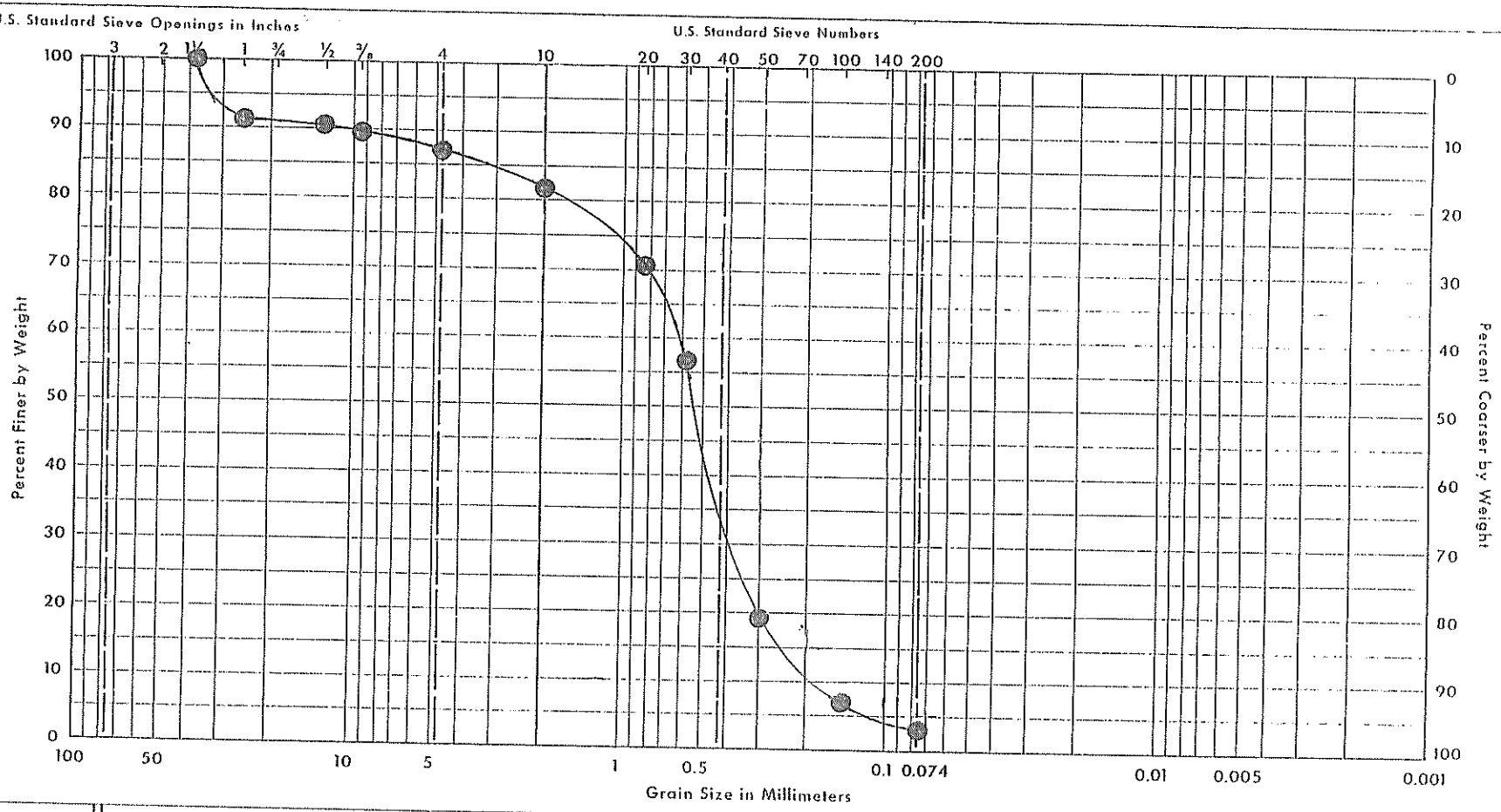
GRAIN SIZE ANALYSIS CURVES



UNIFIED	GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	FINES	
AASHO	GRAVEL		COARSE SAND	FINE SAND	SILT	CLAY

Drill Hole	Sample No.	Sample Depth	LL	PL	PI	Water Cont.%	Classification
DH-3	S-5	18½-20'	NP	NP	NP	1.6	w/ 1" Stone

Project: Veterans Home

Date: 5/24/13 Job No: 133-01-20

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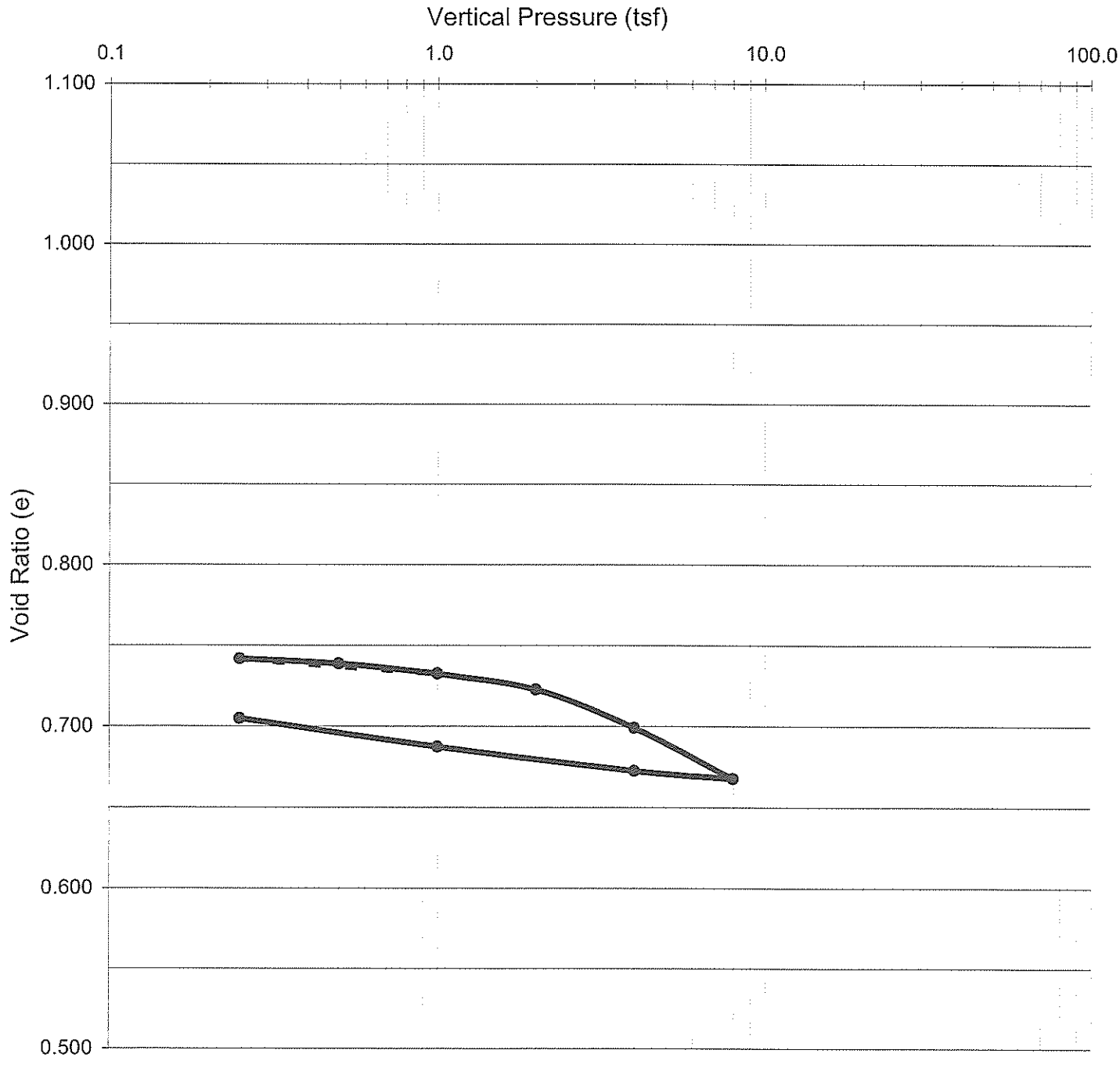
MID-STATE ENGINEERING & TESTING 11 EAST 11TH ST. KEARNEY, NE	Project: Vet Home	
	Location: Kearney, NE	
	Job No. 133-01-20	Date: 5/22/2013

CONSOLIDATION TEST

Drill Hole # DH-2 Sample # U-3 Sample Depth Interval 8 1/2 - 10'

Sample Description Light Grey Brown Lean Clay w/ mottling, carbon stains, carbonate nodules

Initial Water Content (%)	24.2	Dry Unit Weight (pcf)	96.7	Initial Saturation (%)	87.8
Final Water Content (%)	25.1	Specific Gravity (Assumed)	2.70		
Liquid Limit	38	Plastic Limit	21	Plasticity Index	17
Classification	CL				



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ENGINEERING & TESTING, INC.
279 ROAD 'D', COLUMBUS, NE. 68601

SOIL PROPERTIES

UNIFIED SOILS CLASSIFICATION

(Including Identification and Description)

Group Symbols	Typical Names	Values as Subgrade When No Subject to Frost Action	Potential Frost Action	Compressibility and Expansion	Drainage Characteristics	Compaction Equipment	Compacted Dry Unit Weight (pcf) ASTM-D-698	Typical Design Values	
								CBR	Subgrade Modulus k lb. per cu. in.
GW	Well-graded gravels, gravel-Sand mixture, little or no fines	Excellent	None to Very Slight	Almost None	Excellent	Crawler-type tractor, rubber tired roller, steel-wheeled roller	125-140	40-80	300-500
GP	Poorly graded gravels, gravel-sand mixtures, little or no fines	Good to Excellent	None to Very Slight	Almost None	Excellent	Crawler-type tractor, rubber tired roller, steel-wheeled roller	110-140	30-60	300-500
GM	Silty gravels, gravel-sand-silt mixtures, <50% Silts & Clays	Good to Excellent	Slight to Medium	Slight	Fair to Poor	Rubber-tired roller Sheepfoot roller	115-135	20-60	200-500
GC	Clayey gravels, gravel-sand-clay mixtures, <50% Silts & Clays	Good	Slight to Medium	Slight	Poor to Practically Impervious	Rubber-tired roller Sheepfoot roller	130-145	20-40	200-500
SW	Well-graded sands, gravely sands, little or no fines	Good	None to Very Slight	Almost None	Excellent	Crawler-type tractor rubber-tired roller	110-130	20-40	200-400
SP	Poorly-graded sands, gravely sands, little or no fines	Fair to Good	None to Very Slight	Almost None	Excellent	Crawler-type tractor rubber-tired roller	105-135	10-40	150-400
SM	Silty sands, sand-silt mixtures <50% Silts & Clays	Fair to Good	Slight to High	Slight	Fair to Poor	Rubber-tired roller Sheepfoot roller	120-135	15-40	150-400
SC	Claycy sands, sand-clay mixtures <50% Silts & Clays	Poor to Fair	Slight to High	Slight to Medium	Poor to Practically Impervious	Rubber-tired roller Sheepfoot roller	100-135	5-20	100-300
ML	Inorganic silts and very fine sands rock flour, silty fine sands or claycy silts with slight plasticity	Poor to Fair	Medium to Very High	Slight to Medium	Fair to Poor	Rubber-tired roller Sheepfoot roller, close control of moisture	100-120	15 or Less	100-200
CL	Inorganic clays of low to medium plasticity, gravely clays, sandy clays, silty clays, lean clays	Poor to Fair	Medium to High	Medium	Practically Impervious	Rubber-tired roller Sheepfoot roller	90-130	15 or Less	50-150
OL	Organic silts and organic silty clays of low plasticity	Poor	Medium to High	Medium to High	Poor	Rubber-tired roller Sheepfoot roller	90-105	5 or Less	50-100
MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	Poor	Medium to Very High	High	Fair to Poor	Sheepfoot roller Rubber-tired roller	90-105	10 or Less	50-100
CH	Inorganic clays or high plasticity fat clays	Poor to Fair	High	High	Practically Impervious	Sheepfoot roller Rubber-tired roller	90-115	15 or Less	50-150
OH	Organic clays of medium to high plasticity, organic silts	Poor to Very Poor	High	High	Practically Impervious	Sheepfoot roller Rubber-tired roller	80-110	5 or Less	25-100
Pt	Peat and other highly organic soils	Not Suitable	Very High	Very High	Fair to Poor	Compaction Not Practical			