NAVARRO COUNTY COMMISSIONER'S COURT

A Special meeting of the Navarro County Commissioner's Court was held on Friday, the 17th day of April, 2015 at 10:00 a.m., in the Courtroom of the Navarro County Annex Building in Corsicana, Texas. Presiding Judge HM Davenport, Jr. Commissioners present Jason Grant, David Warren and Dick Martin.

1. 10:01 A.M. Motion to convene Friday 17th day of April by Judge Davenport sec by Comm. Warren
   Carried unanimously

2. Opening prayer by Comm. Martin

3. Pledge of Allegiance

4. Motion to approve selecting option 1A for the basement slab replacement by Comm. Grant sec by Comm. Warren ***<u>TO WIT PG 675-703</u>***
   Carried unanimously

5. Motion to go into Executive Session Pursuant to the Texas Government Code Section 551.072 to discuss Real Property by Judge Davenport sec by Comm. Martin
   Carried unanimously
   Motion to come out of Executive Session Pursuant to the Texas Government Code 551.072 to discuss Real Property by Judge Davenport sec by Comm. Warren
   Carried unanimously

6. No action taken on Executive Session Pursuant to the Texas Government Code Section 551.072 to discuss Real Property

7. Motion to adjourn by Comm. Martin sec by Comm. Grant
   Carried unanimously

I, SHERRY DOWD, NAVARRO COUNTY CLERK, ATTEST THAT THE FOREGOING IS A TRUE AND ACCURATE ACCOUNTING OF THE COMMISSIONERS COURT'S AUTHORIZED PROCEEDING FOR APRIL 17th, 2015.

SIGNED 17th DAY OF APRIL 2015.

Sherry Dowd

SHERRY DOWD, COUNTY CLERK

COMMISSIONERS COURT OF NAVARRO COUNTY

675

shaping the built environment

214 PHONE
JQENG.COM

03.23.15

Mr. Thomas Nichols
Eleven Thirteen Architects Inc.
PO Box 1607
Georgetown, Texas 78627

Re: Basement Floor Evaluation
Navarro County Courthouse Restoration, Corsicana Texas
JQ Project No: 3140238.102

Dear Tom:

We have completed the structural and geotechnical review of the existing concrete slab-on-grade and underlying soils in the basement of the Navarro County Courthouse, Corsicana, Texas. The existing slab has experienced significant settlement since originally constructed as indicated by variations of the top surface elevation of the existing slab, evidence of previous concrete toppings to level the slab, and voids beneath the slab exposed during slab removal for installation of underfloor plumbing.

Our findings and recommendations for remediation are as follows:

Geotechnical Investigation

The geotechnical investigation was conducted by Rone Engineering and their findings are contained in the enclosed report no. 15-19883 dated February 13, 2015 and an addendum to that report dated February 18, 2015. The addendum was to address the depth of the existing building foundations which limits the possible depth of subgrade remediation. A summary of their findings follows:

- Voids of approximately 3 inches in depth were found beneath the existing concrete slab-on-grade in two of the three borings. Although no void was found at one boring, the slab in this area has settled which would still indicate settlement of the underlying soils.
- The subgrade soils are relatively dry and have very high plasticity. High plasticity is generally associated with potential for shrink and swell due to moisture variations in the soil.
- The potential vertical movement (PVM) for the underlying soils as determined by Texas Department of Transportation Method 124-E is approximately 6 inches.

- Removal and replacement of the underlying soils with select fill or moisture conditioned on-site soils will reduce the potential for vertical movement, but will not eliminate that potential. Due to the depth of the existing foundation footings and the need to avoid undercutting these footings, the depth of remediation of the subsoil is limited to approximately 4 feet.

Alternatives

Based on the geotechnical findings, the observed conditions and the configuration of the existing construction, the following alternatives are presented. Opinions of probable cost were developed by Phoenix 1 Construction and Restoration and are provided for budgetary purposes. These costs are subject to change based on production of complete construction documents for the selected option and bidding of the work.

- Alternate 1 – Replacement slab-on-grade with minimal subsoil modification
  This alternative is for construction of a new slab on the existing subgrade with new fill placed only if required to obtain finished subgrade elevations. While the slab would be completed at the correct elevation, the potential for vertical movement would remain at 6 inches as no modification of the subsoil would be implemented. Therefore, this alternative has the highest risk for potential future damage to the completed structure and interior finishes. However, as the potential for movement of the existing soils can be minimized by maintaining the current moisture levels in the soil, successful management of drainage and utilities on the site will minimize the risk. This is the least cost alternative with an opinion of probable construction cost of $196,000 for the basement exclusive of the northeast section which is not within the current scope of the renovation. If the northeast section of the basement is included, the opinion of probable construction costs is $315,000.
- Alternate 2 – Replacement slab-on-grade with 4 feet of subsoil modification
  This alternative is for construction of a new slab on a subgrade consisting of 4 feet of new select soils. With removal of 4 feet of the existing highly expansive clay soils with select fill, the potential for vertical movement is estimated to be reduced to 2 inches. Increased depth in excess of 4 feet of replacement of existing high plasticity clays with select fill would reduce the potential for vertical movement, but such replacement is not possible as further excavation would undermine the existing footing foundations. While the 2 inches of movement is a significant reduction from the existing 6 inches of potential vertical movement, some risk for potential future damage to the completed structure and interior finishes would still exist. The opinion of probable construction cost of this option is $1,007,000 for the basement exclusive of the northeast section which is not within the current scope of the renovation. If the northeast section of the basement is included, the opinion of probable construction costs is $1,287,000.
- Alternate 3 – Structurally suspended ground floor
  If future movement of the ground floor slab cannot be tolerated, a structurally suspended floor is required. This structure would consist of an 8 inch thick reinforced concrete slab cast over void forms to allow for movement of the underlying soils and supported on drilled concrete piers spaced at approximately 15 feet on center and founded at depth in the underlying soils. As no soil related movement would be expected, this alternative has the least risk for potential future damage to the completed structure and interior finishes. The opinion of probable construction cost of this option is $944,000. This includes the entire basement as using structurally suspended

floor alongside slab-on-grade in the unrenovated northeast section is not recommended due to possible differential movement at the interface between the two structural systems.

Recommendations

If potential vertical movement can be tolerated, we would recommend alternate 1. Future budgets should include allowances for periodic repair of building finishes which will experience some damage as movement of the underlying soils occurs. If no soil related movement is desired, then a structurally suspended slab and pier foundations will be required. Please review the alternatives with the County and let us know how to proceed.

If you have any questions, please contact me.

Sincerely,
JASTER-QUINTANILLA DALLAS, LLP
TBPE Firm No. F-1294

Stephen H. Lucy, PE
Partner

STATE OF TEXAS
STEPHEN H. LUCY
82420
REGISTERED
PROFESSIONAL ENGINEER

Enclosures

Option 1a - remove entire basement slab, dirtwork as required for proper elevations, new 5" slab w/15 mil vapor barrier

Scope	Qty	Unit	Unit Price	Subtotal
Basement Slab Removal	11480	sf	$7.00	$80,360.00
Basement Slab Installation	11480	sf	$14.60	$167,608.00
Credit for Area of Removal/Replacement in Base Bid	-2265	sf	$16.00	($36,240.00)
Rebuild Walls/Finish Out Northeast Section (not in base bid)	1910	sf	$32.50	$62,075.00
Subtotal				$273,803.00
Phoenix I OH&P				$41,070.45
TOTAL				$314,873.45

Option 1b - remove existing slab (leave northeast section in place, no work in that area), dirtwork as required for proper elevations, new 5" slab w/15 mil vapor barrier

Scope	Qty	Unit	Unit Price	Subtotal
Basement Slab Removal	11480	sf	$7.00	$80,360.00
Basement Slab Installation	11480	sf	$14.60	$167,608.00
Credit for Area of Removal/Replacement in Base Bid	-2265	sf	$16.00	($36,240.00)
Credit for Leaving Northeast Section of Existing Slab	-1910	sf	$21.60	($41,256.00)
Subtotal				$170,472.00
Phoenix I OH&P				$25,570.80
TOTAL				$196,042.80

Option 2a - remove entire basement slab, remove 4' of soil, replace w/select fill, new 5" slab w/15 mil vapor barrier

Scope	Area	Unit	Unit Price	Subtotal
Basement Slab Removal	11480	sf	$7.00	$80,360.00
Remove/Replace Soil	11480	sf	$73.65	$845,502.00
Basement Slab Installation	11480	sf	$14.60	$167,608.00
Credit for Area of Removal/Replacement in Base Bid	-2265	sf	$16.00	($36,240.00)
Rebuild Walls/Finish Out Northeast Section (not in base bid)	1910	sf	$32.50	$62,075.00
Subtotal				$1,119,305.00
Phoenix I OH&P				$167,895.75
TOTAL				$1,287,200.75

Navarro County Courthouse
Basement Slab Replacement Options

3/17/2015

Option 2b - remove existing slab (leave northeast section in place, no work in that area), remove 4' of soil, replace w/select fill, new 5" slab w/15 mil vapor barrier

Scope	Area	Unit	Unit Price	Subtotal
Basement Slab Removal	11480	sf	$7.00	$80,360.00
Remove/Replace Soil	11480	sf	$73.65	$845,502.00
Basement Slab Installation	11480	sf	$14.60	$167,608.00
Credit for Area of Removal/Replacement in Base Bid	-2265	sf	$16.00	($36,240.00)
Credit for Leaving Northeast Section of Existing Slab	-1910	sf	$95.25	($181,927.50)
Subtotal				$875,302.50
Phoenix I OH&P				$131,295.38
TOTAL				$1,006,597.88

Option 3 - remove entire basement slab, install micro-piles (15' max o.c.), new 8" slab on void form

Scope	Area	Unit	Unit Price	Subtotal
Basement Slab Removal	11480	sf	$7.00	$80,360.00
Micro-pile Installation - ALLOWANCE	60	ea	$7,800.00	$468,000.00
Basement Slab Installation	11480	sf	$21.45	$246,246.00
Credit for Area of Removal/Replacement in Base Bid	-2265	sf	$16.00	($36,240.00)
Rebuild Walls/Finish Out Northeast Section (not in base bid)	1910	sf	$32.50	$62,075.00
Subtotal				$820,441.00
Phoenix I OH&P				$123,066.15
TOTAL				$943,507.15

680

GEOTECHNICAL ENGINEERING REPORT
NAVARRO COUNTY COURTHOUSE
CORSICANA, TEXAS

Prepared For:

Jaster Quintanilla
2105 Commerce Street
Dallas, Texas 75201

Attention: Mr. Stephen Lucy, P.E.

FEBRUARY 2015

PROJECT NO. 15-19883

681

RONE ENGINEERING

GEOTECHNICAL ENGINEERING
ENVIRONMENTAL CONSULTING
CONSTRUCTION MATERIAL TESTING

February 13, 2015

Mr. Stephen Lucy, P.E.
Jaster Quintanilla
2105 Commerce Street
Dallas, Texas 75201

Re: Geotechnical Engineering Report
Navarro County Courthouse
Corsicana, Texas
Rone Project No. 15-19883

Dear Mr. Lucy:

Submitted herewith are the results of a geotechnical investigation conducted for the referenced project. This investigation was performed in accordance with our proposal P-20710-15 dated January 9, 2015.

This report presents our evaluation of subsurface condition beneath the basement level slab. Results of our field and laboratory investigation are submitted in detail in the Appendix section of the report.

We appreciate the opportunity to be of service to you on this project, and we would appreciate the opportunity to provide the materials engineering testing and geotechnical observation services during the construction phase of this project. Please contact us if you have any questions or need any additional services.

Respectfully S

STATE OF TEXAS
ABDOL R. SAVABI
113752
LICENSED
PROFESSIONAL ENGINEER
2.13.2015

Reza Savabi, P
Senior Geotec

Mark D. Gray, P.E.
Vice President

Texas Engineering Firm License No. F-1572

682

TABLE OF CONTENTS

APPENDIX A

APPENDIX B

GEOTECHNICAL ENGINEERING REPORT
NAVARRO COUNTY COURTHOUSE
CORSICANA, TEXAS

1.0 INTRODUCTION

The project is located at the address of 300 West 3rd Avenue in Corsicana, Texas. We understand the project consists of evaluating the subsurface conditions beneath the basement level slab. A site vicinity map and geological map are attached as Plates A.1 and A.2, respectively. The general location and orientation of the site are shown on the Boring Location Diagram, Plate A.3, in the Appendix section of this report.

2.0 PURPOSES AND SCOPE OF STUDY

The principal purposes of this investigation were to provide an evaluation of existing subsurface condition beneath the basement level floor slab. To accomplish its intended purposes, the study was conducted in the following phases:

(1) performed sample borings to evaluate the soil conditions at the boring locations and to obtain soil samples;

(2) conducted laboratory tests on selected samples recovered from the borings to establish the pertinent engineering characteristics of the subgrade soils.

3.0 PROJECT OVERVIEW

We understand the Navarro County Courthouse has been declared a historical building. As a result, renovations are in progress to restore the building while maintaining most of the historically relevant features. Among the area being replaced is the deteriorating basement floor slab. The basement is about 7 to 8 feet below surrounding surface grade and is accessible via an exterior ramp, as well as interior access.

4.0 FIELD OPERATIONS AND LABORATORY TESTING

Soil conditions were determined by a total of three interior sample borings. Borings B-1A and B-1B were drilling in the area of the corridor B12 near the southwest corner of the basement. Boring B-2 was drilled in the area of stair east B34 near the southeast corner of the basement.

The borings were cored through the slab, and then advanced using hydraulic sampling equipment to a depth of about 3 to 10 feet. The borings were completed in February 2015 and their locations are shown on Plate A.3. Sample depth, description of soils, and classification (based on the Unified Soil Classification System) are presented on the Logs of Borings, Plates A.4 through A.6. Keys to terms and symbols used on the logs are shown on Plates A.7 and A.8.

Laboratory soil tests were performed on selected samples recovered from the borings to verify visual classification and determine the pertinent engineering properties of the soils encountered. Classifications test results are presented on the Logs of Boring. Swell tests were performed on selected clay samples and the results are tabulated and presented in the Appendix section of this report on Plate A.9.

Descriptions of the procedures used in the field and laboratory phases of this study are presented in the Appendix of this report.

5.0 GENERAL SITE CONDITIONS

5.1 Site Geology

Based on the Geologic Atlas of Texas, Dallas Sheet, this site appears to be within the Kemp Clay and Corsicana Marl formation. This formation consists of mostly silty and calcareous clay underlying by sandstone. Descriptions of the various strata and their approximate depths and thickness are shown on the Logs of Boring.

5.2 Subsurface Soil Conditions

The subsurface conditions are indicated in detail for each boring location in the Logs of Boring. The stratification boundaries shown on the Logs of Boring represent the approximate locations of changes in types of soil; in situ, the transition between material types may be gradual and indistinct. A brief summary of the stratigraphy encountered at the borings is given below.

Borings encountered about 4 to 5 inches of unreinforced concrete. Beneath the concrete, 3 inches of void space was encountered in Borings B-1A and B-1B, void space was not encountered in Boring B-2. The void space appears to be the result of the settlement of the subgrade soil in this area. Beneath the concrete in Boring B-2 and void space in Boring B-1A and B-1B, dark gray, light brown, dark brown and gray fat clays (CH) with various amount of sand, calcareous nodules and FE stains was encountered to the terminated depths of about 3 to 10 feet. Boring B-1B was added due to shallow refusal at about 3 feet in Boing B-1A.

The Plasticity Index (PI) of the clay samples tested varied from 45 to 63, indicating very high plasticity, high Plasticity Index is generally associated with a high potential for the active clay soils to shrink and swell with changes in moisture content.

5.3 Groundwater

Groundwater seepage was not encountered during drilling. The borings remained dry after completion of drilling.

It is difficult to accurately predict the magnitude of subsurface water fluctuations that might occur based upon short-term observations. It should be noted that fluctuations in groundwater level may occur, and the groundwater level may rise during extended period of precipitation.

6.0 ANALYSIS

6.1 Remaining Vertical Soil Movement Potential

Potential Vertical Movement (PVM) calculations were performed in general accordance with the Texas Department of Transportation (TxDOT) Method 124-E. The TxDOT 124-E method is empirical and is based on the Atterberg limits and moisture content of the subsurface soils. Swell test results were also used in the estimation of the Potential Vertical Rise (PVR).

The PVR calculated using the TxDOT method ranges from about 3 to 5.5 inches based on in-situ soil being at a dry antecedent condition, existing site grades at the time of our drilling, and the depth the active soil zone below basement level. We believe the active zone is on the order of 8 feet from the basement level (15 feet from the surface). At the time of drilling, the soil boring samples were in a relatively dry condition. Results of free swell tests performed on the samples obtained indicate that a PVR up to 6 inches is possible below basement level based on the current site conditions.

6.2 Discussion of Study

6.2.1 Subgrade Movements

Review of site-specific geologic and subsurface investigation indicates that active clays support the slabs on grade. Movement of the slab typically occurs when the active clays supporting the slab experience volume changes due to moisture fluctuations. Moisture increases create the potential for the active clays to expand and exert uplift pressures capable of lifting the slab when these uplift pressures exceed the relatively light downward loads of the floor slab. When the active clay soils become dry, this causes the clays to shrink, resulting in settlement of the subgrade soil and slab.

Moisture fluctuations (increases and decreases) that cause the volume changes in these active clays can result from various conditions beneath and around the structure. Moisture increases in the active clays adjacent to and beneath the floor slab can occur due to various sources, including poor drainage, water discharged adjacent to the foundation (i.e. downspouts), plumbing leaks, subsurface groundwater, etc. Drying of the soils will also cause volume changes (shrinkage) of the active clays, particularly around the perimeter of the foundation. Maintaining constant moisture level aide in the stability of grade supported slabs.

The void observed beneath the slab at Boring B-1A and B-1B suggests that shrinkage/settlement of active clay occurred under the floor slab. The samples obtained from the borings were in a relatively dry condition. The most likely cause of the void beneath the floor slab appears to be the result of the settlement of the active clays.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on our investigation, the void space beneath the floor slab is due to shrinkage of the subgrade soil causing the subgrade to settle. Conversely, swell test results indicate that the PVR could be as high as 6 inches if subjected to significant water source . Subgrade treatment may be considered for the new slab subgrade if it is desired to limit the PVR to more tolerable levels. Subgrade treatment may consist of:

1) Removing and replacing active subgrade soils to a depth of 5 feet below final pad elevation and replacing with select fill will reduce the PVR to about 1 inch.
2) Removing and replacing active subgrade soils to a depth of 7 feet below final pad elevation and replacing with replacing with moisture and density control to within 1 foot of final pad elevation, and capping with 1 foot of select fill. The subgrade to receive moisture-conditioned soils should be scarified to a depth of 6 inches, and compacted to 92 to 96 percent of the material's Standard Proctor dry density (ASTM D698) at a workable moisture content at least 4 percentage points above optimum. The excavated clay soils may then be returned to the excavation and compacted in a similar manner.
3) A third option is to simply restore the subgrade underlain slab support with no improvement to the undelaying soil. The client should understand that up to 6 inches of vertical movement is possible if the soils should become wet.

Select fill should consist of a sandy clay or clayey sand with a liquid limit less than 35 and plasticity index (PI) between 5 and 15.

Once the subgrade has been restored, the floor slab may be replaced.

If subgrade treatment is not acceptable, it will be necessary to structurally suspend the floor slab. Rone should be contacted for further guidance if this option is desired.

8.0 CONSTRUCTION OBSERVATIONS

In any geotechnical investigation, the design recommendations are based on a limited amount of information about the subsurface conditions. In the analysis, the geotechnical engineer must assume the subsurface conditions are similar to the conditions encountered in the borings. However, during construction quite often anomalies in the subsurface conditions are revealed. Therefore, it is recommended that Rone Engineering be retained to observe earthwork and foundation installation and perform materials evaluation and testing during the construction phase of the project. This enables the geotechnical engineer to stay abreast of the project and to be readily available to evaluate unanticipated conditions, to conduct additional tests if required and, when necessary, to recommend alternative solutions to unanticipated conditions. Until these construction phase services are performed by the project geotechnical engineer, the recommendations contained in this report on such items as final foundation bearing elevations, final depth of undercut of expansive soils for non-expansive earth fill pads, and other such subsurface-related recommendations should be considered as preliminary.

It is proposed that construction phase observation and materials testing commence by the project geotechnical engineer at the outset of the project. Experience has shown that the most suitable method for procuring these services is for the owner to contract directly with the project geotechnical engineer. This results in a clear, direct line of communication between the owner and the owner's design engineers, and the geotechnical engineer.

9.0 REPORT CLOSURE

The analyses, conclusions and recommendations contained in this report are based on site conditions as they existed at the time of the field investigation and further on the assumption that the exploratory borings are representative of the subsurface conditions throughout the site; that is, the subsurface conditions everywhere are not significantly different from those disclosed by the borings at the time they were completed. If during construction, different subsurface conditions from those encountered in our borings are observed, or appear to be present in excavations, we must be advised promptly so that we can review these conditions and reconsider our recommendations where necessary. If there is a substantial lapse of time between submission of this report and the start of the work at the site, if conditions have changed due either to natural causes or to construction operations at or adjacent to the site, or if structure locations, structural loads or finish grades are changed, we urge that we be promptly informed and retained to review our report to determine the applicability of the conclusions and recommendations, considering the changed conditions and/or time lapse.

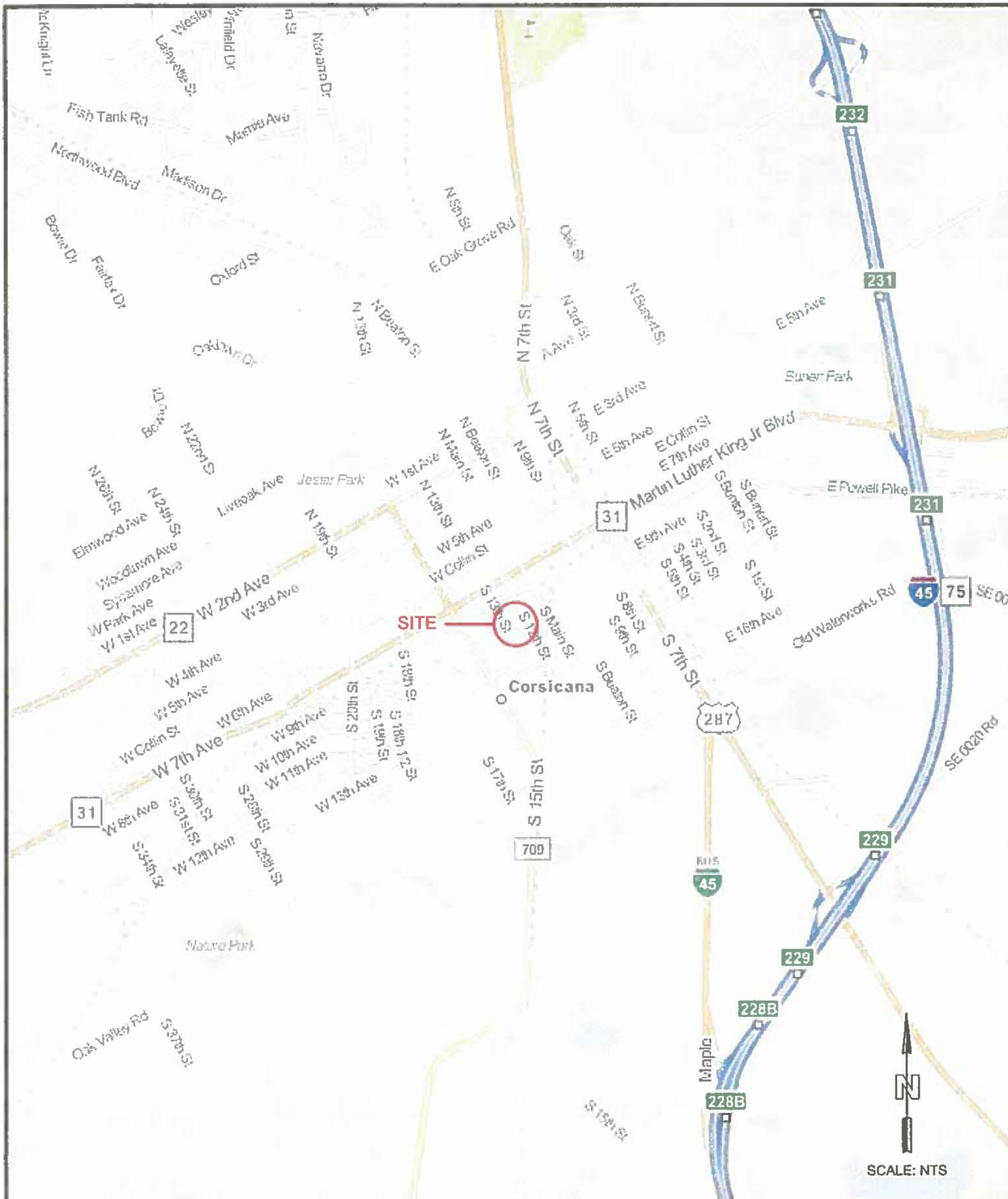
Further, it is urged that Rone Engineering Services, Ltd. be retained to review those portions of the plans and specifications for this particular project that pertain to earthwork and foundations as a means to determine whether the plans and specifications are consistent with the recommendations contained in this report. In addition, we are available to observe construction, particularly the compaction of structural fill, or backfill and the construction of foundations as recommended in the report, and such other field observations as might be necessary.

This report has been prepared for the exclusive use of the client and their designated agents for specific application to design of this project. We have used that degree of care and skill ordinarily exercised under similar conditions by reputable members of our profession practicing in the same or similar locality. No warranty, expressed or implied, is made or intended.

689

APPENDIX A

640



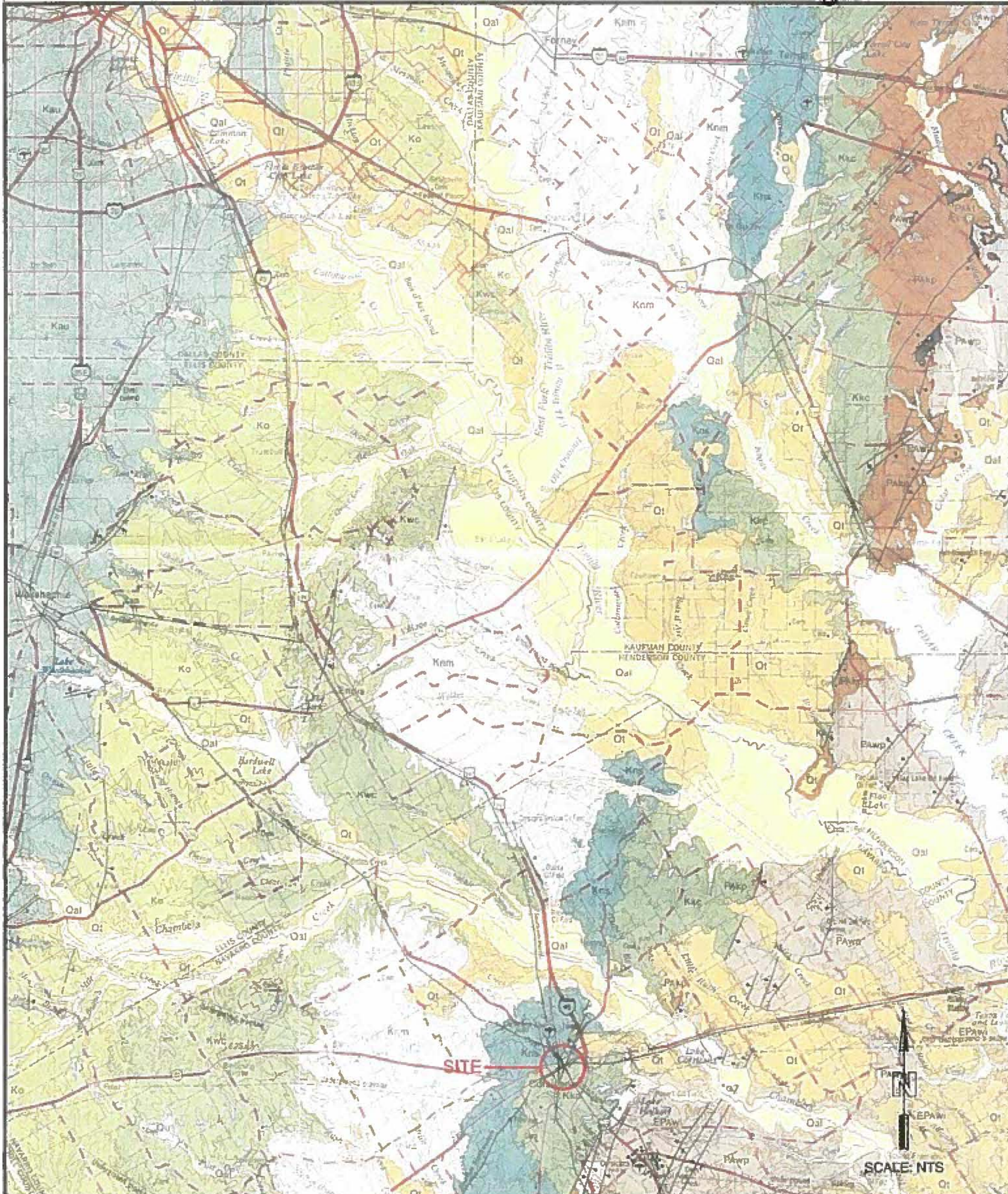
PROJECT NO:	15-19883		
FILE NAME:	1519883.DWG		
DRAWN BY:	CM	DATE:	2-5-2015
REVISED BY:		DATE:	
REVISED BY:		DATE:	
APPROVED BY:	RS	DATE:	2-5-2015

RONE ENGINEERING

PLATE A.1
VICINITY MAP

NAVARRO COUNTY COURTHOUSE
W. 3RD AVENUE
CORSICANA, TEXAS

641

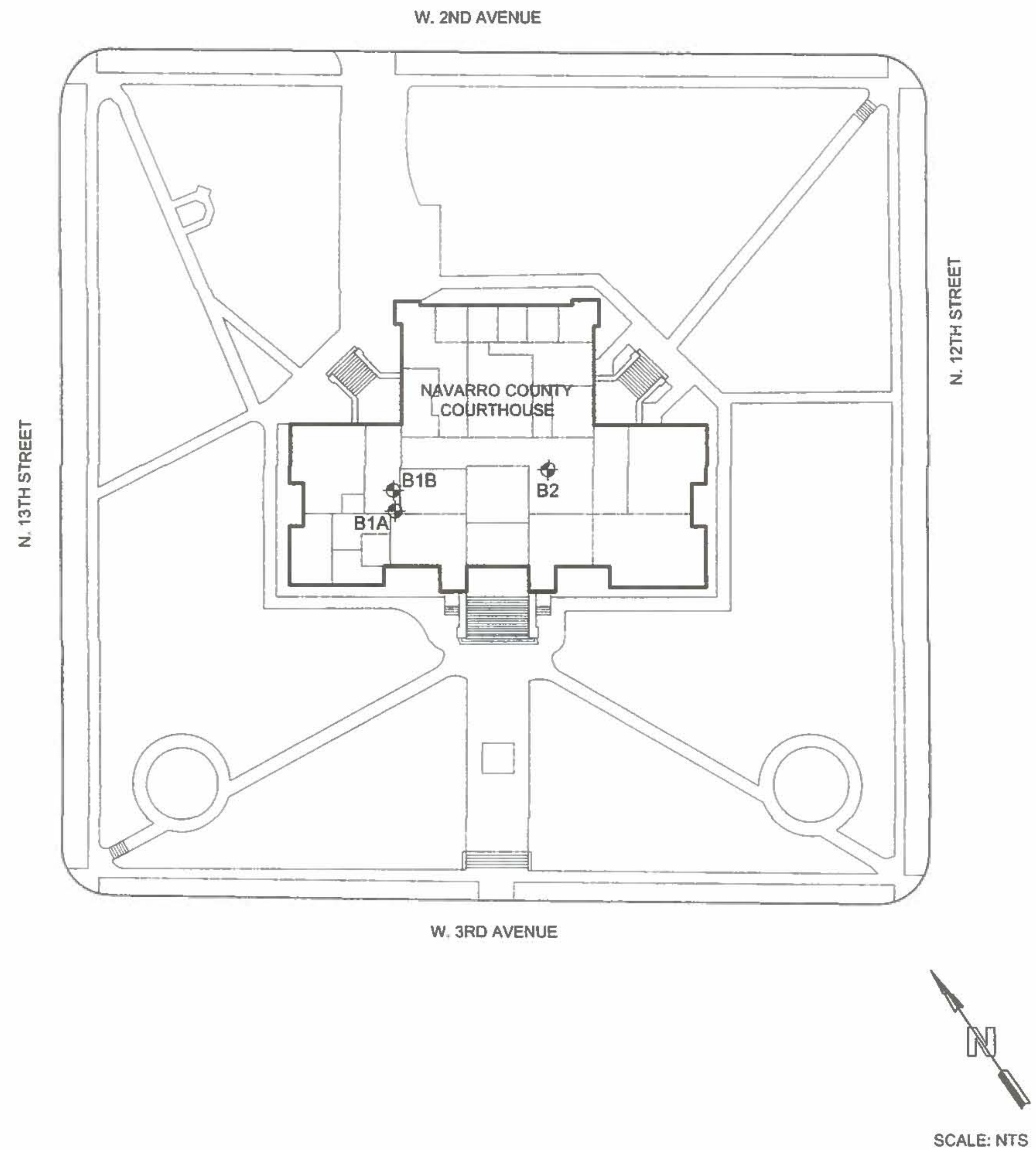


RONE ENGINEERING

PLATE A.2
GEOLOGY MAP

NAVARRO COUNTY COURTHOUSE
W. 3RD AVENUE
CORSICANA, TEXAS

PROJECT NO:	15-19883		
FILE NAME:	1519883.DWG		
DRAWN BY:	CM	DATE:	2-5-2015
REVISED BY:		DATE:	
REVISED BY:		DATE:	
APPROVED BY:	RS	DATE:	2-5-2015



RONE ENGINEERING

PLATE A.3

BORING LOCATION DIAGRAM

NAVARRO COUNTY COURTHOUSE
W. 3RD AVENUE
CORSICANA, TEXAS

PROJECT NO:	15-19883		
FILE NAME:	1519883.DWG		
DRAWN BY:	CM	DATE:	2-5-2015
REVISED BY:		DATE:	
REVISED BY:		DATE:	
APPROVED BY:	RS	DATE:	2-5-2015

Project No. 15-19883	Boring No. B- 1A	Navarro County Courthouse Corsicanna, Texas	
Location		Water Observations (feet)	
		While Drilling	Not Encountered
Completion Depth 3.0'	Completion Date 2-3-15	At Boring Completion	Not Encountered
		End of Day After Boring Completion	Not Measured

RONE ENGINEERING

Surface Elevation

Type CFA

Stratum Description

Depth, Ft.	Symbol	Samples	Stratum Description	REC %	Penetrometer Reading, TSF	SPT - Blows/Foot TCP - Blows/Inch	Passing No. 200 Sieve, %	Liquid Limit, %	Plastic Limit, %	Plasticity Index	Moisture Content, %	Dry Unit Weight pcf	Unconfined Compression psf
			FAT CLAY (CH) - light brown with calcareous nodules		4.5		86	50	18	32	16		
					4.25		70	57	19	38	17		
			Shelby tube refusal at 3 feet.										

RONE ENGINEERING LOGS-1 15-19883.GPJ RONE.GDT 2/13/15

Project No. 15-19883	Boring No. B- 1B	Navarro County Courthouse Corsicanna, Texas	
Location		Water Observations (feet)	
		While Drilling	Not Encountered
Completion Depth 7.0'	Completion Date 2-3-15	At Boring Completion	Not Encountered
		End of Day After Boring Completion	Not Measured

RONE ENGINEERING

Surface Elevation | Type CFA

Depth, Ft.	Stratum Description	REC %	Penetrometer Reading, TSF	SPT - Blows/Foot TCP - Blows/Inch	Passing No. 200 Sieve, %	Liquid Limit, %	Plastic Limit, %	Plasticity Index	Moisture Content, %	Dry Unit Weight pcf	Unconfined Compression psf
	FAT CLAY (CH) -dark gray to dark brown with calcareous nodules		4.5						19		
			4.5		96	69	24	45	20		
			4.5						29		
5	with FE stains										
			3.75		95	96	33	63	31		
	Shelby tube refusal at 7 feet.										

Project No. 15-19883	Boring No. B- 2	Navarro County Courthouse Corsicanna, Texas		RONE ENGINEERING
Location		Water Observations (feet)		
		While Drilling	Not Encountered	
Completion Depth 10.0'	Completion Date 2-3-15	At Boring Completion	Not Encountered	
		End of Day After Boring Completion	Not Measured	

Surface Elevation

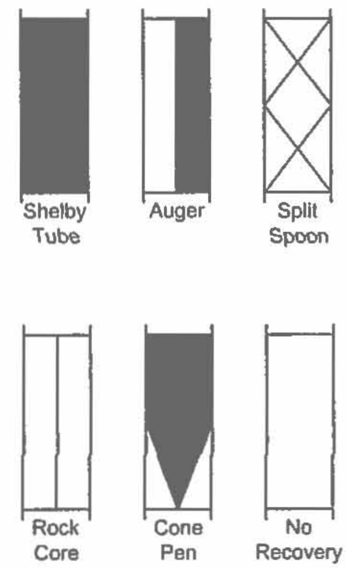
Type CFA

Depth, Ft.	Symbol	Samples	Stratum Description	REC %	Penetrometer Reading, TSF	SPT - Blows/Foot TCP - Blows/Inch	Passing No. 200 Sieve, %	Liquid Limit, %	Plastic Limit, %	Plasticity Index	Moisture Content, %	Dry Unit Weight pcf	Unconfined Compression psf
			FAT CLAY (CH) - dark gray to light brown with calcareous nodules and sand seams		3.75						23		
					3		97	77	26	51	27		
5					3		96	82	28	54	29		
											39		
					4.5		98	84	28	56	33		
10			Boring terminated at 10 feet.										

SOIL OR ROCK TYPES

CLAY	SAND-*WELL GRADED*
FAT CLAY	LIMESTONE-WEATHERED
LEAN CLAY	CONCRETE
SANDY CLAY	FILL
LIMESTONE	GRAVEL
CLAYEY SAND	CLAYEY GRAVEL
SHALE	MARL
SAND-*POORLY GRADED*	SILT

RONE ENGINEERING



TERMS DESCRIBING CONSISTENCY, CONDITION, AND STRUCTURE OF SOIL

Fine Grained Soils (More than 50% Passing No. 200 Sieve)

Consistency	Penetrometer Reading, (tsf)	Unconfined Compression, (psf)
Very Soft	≤ 0.5	≤ 1000
Soft	0.5 to 1.0	1000 to 2000
Firm	1.0 to 2.0	2000 to 4000
Hard	2.0 to 4.0	4000 to 8000
Very Hard	> 4.0	> 8000

Coarse Grained Soils (More than 50% Retained on No. 200 Sieve)

Penetration Resistance (Blows / Foot)	Descriptive Item	Relative Density
0 to 4	Very Loose	0 to 20%
4 to 10	Loose	20 to 40%
10 to 30	Medium Dense	40 to 70%
30 to 50	Dense	70 to 90%
Over 50	Very Dense	90 to 100%

Soil Structure

Calcareous	Contains appreciable deposits of calcium carbonate; generally nodular
Slickensided	Having inclined planes of weakness that ate slick and glossy in appearance
Laminated	Composed of thin layers of varying color or texture
Fissured	Containing cracks, sometimes filled with fine sand or silt
Interbedded	Composed of alternated layers of different soil types, usually in approximately equal proportions

TERMS DESCRIBING PHYSICAL PROPERTIES OF ROCK

Hardness and Degree of Cementation

Very Soft or Plastic	*Can be remolded in hand; corresponds in consistency up to hard in soils*
Soft	Can be scratched with fingernail
Moderately Hard	Can be scratched easily with knife; cannot be scratched with fingernail
Hard	Difficult to scratch with knife
Very Hard	Cannot be scratched with knife
Poorly Cemented or Friable	Easily crumbled
Cemented	Bound together by chemically precipitated material; Quartz, calcite, dolomite, siderite, and iron oxide are common cementing materials.

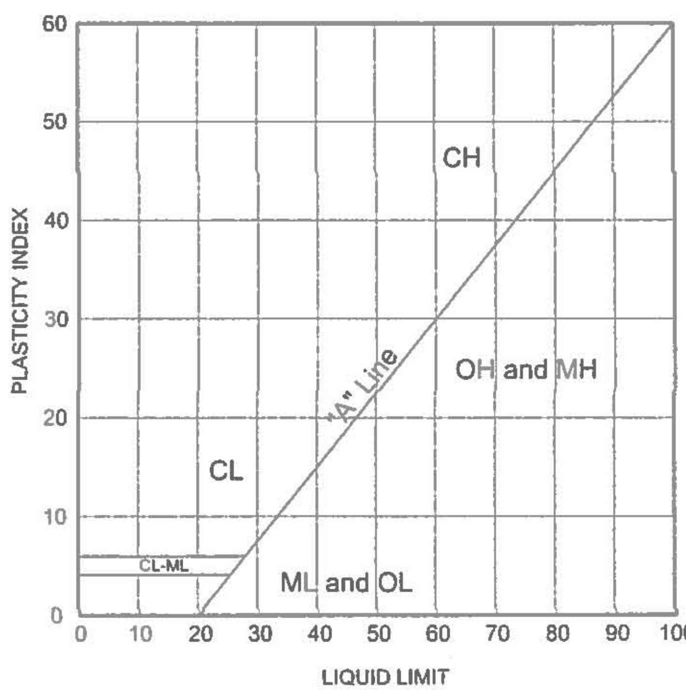
Degree of Weathering

Unweathered	Rock in its natural state before being exposed to atmospheric agents
Slightly Weathered	Noted predominantly by color change with no disintegrated zones
Weathered	Complete color change with zones of slightly decomposed rock
Extremely Weathered	Complete color change with consistency, texture, and general appearance approaching soil

KEY TO CLASSIFICATION AND SYMBOLS **PLATE A.7**

RONE ENGINEERING

Major Divisions			Grp. Sym.	Typical Names	Laboratory Classification Criteria	
Coarse - Grained Soils (more than half of the material is larger than No. 200 Sieve size)	Gravels (more than half of coarse fraction is larger than No. 4 Sieve size)	Clean gravels (Little or no fines)	GW	Well graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel form 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	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4: $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines		Not meeting all gradation requirements for GW
		Gravels with fines (Appreciable amount of fines)	GM	Silty gravels, gravel - sand - silt mixtures		Liquid and Plastic limits below "A" line or P.I. greater than 4 / Liquid and plastic limits plotting in hatched zone between 4 and 7 are borderline cases requiring use of dual symbols
			GC	Clayey gravels, gravel - sand - clay mixtures		Liquid and Plastic limits above "A" line with P.I. greater than 7
	Sands (more than half of coarse fraction is smaller than No. 4 Sieve size)	Clean sands (Little or no fines)	SW	*Well graded sands*, gravelly sands, little or no fines		$C_u = \frac{D_{60}}{D_{10}}$ greater than 6: $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
			SP	Poorly graded sands, gravelly sands, little or no fines		Not meeting all gradation requirements for SW
		Sands with fines (Appreciable amount of fines)	SM	Silty sands, sand silt mixtures		Liquid and Plastic limits below "A" line or P.I. less than 4 / Liquid and plastic limits plotting between 4 and 7 are borderline cases requiring use of dual symbols
			SC	Clayey sands, sand clay mixtures		Liquid and Plastic limits above "A" line with P.I. greater than 7
Fine - Grained Soils (more than half of the material is smaller than No. 200 Sieve)	Silts and Clays (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity		
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, and lean clays		
			OL	Organic silts and organic silty clays of low plasticity		
	Silts and Clays (Liquid limit greater than 50)		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		



PLASTICITY CHART

SWELL TEST RESULTS

Geotechnical Engineering Report
Navarro County Courthouse
Corsicana, Texas
Rone Project Number: 15-19883

Boring	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	Initial MC (%)	Final MC (%)	Load (psf)	Swell (%)
B- 1B	2-4	69	24	45	21	28	375	8.3
B- 1B	6-7	96	33	63	31	39	813	9.3
B- 2	2-4	77	26	51	28	30	375	1.9
B- 2	4-6	82	28	54	29	31	625	2.1
B- 2	8-10	84	28	56	27	31	1125	2.0

APPENDIX B

FIELD OPERATIONS

Subsurface conditions were defined by three interior sample borings as shown on the Boring Location Diagram, Plate A.3. The borings were completed at locations marked in the field by client. The borings were advanced between sample intervals using continuous push procedures. The results of each boring are shown graphically on the Logs of Boring, Plates A.4 through A.6. Sample depth, description, and soil classification based on the Unified Soil Classification System are shown on the Logs of Boring. Keys to the symbols and terms used on the Logs of Boring are presented on Plates A.7 and A.8.

Relatively undisturbed samples of cohesive soils were obtained with Shelby tube samplers in general accordance with ASTM D1587 at the locations shown on the Logs of Boring. The Shelby tube sampler consists of a thin-walled steel tube with a sharp cutting edge connected to a head equipped with a ball valve threaded for rod connection. The tube is pushed into the undisturbed soils by the hydraulic pull-down using hydraulic sampling equipment. The soil specimens were extruded from the tube in the laboratory, logged, tested for consistency with a hand penetrometer, sealed, and packaged to maintain "in situ" moisture content.

The consistency of cohesive soil samples was evaluated in the lab using a calibrated hand penetrometer. In this test, a 0.25-inch diameter piston is pushed into the undisturbed sample at a constant rate to a depth of 0.25-inch. The results of these tests are tabulated at respective sample depths on the logs. When the capacity of the penetrometer is exceeded, the value is tabulated as 4.5+.

Groundwater observations during and after completion of the boring are shown on the upper right of the boring log. Upon completion of the boring, the boreholes were backfilled from the top and plugged at the surface.

LABORATORY TESTING

General

Laboratory tests were performed to define pertinent engineering characteristics of the soils encountered. The laboratory tests included moisture content, gradation (percentage of material passing through a standard U.S. No. 200 sieve), Atterberg limits determination unconfined compression, dry unit weight, free swell and visual classification.

Classification Tests

Classification of soils was verified by natural moisture content and Atterberg limits determinations. These tests were performed in general accordance with American Society for Testing and Materials (ASTM) procedures. The Atterberg limits, gradations and natural moisture content determinations are presented at the respective sample depths on the Logs of Boring.

Free Swell Tests

Selected samples of the near-surface cohesive soils were subjected to free swell tests. In the free swell test, a sample is placed in a consolidometer and subjected to the estimated overburden pressure. The sample is then inundated with water and allowed to swell. Moisture contents are determined both before and after completion of the test. Test results are recorded as the percent swell, with initial and final moisture content.

702

RONE ENGINEERING

GEOTECHNICAL ENGINEERING
ENVIRONMENTAL CONSULTING
CONSTRUCTION MATERIAL TESTING

February 18, 2015

Mr. Stephen Lucy, P.E.
Jaster Quintanilla
2105 Commerce Street
Dallas, Texas 75201

Re: Addendum
Navarro County Courthouse
Corsicana, Texas
Rone Project No. 15-19883

Dear Mr. Lucy:

Rone Engineering Services, Ltd. (Rone) has been requested to provide additional recommendations regarding the subgrade treatment depth for the referenced project. This request was made by Mr. Stephen Lucy with Jaster Quintanilla (JQ), on February 17, 2015. This letter presents our recommendations and should be considered an addendum to Rone's Geotechnical Engineering Report 15-19883 dated February 13, 2015. This letter should not be considered separately from the geotechnical report.

In our original report, we recommended two options for the subgrade treatment. Option 1, consisted of removing the active subgrade soils to a depth of 5 feet, replacing the soil with select fill. Option 2, consisted of removing the active clay to a depth of 7 feet, replacing the excavated soil with moisture-conditioned soil and capping with 1 foot of select fill. After reviewing the drawing provided to us by Mr. Lucy, we understand that the exiting footings are located about five feet below the interior floor slab. In order to prevent exposing the footings, we are providing additional removal and replacement depth and corresponding PVR values in the following table.

Remove and Replace active subgrade soil with select fill (feet)	**PVR (inches)**	Remove and replace active subgrade soil with Moisture conditioned soil and capping with 1 foot select fill (feet)	**PVR (inches)**
0	6	0	6
1	5	-	-
2	4	2	5
3	3	3	4
4	2	4	3

All other comments and recommendations contained in the referenced geotechnical report remain unchanged.

Thank you for the opportunity to provide services to you for this project. Please call if you have any questions regarding this letter.

Respectfully submitted,

STATE OF TEXAS
ABDOL R. SAVABI
113752
LICENSED
PROFESSIONAL ENGINEER
2.18.2015

Reza Savabi, P.E.
Senior Geotechnical Engineer

Mark D. Gray, P.E.
Vice President

Texas Engineering Firm License No. F-1572