GEOTECHNICAL INVESTIGATION

PROPOSED NETTING SYSTEM & BACK-STOP
LA LA REGIRA FIELD
896-1198 CLAY ST.
DONALDSONVILLE, LOUISIANA

TBG PROJECT NO. 5965G

Prepared for:

PARISH OF ASCENSION GOVERNMENT

GONZALES, LOUISIANA

TheBetaGroup
engineering and construction services

1428½ Claire Avenue, Gretna, Louisiana 70053

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Betagroupgc.com

TheBetaGroup
engineering and construction services

October 25, 2022

Parish of Ascension Government
Lamar Dixon Expo Center, Bldg. G
Gonzales, LA 70737

Attn: Mr. Dean Thomason

Reference: Report of Geotechnical Investigation
Proposed Netting System & Back-Stop
La La Regira Field
896-1198 clay St.
Donaldsonville, Louisiana
TBG Report No. 5965G

Dear Mr. Thomason:

The Beta Group, LLC (TBG) has performed a Geotechnical Investigation for the above referenced site as authorized by our geotechnical proposal dated, September 15, 2022. The attached report presents our understanding of the project, reviews our exploration procedures, describes existing site and general subsurface conditions, and presents our evaluations and recommendations.

We have enjoyed working with you on this project and look forward to assisting you during the continuing design and construction activities. Please contact us at anytime if you have any questions regarding this report or need further service.

Sincerely,

THE BETA GROUP, LLC

STATE OF LOUISIANA
Alexander Jaramillo
License No 36324
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

Alex Jaramillo, P.E.
Senior Project Engineer

Hannah Jenkins

Hannah Jenkins, E.I.
Staff Engineer

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PURPOSE AND SCOPE OF SERVICES

PURPOSE OF SERVICES

The purpose of the Geotechnical Investigation was to explore the subsurface conditions at the site and to provide geotechnical design recommendations for the Proposed Netting System & Back-Stop, site preparation, earthwork and quality control measures related to these design aspects.

SCOPE OF SERVICES

To accomplish the stated purpose, we executed the following:

1. Documented existing surface conditions and features at the project site and the marked boring locations.

2. Performed a subsurface exploration consisting of two (2) undisturbed soil test borings performed to the 40 ft. depth below the existing ground surface in the general area of the Proposed Netting System & Back-Stop.

3. Performed laboratory testing on selected soil samples to ascertain soil properties for engineering purposes.

4. Evaluated the findings of the subsurface exploration and laboratory data relative to general subsurface characterization, support, and other geotechnical aspects of the project.

Our scope of services did not include a survey of the boring locations and elevations, quantity of estimates, preparation of plans or specifications, or the identification and evaluation of environmental aspects of the project site.

PROPOSED PROJECT DESCRIPTION

We understand the project will consist of the installation of a new netting system and back-stop, for La La Regira Field, located at 896-1198 Clay St., in Donaldsonville, Louisiana. The proposed Netting System foundation will consist of 36-in. diameter concrete piles that extend to the 10½ ft. depth. The individual poles that will support the Netting System will extend approximately 30 ft. above the brick wall and will be approximately 12 in. in diameter. It is understood that the

Netting System will extend to a maximum of 100 ft. on each side of the field. The backstop will consist of a brick wall that is 36 inches in height and 18 inches in width above the ground surface. The brick wall will extend approximately 11½ in. below the ground surface and have a width of 3 ft. at the bottom of the wall.

SUBSURFACE EXPLORATION

FIELD EXPLORATION

The subsurface exploration consists of two (2) undisturbed soil test borings (designated as B-1 and B-2) performed on September 16, 2022 at the referenced site and at the approximate locations shown on the attached Boring Location Plan (Figure No. 1).

The soil test boring locations were located in the field by a TBG representative. The boring locations were plotted and topographical information was estimated. The methods used in the determination of the boring locations shown on the Boring Location Plan should be considered approximate.

The soil test borings were drilled utilizing a truck mounted drill rig at the designated locations shown on the Boring Location Plan. Undisturbed sampling was performed continuously in the upper 10 ft. and on 5 ft. centers thereafter, with a 3-inch diameter thin-walled tube sampler. Representative samples were removed from the tubes and placed in moisture-proof containers for laboratory testing.

The soil test borings were advanced through the soil overburden to the assigned termination depth of 40 ft. below the existing ground surface.

Subsurface water level readings were obtained at the soil test borings immediately upon completion of the drilling process and after a period of 15 minutes. Upon completion of the drilling activities, the boreholes were backfilled with a high-strength concrete/bentonite mixture as per LADOTD requirements.

LABORATORY TESTING

Laboratory tests were conducted on selected samples in general accordance with ASTM standards. The laboratory testing performed for this project consisted of:

- Atterberg Limits
- Unconfined Compression Tests
- Natural Moisture Content
- Unit Weight Determination

The test results are summarized on the Boring Log in the Appendix of this report.

SITE AND SUBSURFACE CONDITIONS

SITE CONDITIONS

TBG performed reconnaissance of the site on September 16th, 2022. The site is located adjacent to the existing Softball Fields, within La La Regira Field in Donaldsonville, La.

SUBSURFACE CONDITIONS

Boring B-1:

Reference to the log of boring B-1 shows that beginning at the ground surface there is 2 ft. of stiff gray with tan silty clay, followed by soft to medium stiff gray with tan silty clay to the 13 ft. depth. This clay is underlain by medium stiff gray sandy clay to the 23 ft. depth and proceeded by medium stiff gray silty clay to the 28 ft. depth. This silty clay was underlain by very soft to soft gray clay to the 38 ft. depth. This clay is then proceeded by medium stiff gray silty clay to at least the boring's termination depth of 40 ft.

Boring B-2:

Reference to the log of boring B-2 shows that beginning at the ground surface there is 2 ft. of stiff gray with tan silty clay with shell fragments, followed by soft to medium stiff gray with tan silty clay to the 13 ft. depth. This clay is underlain by soft to medium stiff gray with tan sandy clay to the 23 ft. depth and is proceeded by medium stiff gray silty clay to the 28 ft. depth. This clay is then followed by medium stiff gray clay to the 38 ft. depth and underlain by medium stiff gray silty clay to at least the boring's termination depth of 40 ft.

GROUNDWATER CONDITIONS

At the time of performing the soil borings, subsurface water was encountered at the approximate 8 ft. depth below the existing ground surface in both soil borings. After a 15-minute wait period, the subsurface groundwater was measured at the 5 ft. depth in soil boring B-1 and

the 3 ft. depth in boring B-2. It should be noted that groundwater levels tend to fluctuate with seasonal and climatic changes, the proximity to any water bodies, as well as with some types of construction operations. As such, groundwater levels at other times of the year may be different than those described in this report. These observations were made while completing the soil borings and may not have become fully static at the time of measurement. If groundwater is important to construction, it should be measured at that time.

ENGINEERING EVALUATION & RECOMMENDATIONS

The following evaluations and recommendations are based on our observations at the site, interpretation of the field and soil laboratory data obtained during this exploration, and our experience with similar subsurface conditions and projects. Subsurface conditions in unexplored locations may vary from those encountered. If the project location or information changes, we request that we be advised so that we may re-evaluate our recommendations.

Design recommendations for the proposed Netting System & Back-Stop, for the given locations are dependent on the soil and site conditions analyzed. The subsurface exploration aids the geotechnical engineer in determining the necessary geotechnical recommendations needed. In addition, since the method of construction greatly affects the soils intended for the proposed Netting System & Back-Stop, consideration must be given to the implementation of suitable methods of site preparation, pile driving, material compaction, and other aspects of construction.

DEEP FOUNDATION (Netting System)

Analyses were made based on soil borings B-1 and B-2, and laboratory tests data to develop geotechnical related parameters for use in design of the proposed Netting System foundation. These include an evaluation of pile capacities for 36 in. diameter concrete piles. Results of these analyses are given in the following sections. Allowable pile load capacities are provided in the following tables. The allowable pile capacities assume the piles are vertical and do not include the weight of the pile. The piles will receive their support through "skin friction" along their embedment length.

ALLOWABLE PILE LOAD CAPACITIES

TYPE AND SIZE PILE	PILE TIP EMBEDMENT DEPTH BELOW EXISTING GROUND SURFACE IN FEET	ESTIMATED ALLOWABLE SINGLE PILE LOAD CAPACITIES IN TONS COMPRESSION FACTOR OF SAFETY = 2 TENSION FACTOR OF SAFETY = 3	
		COMPRESSION	TENSION
36- in. Dia. Concrete Pile	10½	12	8

*These are soil-pile related values and consideration should be given to the requirements of the structural integrity of the pile member.

The provided compression capacity contains an estimated factor of safety of two (2) and a tension capacity with an estimated factor of safety of three (3) against failure of a single pile through the soil. The analysis for the pile capacity is based on a soil-pile relationship only. The structural capacity of the pile and its connection to transmit these loads should be determined by a structural engineer.

LATERAL CAPACITY

The value given in the previous table is for an axial capacity of a vertical single pile in compression and tension. In general, the allowable lateral load on a single, vertical 36-inch diameter concrete pile should be limited to 1 ton per pile.

ESTIMATED SETTLEMENT OF PILE FOUNDATIONS

No detailed settlement analyses were made since the design structural loads, etc. are not known at this time. However, settlement of the pile supported Netting System using the recommended pile load capacity is estimated to be on the order of ½ to 1 inch.

Our estimates do not include the elastic deformation of the piles, which should be added to the settlement estimates. Elastic deformation of the piles may be estimated at 67% of the static column strain of a pile acting as a column. In the event any of our assumptions are not valid, TBG should be contacted to evaluate the potential effects on settlement of pile foundations.

PILE DRIVING

The driving of the concrete piles having a width of 36 in. should be limited to the rate of 50 to 75 blows per foot using a maximum of 20,000 to 30,000 ft-lbs. of energy per blow. These recommendations are given in order to minimize possible damage to the piles.

It is important that inspection and monitoring of piles be done by a qualified soil technician so as to detect unexpected conditions indicated by the driving resistance (hammer blows per foot) as well as any potential problems with breakage or driving difficulties.

MINIMUM PILE SPACING

$$SPAC = 0.05\ L_1 + 0.025\ L_2 + 0.0125\ L_3$$

SPAC (ft.) = Center to center spacing of piles = (Min. 3.0 ft.)
L_1 = Pile penetration in ft. up to 100 ft.
L_2 = Pile penetration in ft. from 101 to 200 ft.
L_3 = Pile penetration in ft. from 201 to 300 ft

VIBRATION MONITORING

Pile driving will cause vibrations that may affect nearby buildings, utilities and pavements. Pile driving should be monitored at any structure of concern during the driving of the job piles to record their magnitude of vibrations. Sustained peak particle velocities of 0.25 inches per second measured at a structure may induce damage to the structure. Therefore, for sustained peak particle velocities in excess of 0.25 inches per second pile driving operations should be terminated and consideration given to altering the pile installation criteria.

SHALLOW FOUNDATION (Back-Stop)

ULTIMATE SOIL BEARING CAPACITY

It is understood the proposed Backstop will be 3 ft. in height above the existing ground surface and 1.625 ft. below the existing ground surface, as specified in the provided cross-section, (Fig. No. 2). The table below provides allowable soil bearing capacities for each soil boring location utilizing a factor of safety (F.O.S.) of 1.5, 2, and 3.

Soil Boring	Allowable Soil Bearing Capacity (PSF)		
	F.O.S =1.5	F.O.S.=2	F.O.S.=3
B-1	1,530	1,150	760
B-2	2,060	1,550	1,030

ESTIMATED SETTLEMENT

Estimated long term settlements based on the preceding allowable bearing capacities are provided in the table below. The footing of the Backstop will be 3 ft. in width.

Soil Boring	Pressure (PSF)	Estimated Settlement at Center (Inches)	Estimated Settlement at Edge (Inches)
B-1	1,530	0.95	0.41
	1,150	0.72	0.34
	760	0.50	0.20
B-2	2,060	1.15	0.48
	1,550	0.81	0.39
	1,030	0.57	0.27

It is estimated that about 30 to 40 percent may occur within the first 1 to 2 years. The remaining 60 to 70 percent would take a long time to completely occur and on the order of 20 to 30 years.

CONSTRUCTION QUALITY CONTROL

The Geotechnical Engineer of record should be retained to monitor and test earthwork activities, pile driving activities, subgrade preparations, as well as any additional construction activities. We recommend that TBG be employed to monitor the earthwork construction, and to report that the recommendations contained in this report are completed in a satisfactory manner. Our continued involvement on the project will aid in the proper implementation of the recommendations discussed herein.

The following is a recommended scope of services:

- Review of project plans and construction specifications to verify that the recommendations presented in this report have been properly interpreted and implemented.
- Observe the earthwork process to document that subsurface conditions encountered during construction are consistent with the conditions anticipated in this report.
- Observe the subgrade conditions before placing structural materials.
- Observe the placement and compaction of all structural materials, and perform laboratory and field compaction testing.

CONSULTATION

Often during final design and/or construction, questions can arise or services are needed to complete the project. TBG offers various construction services such as pile logging, vibration monitoring, pile load tests, subgrade preparation testing, etc. At your request, TBG would be pleased to discuss these services with a brief phone call or conference.

LIMITATIONS

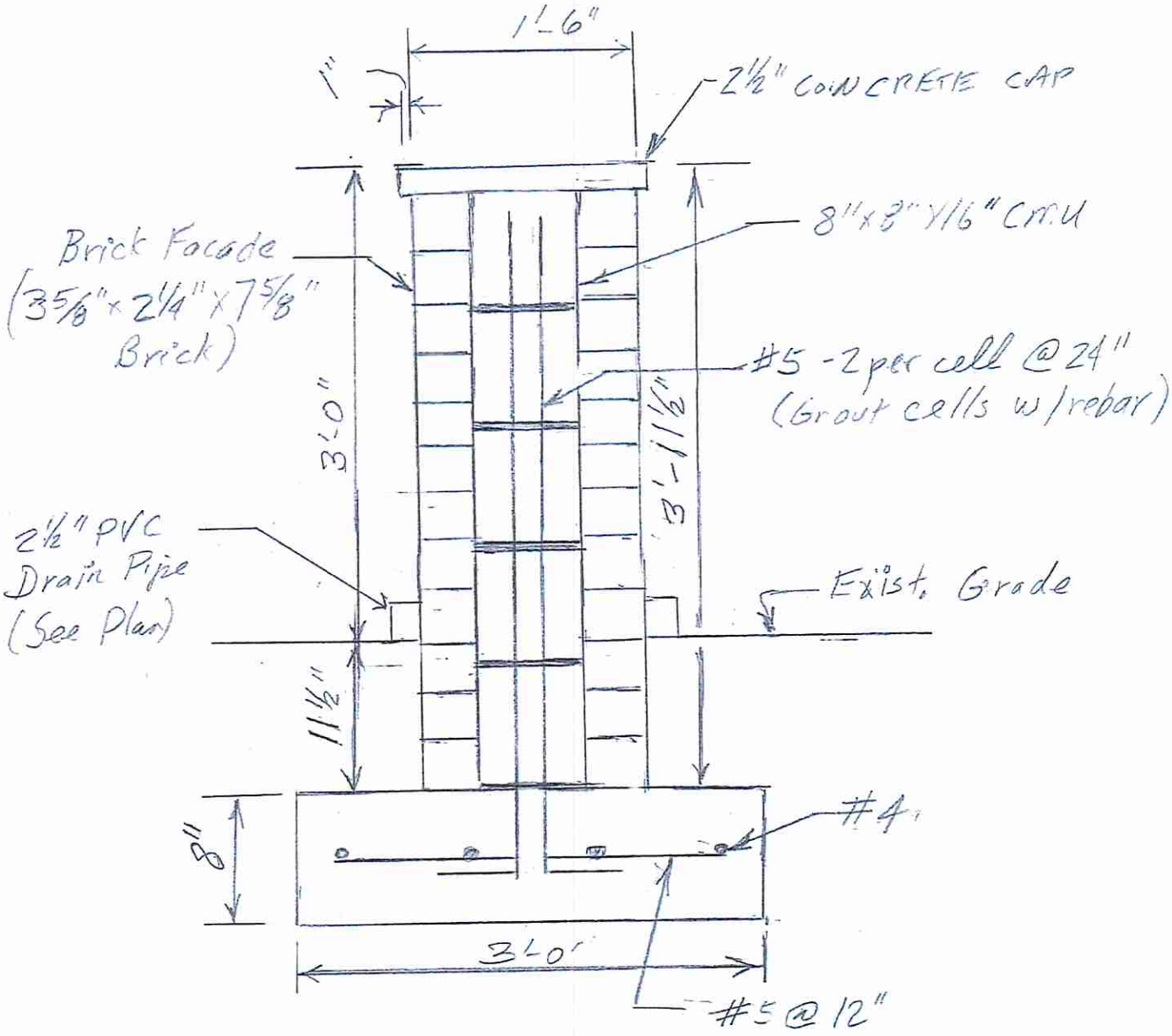
This report has been prepared for the exclusive use of Parish of Ascension Government, and their assigns for specific application to the referenced property in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made. These recommendations do not reflect variations in subsurface conditions that may be intermediate of the boring locations or in unexplored areas of the site. Should such variations become apparent during construction, we reserve the right to re-evaluate our recommendations based upon on-site observations of the conditions. In the event changes are made in the proposed construction plans, the recommendations presented in this report shall not be considered valid unless reviewed by our firm and modified or verified in writing.

Appendix

BORING LOCATION PLAN ● **BORING LOCATIONS** | **North** ▲

THE BETA GROUP, LLC.
1428½ Claire Ave, Gretna, Louisiana, 70053
504-227-2273 fax: 504-227-2274
Betagroupgc.com

Client:	Ascension Parish
Project:	Proposed Netting System & Back-Stop
Location:	Donaldsonville, Louisiana
TBG Project No:	5965G
Date:	10/5/2022
	Scale: Not To Scale — Figure 1

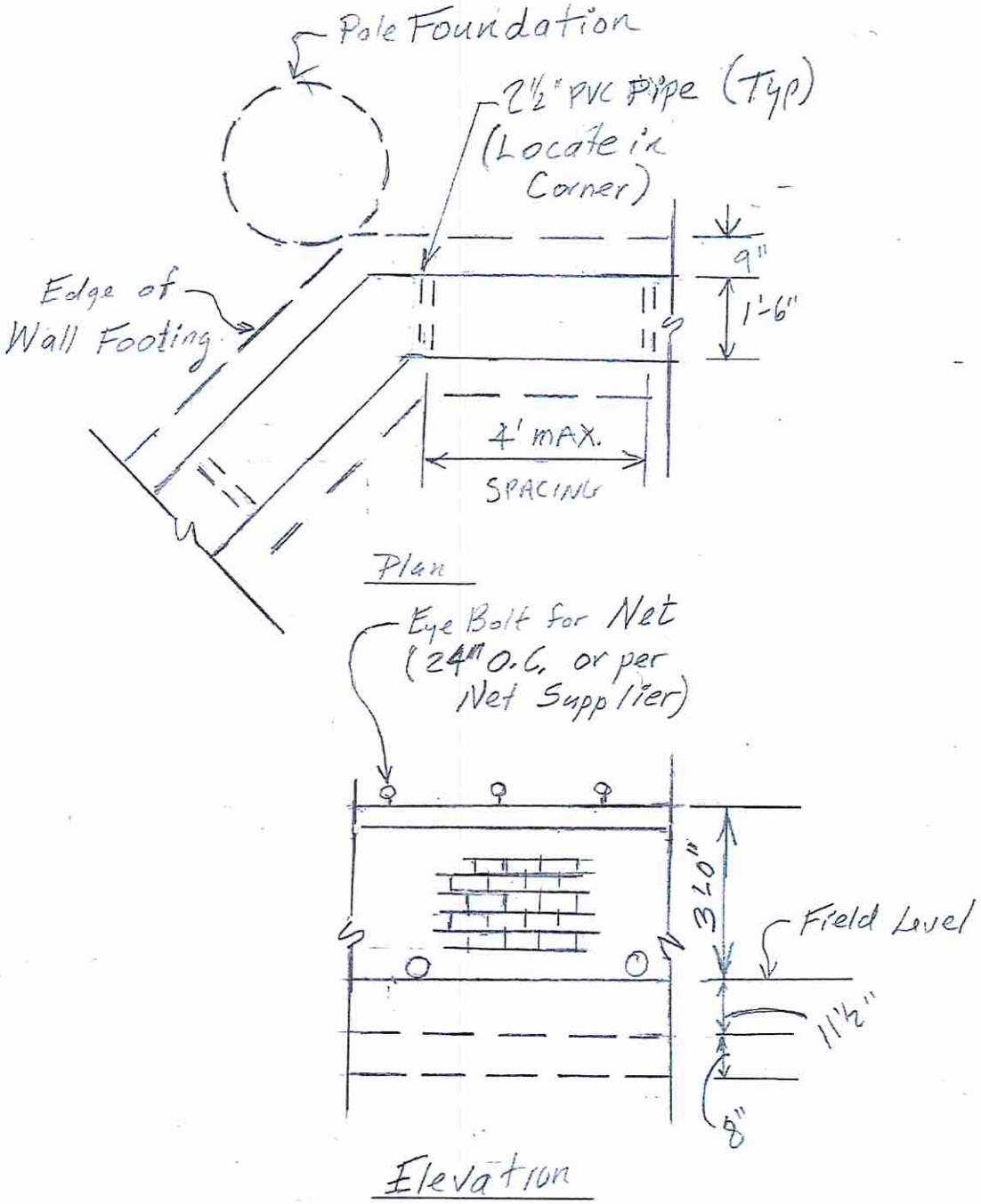


Cross-Section

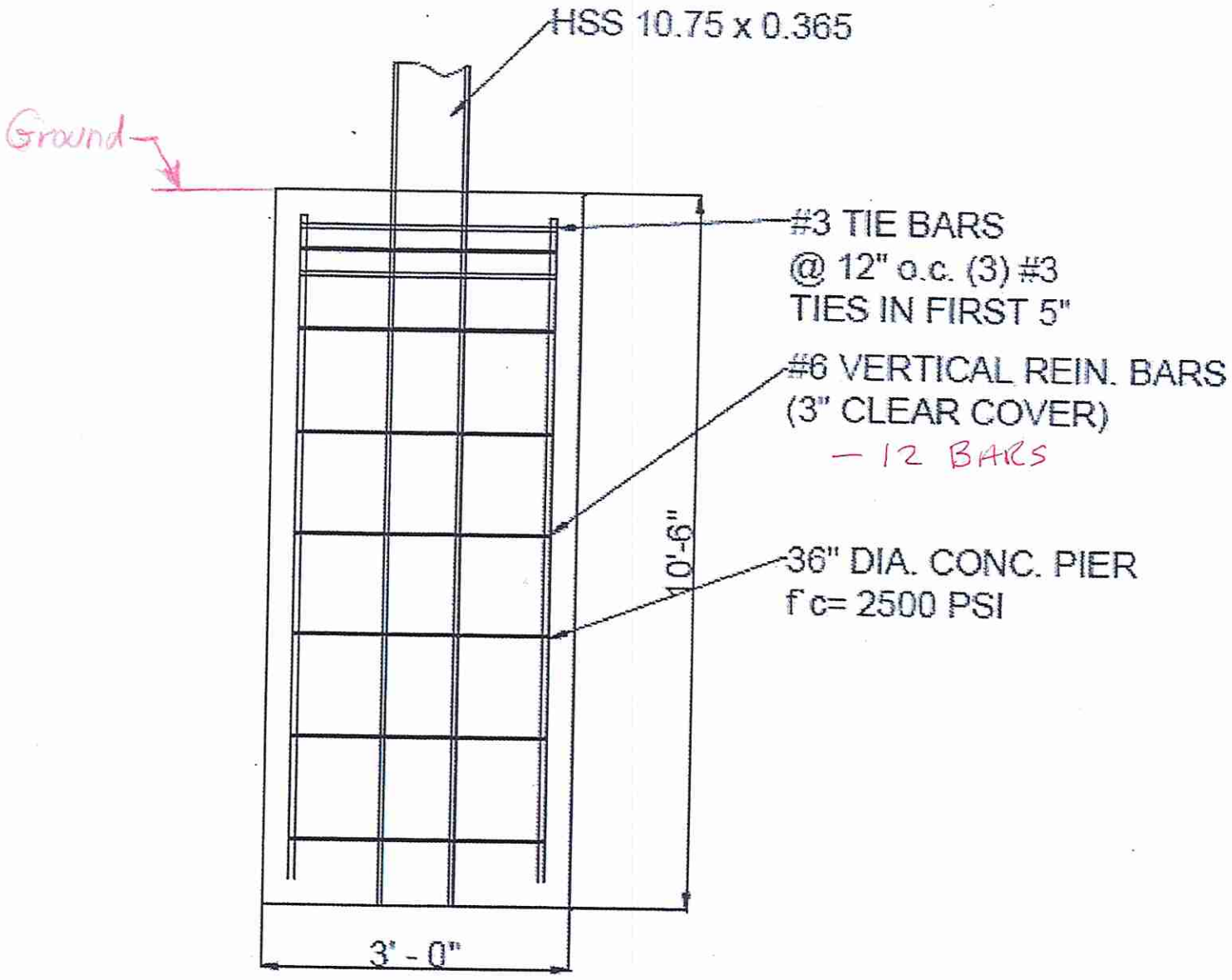
3' Tall Brick Backstop Wall

Note: Match Footing Elevations for 2' Tall Wall

FIGURE 2

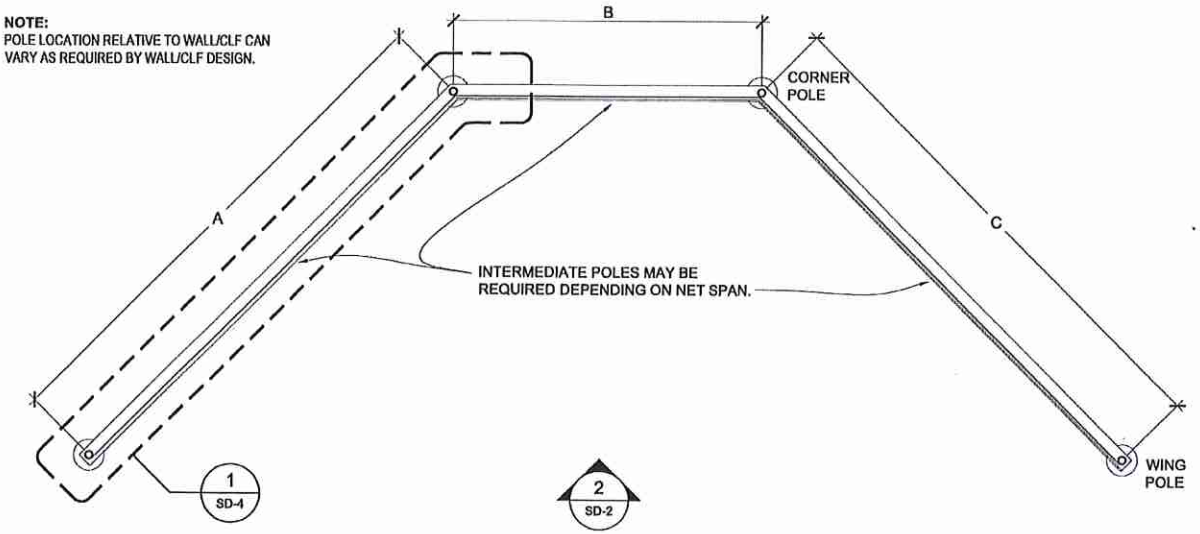


Backstop Wall Section

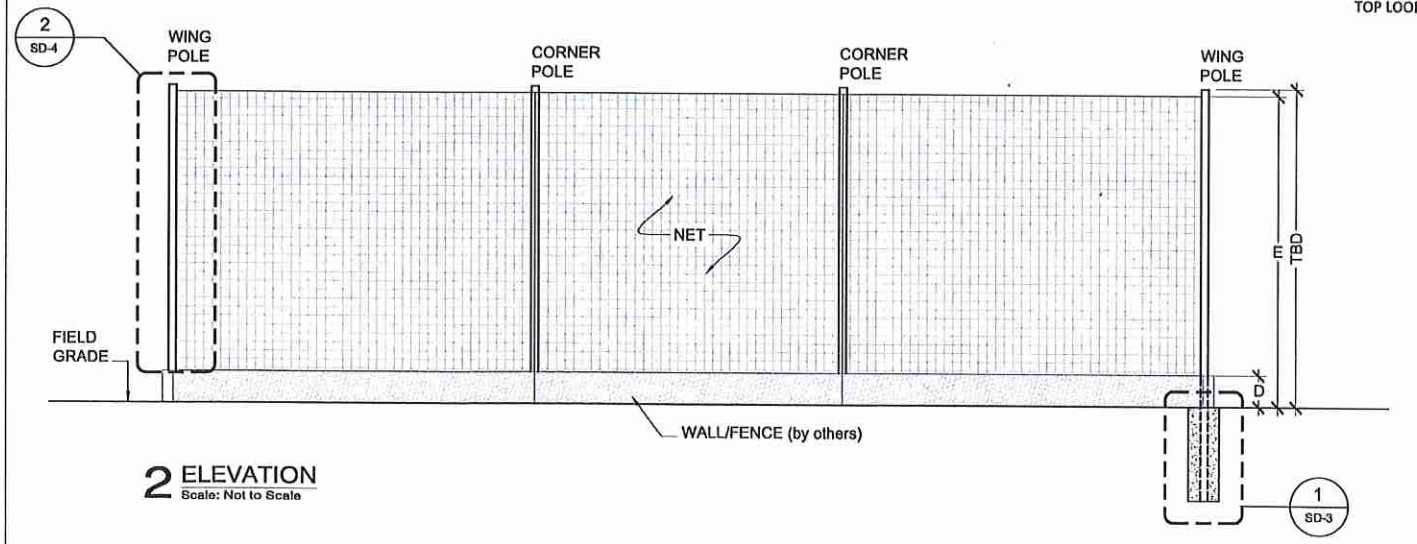


Support Pole Foundation

NOTE:
POLE LOCATION RELATIVE TO WALL/CLF CAN VARY AS REQUIRED BY WALL/CLF DESIGN.



1 PLAN VIEW
Scale: Not to Scale



2 ELEVATION
Scale: Not to Scale

BACKSTOP DIMENSIONAL CHART

PLAN ID	DESCRIPTION	REQUIRED DIMENSION
A	Wing Pole to Corner Pole	
B	Corner Pole to Corner Pole	
C	Corner Pole to Wing Pole	
D	Wall or Fence height from field grade	
E	Net height from field grade	

NOTES:

BASED ON THE DIMENSIONS PROVIDED ABOVE, POLE SPECIFICATIONS, LENGTHS, AND FOUNDATION SIZE(S) WILL BE DETERMINED BY BACKSTOP ENGINEERING.

STAMPED ENGINEERING CALCULATIONS FOR POLE SPECIFICATIONS AND FOUNDATION DETAIL BASED ON CLIENT-PROVIDED SITE SOILS DATA, PREVAILING CODE, AND DESIGN WIND SPEED CAN BE PROVIDED AS REQUIRED BY THE PROJECT PLANS.

RECOMMENDATIONS:

MAINTAIN A MINIMUM CLEAR DISTANCE OF 36" IN FRONT OF AND IN BACK OF THE NET TO AVOID DAMAGE. REPEATED RUBBING AND/OR SNAGGING OF THE NET AGAINST OTHER OBJECTS, INCLUDING - BUT NOT LIMITED TO - WALLS, LIGHT POLES, AND FENCING MAY CAUSE PREMATURE TEARING AND NET FAILURE.

IF THE BOTTOM OF THE NET WILL BE NEAR THE TOP OF A CHAIN LINK FENCE, USE A PLASTIC FENCE CAP OR SLIT DRAIN TILE TO PROTECT THE BOTTOM OF THE NET FROM SNAGGING ON THE TOP LOOPS OF THE CHAIN LINK FABRIC.

BEACON ATHLETICS
phone: 1-800-747-5985
www.BeaconAthletics.com

DRAWING TITLE:
BEACON INLINE BACKSTOP LIFTING & TENSIONING MODEL# BSP-L
PLAN AND ELEVATION

CUSTOMER NAME: -
PROJECT NAME: -
PROJECT LOCATION: -

REVISION #	DATE	BY
REV 1	5/4/15	TMB
REV 2	9/21/15	TMB
REV 3	11/15/16	EH

SCALE:	SEE DWG
DRAWN BY:	JP
DATE:	08/04/14
PROJECT NO:	
DRAWING NO:	**SD-2**

Ascension Parish Softball Field Backstop Replacement

Geotechnical Investigations

Scope of Services

September 14, 2022

The work on the proposed project will consist of replacement of the backstops (poles and netting) on three (3) adjacent fields. The new backstop will consist of a brick wall structure 2-3 ft tall with a net fastened to it up to approximately 30 ft. The netting will be supported on poles of approximately this height. The poles will be installed adjacent to and behind the back stop.

Work to be performed:

1. Collect soil borings and perform analysis as required to adequately define the soils in the work area

2. For the wall structure, to be placed roughly at grade or just below grade, provide recommended allowable bearing pressures for design of footings

3. For the support poles, provide recommended allowable bearing pressures and lateral load capacity of soils as would be suitable for use in design. A reasonable depth for the poles or footings should be considered (Refer to the attached drawing showing the general arrangement of the backstop Additional poles may be needed depending on the length of netting required down each sideline.

4. For both the wall structure and support poles, provide a reasonable estimate of settlement (if practical)

A geotechnical report, suitable for further design, will be provided which will include the results of soil borings and all recommendations.

It is the intent to include this report as part of the bid package for this project. The design of the poles and foundation is **not** a part of this work. The supplier of the net system will be required to provide the complete design for the poles and foundation.

Proposed Netting System and Back Stop
896-1198 Clay St.
Donaldsonville, Louisiana

Parish of Acension Government
Lamar Dixon Expo Center, Bldg. G
Gonzales, LA 70737

LOG OF SOIL BORING B-1

TheBetaGroup
engineering and construction services

Sheet 1 of 1

File: 5965G
Date: 9/16/22
Logged by: E. Lazier
Driller: T. Roche
Rig: CME 75

Location: Lat. 30° 5' 56.59"
Long. 90° 59' 2.68"
Surface Elevation:

FIELD DATA				LABORATORY DATA								
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Wet Unit Weight (pcf)	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Percent Passing #200 Sieve	Organic Content	Soil Type	Description
			2.75 (P)	1.03	21	118							Stiff Gray w/ Tan SILTY CLAY (CL)
			1.25 (P)	0.59	35	110							Soft to Medium Stiff Gray w/ Tan SILTY CLAY (CL)
▼	5		1.0 (P)	0.61	36	111	55	23	32				
▽			0.75 (P)	0.25	37	121							
	10		0.75 (P)	0.35	49	107							
			1.0 (P)		29								Medium Stiff Gray SANDY CLAY (CL)
	15												
	20		0.75 (P)	0.63	30	135							
			1.0 (P)		38								Medium Stiff Gray SILTY CLAY (CL)
	25												
			1.0 (P)	0.15	59	96							Very Soft to Soft Gray CLAY (CH)
	30												
			1.25 (P)		61								
	35												
			1.0 (P)	0.49	34	116	53	21	32				Medium Stiff Gray SILTY CLAY (CL)
	40												Boring completed at 40 ft.

Ground Water Level Data

▽ Free water first encountered

▼ Water level after 15 mins.

Boring Advancement Method

4" Nom. Dia. Short Flight Auger:
0 to 10 ft.
4" Dia. Rotary Wash:
10 to 40 ft.

Boring Abandonment Method

Borehole grouted with cement/ bentonite upon completion

Notes

Strata Boundaries and Sample Lengths May Not Be Exact

ARD LOG01 01R 5965G.GPJ LOG01R.GDT 10/5/22

Proposed Netting System and Back Stop
896-1198 Clay St.
Donaldsonville, Louisiana

Parish of Acension Government
Lamar Dixon Expo Center, Bldg. G
Gonzales, LA 70737

LOG OF SOIL BORING B-2

TheBetaGroup engineering and construction services

Sheet 1 of 1

File: 5965G
Date: 9/16/22
Logged by: E. Lazier
Driller: T. Roche
Rig: CME 75

Location: Lat. 30° 5' 56.11" Long. 90° 59' 5.43"
Surface Elevation:

FIELD DATA				LABORATORY DATA								
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Wet Unit Weight (pcf)	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Percent Passing #200 Sieve	Organic Content	Soil Type	Description
	0		4.0 (P)	1.38	19	121							Stiff Gray w/ Tan SILTY CLAY (CL) w/ Shell Fragments
▽			2.5 (P)	0.76	23	122							Soft to Medium Stiff Gray w/ Tan SILTY CLAY (CL)
	5		1.0 (P)	0.43	28	123							
▽			1.25 (P)	0.73	29	119	42	16	26				
			1.5 (P)	0.53	37	111							
	10												
	15		0.75 (P)	0.28	31	134							Soft to Medium Stiff Gray w/ Tan SANDY CLAY (CL)
	20		1.0 (P)		31								
	25		0.75 (P)	0.56	40	117							Medium Stiff Gray SILTY CLAY (CL)
	30		1.25 (P)		56								Medium Stiff Gray CLAY (CH)
	35		0.75 (P)	0.47	74	96	123	30	93				
	40		1.5 (P)		35								Medium Stiff Gray SILTY CLAY (CL)
													Boring completed at 40 ft.

Ground Water Level Data

▽ Free water first encountered

▼ Water level after 15 mins.

Boring Advancement Method

4" Nom. Dia. Short Flight Auger:
0 to 10 ft.
4" Dia. Rotary Wash:
10 to 40 ft.

Boring Abandonment Method

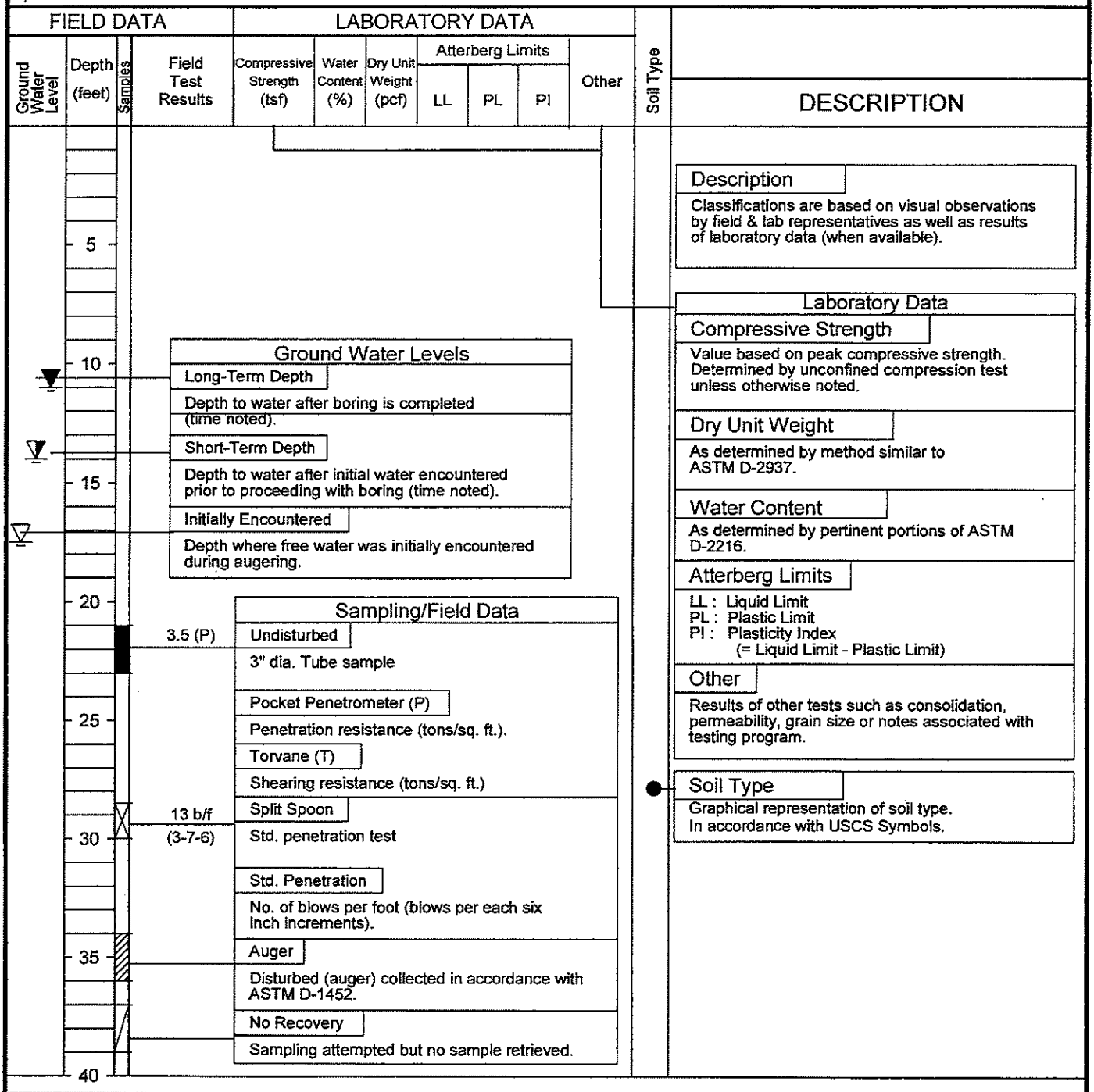
Borehole grouted with cement/ bentonite upon completion

Notes

Strata Boundaries and Sample Lengths May Not Be Exact

ARD LOG01 01R 5965G.GPJ LOG01R.GDT 10/5/22

DESCRIPTION OF TERMS AND SYMBOLS USED ON SOIL BORING LOG



Ground Water Level Data	Boring Advancement Method	Notes
	Boring Abandonment Method	

Form LOGTERMS

Strata Boundaries May Not Be Exact

UNIFIED SOIL CLASSIFICATION SYSTEM

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