

Boring Log No. B-1



Project: **North Burleson Street
From W. Center to Market Place Avenue
Kyle, Texas**

Sampling Date: 6/2/14

Coordinates: N29°59'20.87" W97°52'38.35"

Location: See Boring Location Plan

Backfill: Cuttings

Soil Description	Depth (ft)	SN	WC	PL	LL	PI	PP	N	-200
FAT CLAY (CH) with sand and gravel, stiff, dark brown with reddish tan, moist with limestone fragments		T					1.75		
		T					1.5		
CLAYEY SAND (SC) with gravel, stiff, dark gray with tan, moist with limestone fragment and coarse sand	5	T	17	21	65	44	2.0		41
[CWLS] CLAYEY SAND (SC), very dense, tan and light gray, moist		SS						50/3"	
[AUSTIN] Weathered CHALK, tan and light gray		SS						50/2"	

Borehole terminated at 9 feet

DRAFT

2013-756.GPJ 6/18/14 (BORING LOG SA12-02,ARIASSA12-01.GDT,LIBRARY2013-01.GLB)

Groundwater Data:

First encountered during drilling: 6-ft depth

Field Drilling Data:

Coordinates: Hand-held GPS Unit
 Logged By: R. Russo
 Driller: Austin Geo-Logic
 Equipment: Truck-mounted drill rig

Single flight auger: 0 - 9 ft

Nomenclature Used on Boring Log

- Thin-walled tube (T)
- Split Spoon (SS)
- ▽ Water encountered during drilling
- WC = Water Content (%)
- PL = Plastic Limit
- LL = Liquid Limit
- PI = Plasticity Index
- PP = Pocket Penetrometer (tsf)
- N = SPT Blow Count
- 200 = % Passing #200 Sieve

Boring Log No. B-2



Project: North Burleson Street
From W. Center to Market Place Avenue
Kyle, Texas

Sampling Date: 6/2/14

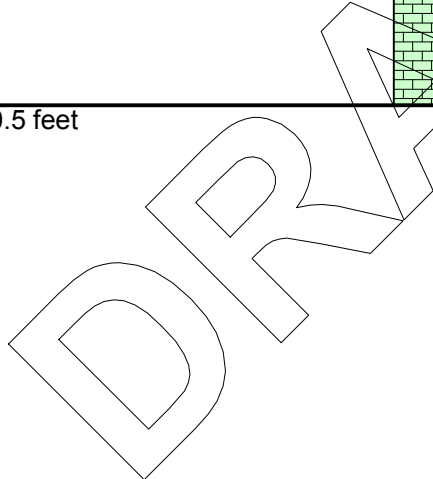
Location: See Boring Location Plan

Coordinates: N29°59'26.94" W97°52'36.66"

Backfill: Cuttings

Soil Description	Depth (ft)	SN	WC	PL	LL	PI	N	-200	RECR	QD
SILTY SAND (SM), brown, dry with gravel.	0 - 5	T								
[CWLS] CLAYEY SAND (SC), dense to very dense, tan, with limestone fragments.	5 - 10	SS	16	21	29	8	35	25		
[Austin] LIMESTONE, tan and light gray, moderately hard with clay partings, weathered layers and discontinuities.	10 - 10.5	RC					64/8"		78	27

Borehole terminated at 10.5 feet



Groundwater Data:

First encountered during drilling: 5.5-ft depth

Field Drilling Data:

Coordinates: Hand-held GPS Unit
Logged By: R. Russo
Driller: Austin Geo-Logic
Equipment: Truck-mounted drill rig

Single flight auger: 0 - 5.5 ft
Rock core: 5.5 - 10.5 ft

Nomenclature Used on Boring Log

- Thin-walled tube (T)
- Rock Core (RC)

Split Spoon (SS)

Water encountered during drilling

WC = Water Content (%)
PL = Plastic Limit
LL = Liquid Limit
PI = Plasticity Index
N = SPT Blow Count

-200 = % Passing #200 Sieve
RQD = Rock Quality Designation
REC = % Recovery

Boring Log No. B-3



Project: **North Burleson Street
From W. Center to Market Place Avenue
Kyle, Texas**

Sampling Date: 5/29/14

Location: See Boring Location Plan

Coordinates: N29°59'34.28" W97°52'34.73"

Backfill: Cuttings

Soil Description	Depth (ft)	SN	WC	PL	LL	PI	N	-200	DD	Uc	RECR	QD
1" Asphalt over 8" BASE	0 - 0.5	GB										
FILL: LEAN CLAY (CL), very stiff, dark brown and tan	0.5 - 1.5	SS	7	17	37	20	28	29				
LEAN CLAY (CL), hard, light tan and gray	1.5 - 2.5	SS	11	18	37	19	50/3"	34				
Weathered LIMESTONE, light tan and gray	2.5 - 5.0	SS	6				**50/3"					
[Austin] LIMESTONE, tan, moderately hard with clay partings, weathered layers and discontinuities. -light gray from 7 to 8 ft	5.0 - 10.0	RC							147 (UW)	178	97	64
									143 (UW)	111		

Borehole terminated at 10 feet

DRAFT

Groundwater Data:

During drilling: Not encountered

Field Drilling Data:

Coordinates: Hand-held GPS Unit
Logged By: W. Persyn
Driller: Austin Geo-Logic
Equipment: Truck-mounted drill rig

Single flight auger: 0 - 5 ft
Rock core: 5 - 10 ft

Nomenclature Used on Boring Log

- Grab Sample (GB)
- Split Spoon (SS)
- Rock Core (RC)

WC = Water Content (%)
PL = Plastic Limit
LL = Liquid Limit
PI = Plasticity Index
N = SPT Blow Count

** = Blow Counts During Seating Penetration
-200 = % Passing #200 Sieve
DD = Dry Density (pcf)
Uc = Compressive Strength (tsf)

QD = Rock Quality Designation
REC = % Recovery
UW = Unit Weight (pcf)

2013-756.GPJ 6/18/14 (BORING LOG SA12-02,ARIASSA12-01.GDT,LIBRARY2013-01.GLB)

Boring Log No. B-4



**Project: North Burleson Street
From W. Center to Market Place Avenue
Kyle, Texas**

Sampling Date: 6/2/14

Location: See Boring Location Plan

Coordinates: N29°59'40.05" W97°52'34.45"

Backfill: Cuttings

Soil Description	Depth (ft)	SN	WC	PL	LL	PI	PP	N	-200	DD	Uc	RECR	QD
FAT CLAY (CH), stiff, dark brown, moist with organics, scattered coarse sand and gravel.	0	T					2.0						
	1	T	31	22	73	51	2.25		82				
SANDY FAT CLAY (CH), stiff, gray to light gray, moist with ferrous staining	5	T					1.5						
	6	T	11	13	26	13	4.0		41				
LEAN CLAY with Sand (CL), hard, tan, with limestone fragments	10	SS						50/5"					
LIMESTONE, tan, moderately hard with clay partings, weathered layers and discontinuities.	15	RC	8							147 (UW)	133	93	82
Borehole terminated at 15 feet													

Groundwater Data:

First encountered during drilling: 8.5-ft depth

Field Drilling Data:

Coordinates: Hand-held GPS Unit
 Logged By: R. Russo
 Driller: Austin Geo-Logic
 Equipment: Truck-mounted drill rig

Single flight auger: 0 - 10 ft
 Rock core: 10 - 15 ft

Nomenclature Used on Boring Log

- Thin-walled tube (T)
- ▣ Split Spoon (SS)
- ▽ Water encountered during drilling
- ▣ Rock Core (RC)
- WC = Water Content (%)
- PL = Plastic Limit
- LL = Liquid Limit
- PI = Plasticity Index
- PP = Pocket Penetrometer (tsf)
- N = SPT Blow Count
- 200 = % Passing #200 Sieve
- DD = Dry Density (pcf)
- Uc = Compressive Strength (tsf)
- REC = % Recovery
- UW = Unit Weight (pcf)
- RQD = Rock Quality Designation

Boring Log No. B-5



Project: **North Burleson Street**
From W. Center to Market Place Avenue
Kyle, Texas

Sampling Date: 6/2/14

Location: See Boring Location Plan

Coordinates: N29°59'53.1" W97°52'31.79"

Backfill: Cuttings

Soil Description	Depth (ft)	SN	WC	PL	LL	PI	PP	N	-200
4" Conc. sidewalk									
FAT CLAY (CH) with sand and gravel, stiff to very stiff, dark brown with tan and gray, with sand and gravel layers.		T					2.75		
		T	30	18	59	41	2.75		62
- increased gravel from 4.5 to 5 fet	5	T					1.75		
- abundant gravel at 7 to 8 feet		T					1.75		
[CWLS] SANDY LEAN CLAY (CL), stiff, tan, wet		SS							50/3"

Borehole terminated at 9.5 feet

DRAFT

2013-756.GPJ 6/18/14 (BORING LOG SA12-02,ARIASSA12-01.GDT,LIBRARY2013-01.GLB)

Groundwater Data:

First encountered during drilling: 6.5-ft depth

Field Drilling Data:

Coordinates: Hand-held GPS Unit
 Logged By: R. Russo
 Driller: Austin Geo-Logic
 Equipment: Truck-mounted drill rig

Single flight auger: 0 - 9.5 ft

Nomenclature Used on Boring Log

- Thin-walled tube (T)
- Split Spoon (SS)
- ∇ Water encountered during drilling
- WC = Water Content (%)
- PL = Plastic Limit
- LL = Liquid Limit
- PI = Plasticity Index
- PP = Pocket Penetrometer (tsf)
- N = SPT Blow Count
- 200 = % Passing #200 Sieve

Boring Log No. B-6



**Project: North Burleson Street
From W. Center to Market Place Avenue
Kyle, Texas**

Sampling Date: 5/29/14

Coordinates: N29°59'57.77" W97°52'27.99"

Location: See Boring Location Plan

Backfill: Cuttings

Soil Description	Depth (ft)	SN	WC	PL	LL	PI	N	-200
FAT CLAY (CH), firm, brown and tan, wet with sand and gravel		SS	16 24	22	48	26	6	45
		SS	26	19	66	47	7	62
	5	SS					4	
		GB	38					
CONCRETE, tan, possible flowable fill		SS	22				**13/3"	13

Borehole terminated at 7.3 feet

DRAFT

Groundwater Data:

First encountered during drilling: 5-ft depth
After 30 minutes: 2-ft depth

Field Drilling Data:

Coordinates: Hand-held GPS Unit
Logged By: W. Persyn
Driller: Austin Geo-Logic
Equipment: Truck-mounted drill rig

Single flight auger: 0 - 7.3 ft

Nomenclature Used on Boring Log

Split Spoon (SS)

Grab Sample (GB)

Water encountered during drilling

Delayed water reading

WC = Water Content (%)

PL = Plastic Limit

LL = Liquid Limit

PI = Plasticity Index

N = SPT Blow Count

** = Blow Counts During Seating

Penetration

-200 = % Passing #200 Sieve

2013-756.GPJ 6/18/14 (BORING LOG SA12-02,ARIASSA12-01.GDT,LIBRARY2013-01.GLB)

Boring Log No. B-7



Project: North Burleson Street
From W. Center to Market Place Avenue
Kyle, Texas

Sampling Date: 6/2/14

Location: See Boring Location Plan

Coordinates: N30°0'0.49" W97°52'22.31"

Backfill: Cuttings

Soil Description	Depth (ft)	SN	WC	PP	N	DD	Uc	RECR	QD
CLAYEY SAND (SC), brown to reddish tan, moist with gravel.	0 - 1	T		2.75					
SANDY LEAN CLAY (CL), firm, tan to reddish tan, wet with limestone fragments.	1 - 5	SS			6				
[Austin] CHALK, tan to light gray, moderately hard with clay partings, weathered layers and discontinuities.	5 - 7	SS			50/1"				
	7 - 10	RC	7					88	60
	10 - 15	RC	6			146 (UW)	265	93	83
	15 - 20	RC	7			150 (UW)	174	100	100
Borehole terminated at 20 feet									

DRAFT

Groundwater Data:

During drilling: Not encountered

Field Drilling Data:

Coordinates: Hand-held GPS Unit
Logged By: R. Russo
Driller: Austin Geo-Logic
Equipment: Truck-mounted drill rig

Single flight auger: 0 - 5 ft
Rock core: 5 - 20 ft

Nomenclature Used on Boring Log

- Thin-walled tube (T)
- Split Spoon (SS)
- Rock Core (RC)

WC = Water Content (%) RQD = Rock Quality Designation
PP = Pocket Penetrometer (tsf) REC = % Recovery
N = SPT Blow Count UW = Unit Weight (pcf)
DD = Dry Density (pcf)
Uc = Compressive Strength (tsf)

2013-756.GPJ 6/18/14 (BORING LOG SA12-02,ARIASSA12-01.GDT,LIBRARY2013-01.GLB)

Boring Log No. B-8



**Project: North Burleson Street
From W. Center to Market Place Avenue
Kyle, Texas**

Sampling Date: 6/5/14

Location: See Boring Location Plan

Coordinates: N30°0'3.42" W97°52'15.2"

Backfill: Cuttings

Soil Description	Depth (ft)	SN	WC	PL	LL	PI	PP	N	-200	DD	Uc	RECR	QD
CLAYEY GRAVEL (GC), firm to hard, dark brown and tan, with sand and subrounded gravel	0	SS	14	25	48	23		8	30				
	1	T	17	26	67	41	4.5+		24				
[CWLS] SANDY LEAN CLAY (CL), hard, tan	5	SS						50/3"					
[Austin] Weathered LIMESTONE, tan to gray, soft to moderately hard, with marl layers, and alternating tan and gray layers.	10	RC										93	23
	10		13							139 (UW)	38		

Borehole terminated at 10 feet

DRAFT

Groundwater Data:
During drilling: Not encountered

Field Drilling Data:
Coordinates: Hand-held GPS Unit
Logged By: R. Russo
Driller: Austin Geo-Logic
Equipment: Truck-mounted drill rig

Hand Auger: 0 - 1 ft

Nomenclature Used on Boring Log

Split Spoon (SS)	Thin-walled tube (T)
Rock Core (RC)	

WC = Water Content (%)	N = SPT Blow Count	REC = % Recovery
PL = Plastic Limit	-200 = % Passing #200 Sieve	UW = Unit Weight (pcf)
LL = Liquid Limit	DD = Dry Density (pcf)	
PI = Plasticity Index	Uc = Compressive Strength (tsf)	
PP = Pocket Penetrometer (tsf)	RQD = Rock Quality Designation	

2013-756.GPJ 6/18/14 (BORING LOG SA12-02,ARIASSA12-01.GDT,LIBRARY2013-01.GLB)

Boring Log No. B-9



**Project: North Burleson Street
From W. Center to Market Place Avenue
Kyle, Texas**

Sampling Date: 5/29/14

Coordinates: N30°0'0.05" W97°52'9.27"

Location: See Boring Location Plan

Backfill: Cuttings

Soil Description	Depth (ft)	SN	WC	PL	LL	PI	PP	N	-200	DD	Uc	RECR	QD
FAT CLAY (CH), very stiff, dark brown	0 - 1												
LEAN CLAY (CL), hard, tan	1 - 5	T	27	21	40	19	1.3		53				
Weathered LIMESTONE, light tan and light gray, with clay seams and layers	5 - 5.5	SS	11					50/4"	18				
	5.5 - 6	SS	16					**50/2"					
[Austin] LIMESTONE, tan, moderately hard with clay partings, weathered layers and discontinuities.	6 - 10	RC								153 (UW)	595	96	25
	10 - 10									145 (UW)	124		

Borehole terminated at 10 feet

DRAFT

Groundwater Data:

First encountered during drilling: 3-ft depth
After 30 minutes: 3-ft depth

Field Drilling Data:

Coordinates: Hand-held GPS Unit
Logged By: W. Persyn
Driller: Austin Geo-Logic
Equipment: Truck-mounted drill rig

Single flight auger: 0 - 5 ft
Rock core: 5 - 10 ft

Nomenclature Used on Boring Log

■ Thin-walled tube (T)

▤ Split Spoon (SS)

▽ Water encountered during drilling

▣ Rock Core (RC)

▼ Delayed water reading

WC = Water Content (%)

N = SPT Blow Count

Uc = Compressive Strength (tsf)

PL = Plastic Limit

** = Blow Counts During Seating

QD = Rock Quality Designation

LL = Liquid Limit

Penetration

REC = % Recovery

PI = Plasticity Index

-200 = % Passing #200 Sieve

UW = Unit Weight (pcf)

PP = Pocket Penetrometer (tsf)

DD = Dry Density (pcf)

Boring Log No. B-10



Project: **North Burleson Street
From W. Center to Market Place Avenue
Kyle, Texas**

Sampling Date: 6/2/14

Location: See Boring Location Plan

Coordinates: N30°0'11.48" W97°52'4.08"

Backfill: Cuttings

Soil Description	Depth (ft)	SN	WC	PL	LL	PI	PP	N	-200
FAT CLAY (CH), stiff, dark brown, moist with coarse sand and small angular gravel.		T					1.5		
		T					2.5		
FAT CLAY (CH) with sand, stiff, light gray to tan, moist with coarse sand and small angular gravel.	5	T	18	17	50	33			79
CLAYEY SAND (SC), tan to light gray, wet		T							
		SS							50/4"

Borehole terminated at 9 feet

DRAFT

Groundwater Data:

First encountered during drilling: 4-ft depth

Field Drilling Data:

Coordinates: Hand-held GPS Unit
Logged By: R. Russo
Driller: Austin Geo-Logic
Equipment: Truck-mounted drill rig

Single flight auger: 0 - 9 ft

Nomenclature Used on Boring Log

■ Thin-walled tube (T)

■ Split Spoon (SS)

▽ Water encountered during drilling

WC = Water Content (%)

N = SPT Blow Count

PL = Plastic Limit

-200 = % Passing #200 Sieve

LL = Liquid Limit

PI = Plasticity Index

PP = Pocket Penetrometer (tsf)

2013-756.GPJ 6/18/14 (BORING LOG SA12-02,ARIASSA12-01.GDT,LIBRARY2013-01.GLB)

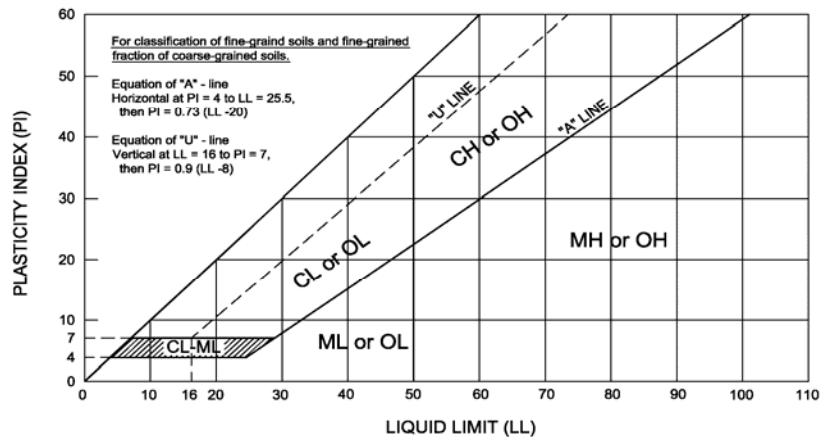
KEY TO TERMS AND SYMBOLS USED ON BORING LOGS

MAJOR DIVISIONS			GROUP SYMBOLS	DESCRIPTIONS				
COARSE-GRAINED SOILS	More than half of material LARGER than No. 200 Sieve size	GRAVELS	Clean Gravels (little or no Fines)	GW	Well-Graded Gravels, Gravel-Sand Mixtures, Little or no Fines			
			Poorly-Graded Gravels, Gravel-Sand Mixtures, Little or no Fines	GP	Poorly-Graded Gravels, Gravel-Sand Mixtures, Little or no Fines			
			Silty Gravels, Gravel-Sand-Silt Mixtures	GM	Silty Gravels, Gravel-Sand-Silt Mixtures			
			Clayey Gravels, Gravel-Sand-Clay Mixtures	GC	Clayey Gravels, Gravel-Sand-Clay Mixtures			
		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		
				Poorly-Graded Sands, Gravelly Sands, Little or no Fines	SP	Poorly-Graded Sands, Gravelly Sands, Little or no Fines		
			Sands with Fines (Appreciable amount of Fines)	Silty Sands, Sand-Silt Mixtures	SM	Silty Sands, Sand-Silt Mixtures		
				Clayey Sands, Sand-Clay Mixtures	SC	Clayey Sands, Sand-Clay Mixtures		
				SILTS & CLAYS	Liquid Limit less than 50	Inorganic Silts & Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity	ML	Inorganic Silts & Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity
						Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays	CL	Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
SILTS & CLAYS	Liquid Limit greater than 50	Inorganic Silts, Micaceous or Diatomaceous Fine Sand or Silty Soils, Elastic Silts	MH	Inorganic Silts, Micaceous or Diatomaceous Fine Sand or Silty Soils, Elastic Silts				
		Inorganic Clays of High Plasticity, Fat Clays	CH	Inorganic Clays of High Plasticity, Fat Clays				
FORMATIONAL MATERIALS	SANDSTONE		Massive Sandstones, Sandstones with Gravel Clasts	Massive Sandstones, Sandstones with Gravel Clasts				
	MARLSTONE		Indurated Argillaceous Limestones	Indurated Argillaceous Limestones				
	LIMESTONE		Massive or Weakly Bedded Limestones	Massive or Weakly Bedded Limestones				
	CLAYSTONE		Mudstone or Massive Claystones	Mudstone or Massive Claystones				
	CHALK		Massive or Poorly Bedded Chalk Deposits	Massive or Poorly Bedded Chalk Deposits				
	MARINE CLAYS		Cretaceous Clay Deposits	Cretaceous Clay Deposits				
GROUNDWATER			Indicates Final Observed Groundwater Level	Indicates Final Observed Groundwater Level				
			Indicates Initial Observed Groundwater Location	Indicates Initial Observed Groundwater Location				

Density of Granular Soils	
Number of Blows per ft., N	Relative Density
0 - 4	Very Loose
4 - 10	Loose
10 - 30	Medium
30 - 50	Dense
Over 50	Very Dense

Consistency and Strength of Cohesive Soils		
Number of Blows per ft., N	Consistency	Unconfined Compressive Strength, q_u (tsf)
Below 2	Very Soft	Less than 0.25
2 - 4	Soft	0.25 - 0.5
4 - 8	Medium (Firm)	0.5 - 1.0
8 - 15	Stiff	1.0 - 2.0
15 - 30	Very Stiff	2.0 - 4.0
Over 30	Hard	Over 4.0

PLASTICITY CHART (ASTM D 2487-11)



KEY TO TERMS AND SYMBOLS USED ON BORING LOGS

TABLE 1 Soil Classification Chart (ASTM D 2487-11)

Criteria of Assigning Group Symbols and Group Names Using Laboratory Tests ^A			Soil Classification				
			Group Symbol	Group Name ^B			
COARSE-GRAINED SOILS	Gravels (More than 50% of coarse fraction retained on No. 4 sieve)	Clean Gravels (Less than 5% fines ^C)	Cu ≥ 4 and 1 ≤ Cc ≤ 3 ^D	GW	Well-Graded Gravel ^E		
		Gravels with Fines (More than 12% fines ^C)	Cu < 4 and/or [Cc < or Cc > 3] ^D	GP	Poorly-Graded Gravel ^E		
	More than 50% retained on No. 200 sieve	Sands (50% or more of coarse fraction passes No. 4 sieve)	Clean Sands (Less than 5% fines ^H)	Fines classify as ML or MH	GM	Silty Gravel ^{E,F,G}	
			Sands with Fines (More than 12% fines ^H)	Fines classify as CL or CH	GC	Clayey Gravel ^{E,F,G}	
		FINE-GRAINED SOILS	Silt and Clays	inorganic	PI > 7 and plots on or above "A" line ^I	CL	Lean Clay ^{K,L,M}
			Liquid limit less than 50	organic	PI < 4 or plots below "A" line ^J	ML	Silt ^{K,L,M}
50% or more passes the No. 200 sieve	Silt and Clays	inorganic	Liquid limit - oven dried ^L / _{Liquid & #10} < 0.75	OL	Organic Clay ^{K,L,M,N} Organic Silt ^{K,L,M,O}		
		Liquid limit 50 or more	inorganic	PI plots on or above "A" line	CH	Fat Clay ^{K,L,M}	
	HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor	inorganic	PI plots on or above "A" line	MH	Elastic Silt ^{K,L,M}	
			organic	Liquid limit - oven dried ^L / _{Liquid & #10} < 0.75	OH	Organic Clay ^{K,L,M,P} Organic Silt ^{K,L,M,O}	
			PT	Peat			

^A Based on the material passing the 3-inch (75mm) sieve

^B If field sample contained cobbles or boulders, or both, add "with cobble sor boulders, or both" to group name

^C Gravels with 5% to 12% fines require dual symbols:

- GW-GM well-graded gravel with silt
- GW-GC well-graded gravel with clay
- GP-GM poorly-graded gravel with silt
- GP-GC poorly-graded gravel with clay

$$^D \text{ Cu} = D_{60}/D_{10} \quad \text{Cc} = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

^E If soil contains ≥ 15% sand, add "with sand" to group name

^F If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM

^G If fines are organic, add "with organic fines" to group name

^H Sand with 5% to 12% fines require dual symbols:

- SW-SM well-graded sand with silt
- SW-SC well-graded sand with clay
- SP-SM poorly-graded sand with silt
- SP-SC poorly-graded sand with clay

^I If soil contains ≥ 15% gravel, add "with gravel" to group name

^J If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay

^K If soil contains 15% to < 30% plus No. 200, add "with sand" or "with gravel," whichever is predominant

^L If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name

^M If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name

^N PI ≥ 4 and plots on or above "A" line

^O PI < 4 or plots below "A" line

^P PI plots on or above "A" line

^Q PI plots below "A" line

TERMINOLOGY

Boulders	Over 12-inches (300mm)	Parting	Inclusion < 1/8-inch thick extending through samples
Cobbles	12-inches to 3-inches (300mm to 75mm)	Seam	Inclusion 1/8-inch to 3-inches thick extending through sample
Gravel	3-inches to No. 4 sieve (75mm to 4.75mm)	Layer	Inclusion > 3-inches thick extending through sample
Sand	No. 4 sieve to No. 200 sieve (4.75mm to 0.075mm)		
Silt or Clay	Passing No. 200 sieve (0.075mm)		
Calcareous	Containing appreciable quantities of calcium carbonate, generally nodular		

Stratified	Alternating layers of varying material or color with layers at least 6mm thick
Laminated	Alternating layers of varying material or color with the layers less than 6mm thick
Fissured	Breaks along definite planes of fracture with little resistance to fracturing
Siickensided	Fracture planes appear polished or glossy sometimes striated
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay
Homogeneous	Same color and appearance throughout

KEY TO TERMS AND SYMBOLS USED ON BORING LOGS

Hardness Classification of Intact Rock

Class	Hardness	Field Test	Approximate Range of Uniaxial Compression Strength kg/cm ² (tons/ft ²)
I	Extremely hard	Many blows with geologic hammer required to break intact specimen.	> 2,000
II	Very hard	Hand held specimen breaks with hammer end of pick under more than one blow.	2,000 – 1,000
III	Hard	Cannot be scraped or peeled with knife, hand held specimen can be broken with single moderate blow with pick.	1,000 – 500
IV	Soft	Can just be scraped or peeled with knife. Indentations 1mm to 3mm show in specimen with moderate blow with pick.	500 – 250
V	Very soft	Material crumbles under moderate blow with sharp end of pick and can be peeled with a knife, but is too hard to hand-trim for triaxial test specimen.	250 – 10

Rock Weathering Classifications

Grade	Symbol	Diagnostic Features
Fresh	F	No visible sign of Decomposition or discoloration. Rings under hammer impact.
Slightly Weathered	WS	Slight discoloration inwards from open fractures, otherwise similar to F.
Moderately Weathered	WM	Discoloration throughout. Weaker minerals such as feldspar decomposed. Strength somewhat less than fresh rock, but cores cannot be broken by hand or scraped by knife. Texture preserved.
Highly Weathered	WH	Most minerals somewhat decomposed. Specimens can be broken by hand with effort or shaved with knife. Core stones present in rock mass. Texture becoming indistinct, but fabric preserved.
Completely Weathered	WC	Minerals decomposed to soil, but fabric and structure preserved (Saprolite). Specimens easily crumbled or penetrated.
Residual Soil	RS	Advanced state of decomposition resulting in plastic soils. Rock fabric and structure completely destroyed. Large volume change.

Rock Discontinuity Spacing

Description for Structural Features: Bedding, Foliation, or Flow Banding	Spacing	Description for Joints, Faults or Other Fractures
Very thickly (bedded, foliated, or banded)	More than 6 feet	Very widely (fractured or jointed)
Thickly	2 – 6 feet	Widely
Medium	8 – 24 inches	Medium
Thinly	2½ – 8 inches	Closely
Very thinly	¾ – 2½ inches	Very closely
Description for Micro-Structural Features: Lamination, Foliation, or Cleavage	Spacing	Descriptions for Joints, Faults, or Other Fractures
Intensely (laminated, foliated, or cleaved)	¼ – ¾ inch	Extremely close
Very intensely	Less than ¼ inch	

Engineering Classification for in Situ Rock Quality

RQD %	Velocity Index	Rock Mass Quality
90 – 100	0.80 – 1.00	Excellent
75 – 90	0.60 – 0.80	Good
50 – 75	0.40 – 0.60	Fair
25 – 50	0.20 – 0.40	Poor
0 – 25	0 – 0.20	Very Poor