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Braun Environmental
Laboratories, Inc.
Braun Pavement
Technologies, Inc.

October 26, 1988

ERV

HASTY TRUCK TERMINAL HASTY, MINNESOTA

Project #: C88-204/6087

Dear Sir,

Braun Environmental Laboratories, Inc. is pleased to provide our report for the analysis you requested. Data for the following sample(s) are enclosed:

Your I.D. Number/Description

Work Requested

Soil Samples

Organic Analysis

All samples were analyzed according to EPA or other standard methods. Any anomalies which were encountered in this analysis are referenced on the laboratory report. Method references and quality control information are available upon request.

If you have any questions or need additional information regarding this report or other Braun Environmental Laboratories services please contact us.

Very truly yours,

BRAUN ENVIRONMENTAL LABORATORIES, INC.

Linda C. Crawford Organic Supervisor

Anne L. Ochs

Laboratory Manager

LCC/ALO:krf

Attachment

ERV HASTY TRUCK TERMINAL HASTY, MN PROJECT: C88-204

COLLECTED: BRAUN

DATE: 09/12/88

RECEIVED: 09/13/88

SAMPLE MATRIX: SOIL

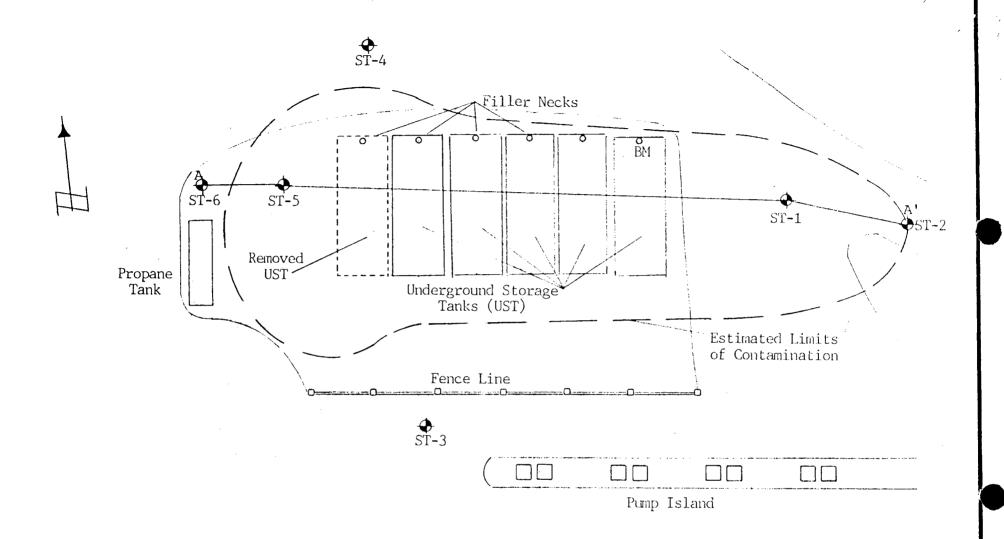
	BRAUN I.D		6087-2	6087-3
	CLIENT I.D	.: ST-214 FT.	ST-614 FT.	THIN SPREAD SOIL
PARAMETER	UNITS			
TOTAL HYDROCARBONS AS FUEL OIL	MG/KG	(55)	<1.0	250
XYLENES, TOTAL	MG/KG	₹1.0	<1.0	<1.0
BENZENE	MG/KG	<1.0	<1.0	<1.0
ETHYL BENZENE	MG/KG	<1.0	<1.0	<1.0
TOLUENE	MG/KG	<1.0	<1.0	<1.0

All quality control checks were within acceptable limits.

Reviewed by: LHILLHUF



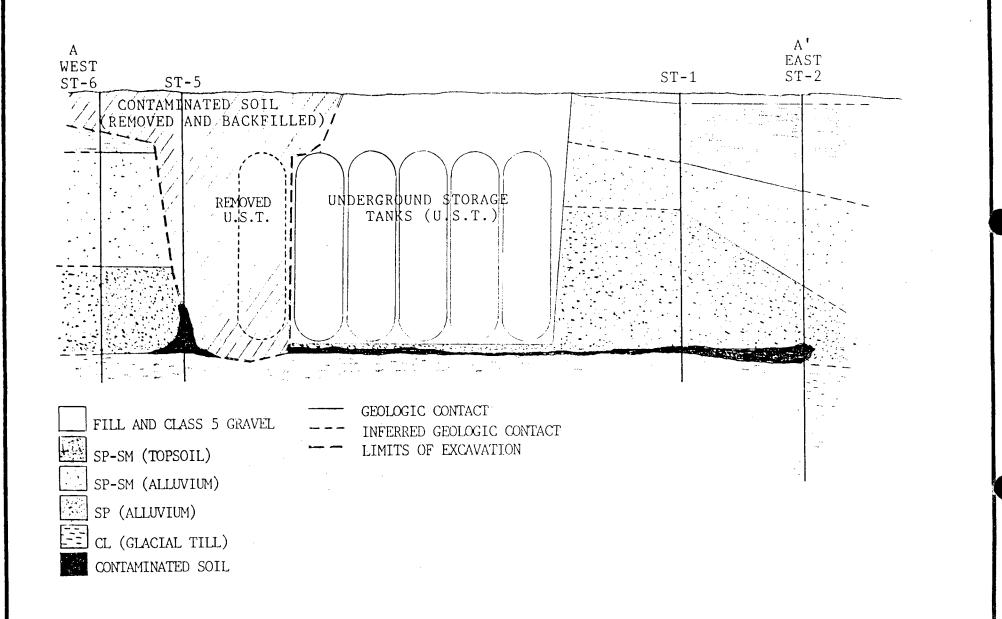
<= less than: compound not detected at or above indicated detection limit





C88-204 LEAKING UNDERGROUND STORAGE TANK INVESTIGATION Hasty Truck Terminal Hasty, Minnesota Soil Boring Location Map

Date:	9/13/88
Revised:	
Or aw n:	KNZ
Cale:	
.1	" = 20"





C88-204 LEAKING UNDERGROUND STORAGE TANK INVESTIGATION HASTY TRUCK TERMINAL HASTY, MINNESOTA GENERALIZED GEOLOGIC CROSS SECTION

Sept. 19, 1988
Revised:

Drawn: KNZ

Scale: HORIZ 1'' = 20' VERT 1'' = 5' VERTICAL EXAG. 4X





							ENGINE	ERING TESTING
:	PROJECT: C88-204 SOIL BORINGS Leaking Underground Storage Tank Evaluation Hasty Truck Stop Clearwater, MN				NG: ATION Atta		ST-1 d Sketo	ch
				DATE	<u>:</u>	9-1:	2–88	SCALE: 1"-4'
Elev. 98.0	Depth 0.0	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	 	BPF	WL	Tests	or Notes
97.0	1.0	SM	FILL: consisting primarily SILTY SAND with GRAVEL (SM) SILTY SAND, mostly fine to medium grained, dark brown black, moist. (Topsoil)	, 1			¹ most grain moist	ly fine to medic ned, brown,
94.5	3.5	SP	POORLY GRADED SAND, mostly to medium grained, with a t of GRAVEL, brown, moist, lo (Coarse Alluvium)	race	7			
90.0	8.0	SP	POORLY GRADED SAND, medium fine grained, with a little GRAVEL, few Cobbies, brown, moist, loose. (Coarse Alluvium)	to	10		holes to th the e stati	round surface tion at the bore were referenced e floor slab at ntrance of the on. This point ssumed to be at tion 100.0.
85.0	13.0							
82.5	15.5	CL	GRAVEL, brown, wet, rather s (Fine Alluvium)	soft.	5			
			Water level not encountered 15' of hollow-stem auger in ground. Water level not encountered cave-in depth of 12' immedia after withdrawal of auger. Boring then backfilled.	the				

LOG OF BORING



BORING: ST-2 PROJECT: LOCATION: C88-204 SOIL BORINGS Leaking Underground Storage See Attached Sketch Tank Evaluation Hasty Truck Stop Clearwater, MN SCALE: 1"=4" DATE: 9-12-88 BPF WL Tests Notes Description of Materials Depth **ASTM** Elev. (ASTM D2488) D2487 97.9 0.0 Symbol FILL: Consisting primarily of SILTY SAND with GRAVEL (SM), mostly fine to medium grained, brown, 96.9 1.0 SILTY SAND, mostly fine to molst. SM medium grained, dark brown, molst. (Topsoll)
POORLY GRADED SAND, mostly fine 94.9 3.0 SP to medium grained, with a little GRAVEL, few Cobbles, brown, moist, loose. 10 (Coarse Alluvium) 88.9 9.0 POORLY GRADED SAND, mostly fine to medium grained, light brown, moist, medium dense. SP 15 (Coarse Alluvium) 85.9 12.0 2 (Coarse Alluvium) POORLY GRADED SAND, mostly fine to medium grained, with a little SP GRAVEL, few Cobbles, brown, moist, medium dense.²
SANDY LEAN CLAY, with a trace of GRAVEL, brown, wet, rather soft. 83.9 14.0 CL (Fine Alluvium) 20.5 77.4 END OF BORING. Water level not encountered with 20' of hollow stem auger in the ground. Water level down 17.5' 14 hour after withdrawl of auger. Water level down 13.5' 2 hours

after withdrawl of auger. Boring then backfilled.





BORING: PROJECT: ST-3 C88-204 SOIL BORINGS LOCATION: Leaking Underground Storage Tank Evaluation See Attached Sketch Hasty Truck Stop Clearwater, MN DATE: SCALE: 9-12-88 BPF WL Elev. Depth **ASTM Description of Materials** Tests Notes or D2487 (ASTM D2488) 99.1 0.0 Symbol FILL: consisting primarily of lmostly fine to medium 98.1 1.0 SILTY SAND with GRAVEL (SM) grained, brown, SM SILTY SAND, mostly fine to moist. medium grained, dark brown to black, molst. 96.1 3.0 (Topsoll) POORLY GRADED SAND with SILT, mostly fine to medium grained, 2
POORLY GRADED SAND, mostly fine to medium grained, with a trace SP-SM ²with a little GRAVEL, 95.1 4.0 brown, moist. (Coarse Alluvium) 12 of GRAVEL, brown, moist, medium dense. (Coarse Alluvium) 90.1 9.0 SP POORLY GRADED SAND, mostly fine grained, light brown, moist. loose. (Coarse Alluvium) 85.1 14.0 3 (Fine Alluvium) CL SANDY LEAN CLAY, with a trace of GRAVEL, brown, moist to wet, rather soft. 5 83.6 15.5 END OF BORING. Water level not encountered with-15' of hollow-stem auger in the ground. Water level not encountered to cave-in depth of 12' immediately after withdrawal of auger. Boring then backfilled.





	PROJE	PROJECT:		BORING: ST-4						
	C88-20		BORING		LOCA	TION				
		Tank Hast	cing Unc Evalua Truck arwater,	Stop	See	Atta	che	d Sketc	h	
			·		DATE: 9-1			12-88 SCALE:		1"=4'
	Elev. 99.0	Depth 0.0	ASTM D2487 Symbol	Description of Materials (ASTM D2488)		BPF	WL	Tests	or	Notes
Standard Plates for evaluation and descriptive terminology.)	99.0	0.0	Symbol	FILL: consisting primarily POORLY GRADED SAND with SIL (SP-SM), mostly fine to med grained, with a trace of GR brown, moist.	T, lum	6				
on and descripti	90.0	9.0	SP	POORLY GRADED SAND, mostly to medium grained, with a I GRAVEL, few Cobbles, light brown, moist, medium dense.	fine ittle	18				
ates for evaluat	85.0	14.0	CL	(Coarse Alluvium)	ce of					
l P	83.5	15.5		GRAVEL, brown, wet, medium. (Fine Alluvium)		6				
(See Report and Standard	83.5	15.5		END OF BORING. Water level not encountered 15' of hollow-stem auger in ground. Water level not encountered cave-in depth of 10' immedia after withdrawal of auger. Boring then backfilled.	the to					
		1								





	PROJE	CT:			BORING: ST-5					
	C88-20		BORING		LOCA	TION	:			
		Tar Hast	ik Evalu Truck	Stop	See	Atta	ache	d Sketc	h	
		Clea	ırwater,	MN	DATE		9-1	2-88	SCALE:	1"=4'
	Elev. 99.1	Depth 0.0	ASTM D2487 Symbol	Description of Materials (ASTM D2488)		BPF	WL	Tests	or	Notes
(See neport and Standard Flates for evaluation and descriptive terminology.)	85.1	14.0	CL	FILL: consisting primarily POORLY GRADED SAND with SIL (SP-SM), mostly fine to med grained, with a trace of GR brown, moist. SANDY LEAN CLAY, mostly fin grained, with a trace of GR brown, wet, medium. END OF BORING. Water level not encountered 15' of hollow-stem auger in ground. Water level not encountered cave-in depth of 11' immediafter withdrawal of auger. Boring then backfilled.	e AVEL, with the	3		1(Fir	ne Allu	vium)
		*								

LOG OF BORING



							ENGINE	ERING TESTIN	4G	
PROJEC	 CT:			BORI	NG:		ST-6			
C88-20		BORING		LOCATION:						
	Tar Hasi	nk Évalu ty Truck	c Stop	See Attached			d Sketc	d Sketch		
Clearwater, MN				DATE:		9-1	2-88	SCALE:	1"=4'	
	·	1		_						
Elev.	Depth	ASTM D2487	Description of Materials (ASTM D2488)		BPF	WL	Tests	or	Notes	
99.2	0.0	Symbol								
98.4	0.8		FILL: consisting primarily					Y SAND V L (SM),		
		SM	SILTY SAND, mostly fine gra black, moist. (Topsoil)	inea,			fine	to mediced, blac	īm	
96.2	3.0	SP	POURLY GRADED SAND, MOSTTY	t ine	-					
			to medium grained, with a t of GRAVEL, brown, moist, me	race						
			dense.	a raiii	20					
			(Coarse Alluvium)		ļ					
					:					
	:									
90.2	9.0	!							, ••	
90.2	9.0	SP	POORLY GRADED SAND, mostly	fine						
			to medium grained, with a l GRAVEL, light brown, moist,	ittle	16					
			medium dense.			1				
			(Coarse Alluvium)							
85.2	14.0									
		CL	SANDY LEAN CLAY, with a tra- GRAVEL, brown, wet, medium.	ce of	6					
83.7	15.5		(Fine Alluvium) END OF BORING.							
			Water level not encountered 15' of hollow-stem auger in ground.	the						
			Water level not encountered cave—in depth of 9' immediated after withdrawal of auger.	to tely						
			Boring then backfilled.							
į										

h.Nu Field Data Sheet

Location: Has Weather Con Calibration	ber: <u>C88-204</u> sty Truck Stop, Hasty, ! ditions: 50°-60°F Over : Span 4 00 in25ppm Ben	cast W270° <u>010-20</u> zene 9/12/88	samples? 🔇	eaned? ① N eaned between N
Depth of Sample	Auger Cuttings	f NF Filler neck Split-Spoon(ppm)	Method: Washed Head Space Analysis (ppm)	in TSPNotes
1.0	0.0		(p pm)	Hoces
2.5	0.0			
5.0	0.0		0.0	
6.0	0.0			
7.0	0.0			
10.0	0.0		0.0	
12.0	0.0			
13.0	3.6	. 	1.2	auger measurement may be inaccurate
Calibration:	ty Truck Stop, Hasty, M litions: 50°-60°F Over Span 4.00 in 25ppm Ben ST-2 55ft E and 16ft S	cast W270010-20	Split-Spoon Cla	eaned? (1) N
Depth of Sample	Auger Cuttings	Split-Spoon (ppm)	Head Space Analysis (ppm)	Notes
5.0	-		0.0	
10.0	-	•	0.0	
14.0	1.0	-		
15.0			1.0	
20.0			1.0	
		-		
	-		·	•



h Nu Field Data Sheet

Calibration	sty Truck Stop, Hasty, litions: 60°F Overcas Span 4.00 in 25ppm Be T-3 59ft S and 45ft W	camplec? (V) N				
Depth of Sample	Auger Cuttings	Split-Spoon (ppm)	Head Space Analysis (ppm)	Notes		
3.0	0.0					
5.0			0.0			
7.0	0.0					
10.0			0.0			
12.0	0.0					
13.5			0.0			
14.5			0.2			
	ty Truck Stop itions: 60°F Overcast Span 4.00 in 25ppm Ben ST-4 56ft W and 20ft N			ned? ① N ned between		
Depth of Sample	Auger Cuttings(ppm)	Split-Spoon	Head Space Analysis(ppm)	Notes		
3.0	0.0			Roces		
5.0			0.0			
7.0	0.0					
10.0			0.0			
14.5			0.0			
				· ·		
						



h · Nu Field Data Sheet

Project	Number:	C88-204	Date: September 12, 1988				
Location	• Hasty 1	ruck Stop, Hasty, I	Mn	Auger Steam Cle			
Weather	Condiți	ons: 60°F Overcast	Split-Spoon Cle				
Calibrat	ion: Si	pan 4.00 in 25ppm Be		N			
Boring I	D: <u>ST-5</u>	74ft W and 9ft S o	Method: Washed	in TSP			
Depth of		Busses Cubbins	g1 ! A. g.	Head Space			
_Sample		Auger Cuttings (pr n)	Split-Spoon	Analysis	** - 4 .		
			(mqq)	(mqq)	<u>Notes</u>		
5.0		0.2		0.0			
			······································		 		
10.0				0.2			
					· · · · · · · · · · · · · · · · · · ·		
13.0		9.0					
14.0				0.4	•		
. 			 				
							
							
		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		-			
Tanahira	. Hactur	Truck Stop, Hasty,	Mn	Date: September :	12 1000		
		ons: 60°F Overcast		Dacc			
		an 4.00 in 25 ppm Be		Auger Steam Cle			
Boring T.	.D.: ST	-6 91ft W and 9ft S	of NE Filler Nec	Split-Spoon Cle $^{ m k}$ samples? $\stackrel{ m (Y)}{ m (Y)}$	aned between		
	<u> </u>	<u> </u>	7 02 110 222201 1100	Method: Washed	in TSP		
				ricciiod.			
				Head Space			
Depth of		Auger Cuttings	Split-Spoon	Analysis			
<u>Sample</u>		(mqq)	(mqq)	(mqq)	Notes		
				•			
5.0	٠			0.0			
7 0		0.0					
7.0	•	0.0		•			
10.0				0.0			
<u> </u>	•						
13.5		0.0		0.0			
	•						
							
					•		
	-						



Quality Services Since 1957

ENGINEERING TESTING

Project #: C88-204/6087

CONSULTING ENGINEERS/ GEOTECHNICAL AND MATERIALS

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Thomas R. Blumberg
Michael M. Heuer, P.E.
Kurt E. Dvorak Kurt E. Dvorak Norman E. Hali Ray A. Huber, P.E. William K. Cody, P.E.

AFFILIATED COMPANIES Braun Environmental Laboratories, Inc. Braun Pavement Technologies, Inc.

October 26, 1988

ERV

HASTY TRUCK TERMINAL HASTY, MINNESOTA

Dear Sir,

Braun Environmental Laboratories, Inc. is pleased to provide our report for the analysis you requested. Data for the following sample(s) are enclosed:

Your I.D. Number/Description

Work Requested

Soil Samples

Organic Analysis

All samples were analyzed according to EPA or other standard methods. Any anomalies which were encountered in this analysis are referenced on the laboratory report. Method references and quality control information are available upon request.

If you have any questions or need additional information regarding this report or other Braun Environmental Laboratories services please contact us.

Very truly yours,

BRAUN ENVIRONMENTAL LABORATORIES, INC.

Linda C. Crawford Organic Supervisor

Anne L. Ochs

101000

Laboratory Manager

LCC/ALO: krf

Attachment

20/03/88

LABORATORY REPORT NO: 6087

PAGE 1 of 1

ERV
HASTY TRUCK TERMINAL
HASTY, MN

PROJECT: C88-204

COLLECTED: BRAUN DATE: 09/12/88

RECEIVED: 09/13/88

SAMPLE MATRIX: SOIL

	BRAUN I.D	.: 6087-1	6087-2	6087-3
	CLIENT I.D	.: ST-214 FT.	ST-614FT.	THIN SPREAD
				SOIL
PARAMETER	UNITS	•••••		
TOTAL HYDROCARBONS AS FUEL OIL	MG/KG	55	<1.0	250
XYLENES, TOTAL	MG/KG	<1.0	<1.0	<1.0
BENZENE	MG/KG	<1.0	<1.0	<1.0
ETHYL BENZENE	MG/KG	<1.0	<1.0	<1.0
TOLUENE	MG/KG	<1.0	<1.0	<1.0

<= less than: compound not detected at or above indicated detection limit</pre>

All quality control checks were within acceptable limits.

Reviewed by: Utility





Designation D 2487 - 83

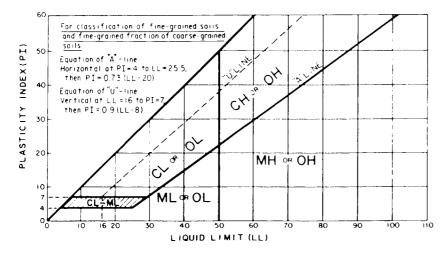
Standard Test Method for CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES

					5	OTL CLASSIFICATION
				OUP SYMBOUS AND ATORY TESTS A	CROUP SYMBOL	GPOUP NAME D
رم 5 5	GRAVELS Mure than 50% of	CLEAN G		$C_{u} \geq 4$ and $1 \leq C_{r} \leq 3^{-6}$	G#	Well-graded gravel f
S0.5	coarse fraction	Less than		$+C_0 + 4$ and/or $1 \ge C_0 \ge 3$ P	Ĉb.	Poorly graded gravel f
G 2 2	retained on No. 4 Sieve	GRAVELS WI		Fines classify as ML or MH	GM	Silty gravel figin
5 2 5	1	More than 1	2% fines C	Fines classify as CL or CH	GC	Clayey gravel f.g.h
g = 7,	SANDS 50% or more of	CLEAN Less than		$C_{u}\geq 6$ and $1\leq C_{c}\leq 3^{-6}$	SH	Well-graded sand ⁱ
49.5 1.95 No.	coarse traction passes No. 4 sieve	Less than	ox rines o	$C_{u} < 6$ and/or $1 > C_{c} > 3$ e	SP	Poorly graded sand i
500 gr		SANDS W1		Fines classify as ML or MH	SM	Silty sand 9.h.i
- €		More than 12		Fines classify as CL or CH	SC	Clayey sand 9.h.i
90	SILTS AND CLAYS Liquid limit less than 50%	inorganic	PI 17 and plots on or above "A" line J		£L.	Lean clay k,1,m
~		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Pl < 4 or plots below "A" line J		ML	Silt k.l.m
9 34 39 39 39 39 39 39 39 39 39 39 39 39 39		organic	Liquid li	mit - oven dried / 0.75	OL.	Organic clay k, 1, m, n Organic silt k, 1, m, o
-GRANKEL e pessed e pessed	SILIS AND CLAYS		PI plots	on or above "A" line	СН	Fat clay k,1,m
F1845	Liquid limit 50% or more	inorganic	Pl plots	below "A" line	Мн	Elastic silt k,l,m
109	<u> </u>	organic	Liquid li Liquid li	imit - oven dried < 0.75	ОH	Organic clay k, l, m, s Organic silt k, l, m, s
Hiq	nly organic soils	Primarily o		er, dark in color, and	PT	Peat

- a. Based on the material passing the 3-in (75-mm) sieve.
 b. If field sample contained cobbles and/or boulders, add "with cobbles and/or boulders" to group name.
 c. Gravels with 5 to 12% fines require dual symbols
 OH-6M well graded gravel with silt
 GH-6M poorly graded gravel with silt
 GP-6M poorly graded gravel with clay
 GP-6M poorly graded gravel with clay
 d. Sands with 5 to 12% fines require dual symbols
 SM-5M well graded sand with silt
 SM-5C well graded sand with silt
 SM-5C well graded sand with clay
 SP-5M poorly graded sand with clay
 SP-5M poorly graded sand with silt
 SP-5C poorly graded sand with clay
 c. Cu = 060/010 Cc = 0000 Poorlog Cobbles SM-5M self sand with clay
 e. Cu = 060/010 Cc = 0000 Poorlog Cobbles SM-5M self sand sand with sand to group name.

- "GO":10 "C $D_{10} \times D_{00}$ | If soil contains > 15% sand, add "with sand" to group name. If fines classify as CL-ML, use dual symbol GC-GM, SC-SM. If fines are organic, add "with organic fines" to group name. If soil contains > 15% gravel, add "with gravel" to group name. If soil contains > 15% gravel, add "with gravel" to group name. If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay. If soil contains > 10% plus No. 200, add "with sand" or "with gravel" whichever is predominant. If soil contains > 30% plus No. 200, predominantly sand, add "sandy" to group name. If soil contains > 30% plus No. 200, predominantly gravel, add "gravelly" to group name. PI > 4 and plots on or above "A" line. PI plots of plots below "A" line. PI plots of bow "A" line.

- PI plots on or above "A" PI plots below "A" line.



LABORATORY TESTS

DD Dry Density, pcf Wet Density, pcf WD

MC Natural Moisture Content, %

Liquid Limit, % LL PL Plastic Limit, % Plasticity Index, % OC Organic Content, %

Percent of Saturation, % S

SG Specific Gravity

C Cohesion Ø Angle of Internal Friction

Unconfined Compressive Strength au

PARTICLE SIZE IDENTIFICATION

Boulders	over 12"
Cobbles	3" to 12"
Gravel	
Coarse	¾" — 3"
Fine	No. 4 — '4"
Sand	
Coarse	No. 4 — No. 10
Medium	No. 10 — No. 40
Fine	No. 40 — No. 200
Silt	No. 200 — .005 mm
Clay	less than .005 mm

RELATIVE DENSITY OF COHESIONLESS SOILS

very loose .		 	 0 —	4 BPI
loose		 	 5 — 1	0 BPf
medium der	ise .	 	 11 — 3	0 BPI
dense		 	 31 — 5	0 BPI
very dense .		 	 50	+ BPF

CONSISTENCY OF COHESIVE SOILS

١	ery s	oft .	 					 										0	_	1	BPF
5	oft .		 					 										2	_	3	BPF
r	ather	soft						 										4	_	5	BPF
r	nediu	ım .	 					 										6	-	8	BPF
r	ather	stiff	 					 										9	_	12	BPF
5	tiff .		 					 										13	_	16	BPF
١	ery s	tiff .	 					 								,	,	17	_	30	BPF
ł	nard		 					 											(30+	BPF

DRILLING NOTES

Standard penetration test borings were advanced by 3%" or 6%" 1.D. hollow-stem augers unless noted otherwise. Jetting water was used to clean out auger prior to sampling only where indicated or logs. Standard penetration test borings are designated by the prefix "ST" (Split Tube).

Power auger borings were advanced by 4" or 6" diameter continuous-flite, solid stem augers. Soil classification and strair depths are inferred from disturbed samples augered to the surface and are therefore somewhat approximate. Power auger boring: are designated by the prefix "B".

Hand probings were advanced manually with a 1%" diamete probe and are limited to the depth from which the probe can be manually withdrawn. Hand probings are indicated by the prefix

SAMPLING — All samples are taken with the standard 2" O.E. split tube sampler, except where noted. TW indicates thin-wa (undisturbed) sample.

BPF — Numbers indicate blows per foot recorded in standar penetration test, also known as "N" value. The sampler is set 6 into undisturbed soil below the hollow-stem auger. Drivin resistances are then counted for second and third 6" increment and added to get BPF. Where they differ significantly, they ar reported in the following form — 2/12 for the second and third ϵ increments respectively.

WH — WH indicates that sampler penetrated soil under weight c hammer and rods alone, driving not required

NOTE — All tests run in accordance with applicable ASTI standards.



HASTY T.S. TOP

WAITING FOR

REDORT FROM

BRAUN ST.

CLOUD