



DRAWING IS NOT TO SCALE

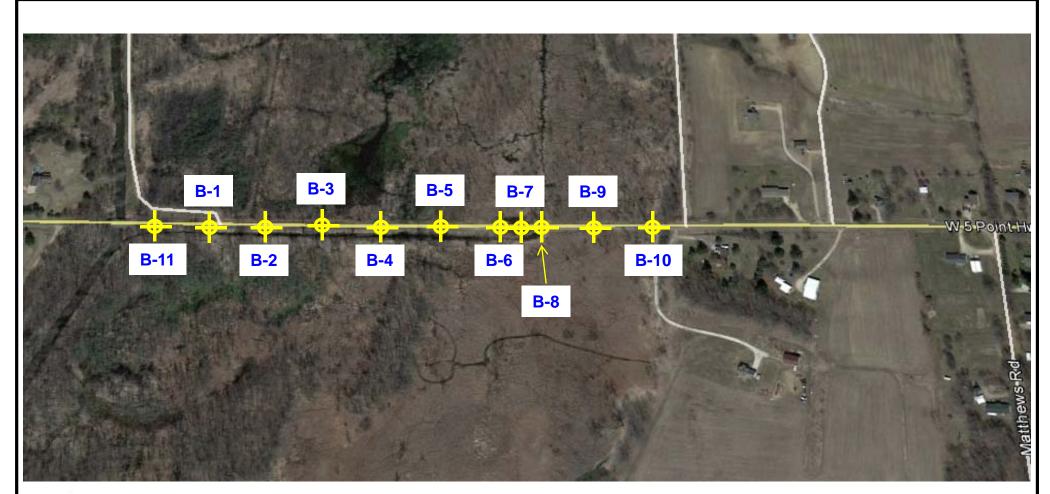


SITE LOCATION DIAGRAM
2013 MISCELLANEOUS SOIL BORINGS
FIVE POINT HIGHWAY
MAUER ROAD TO MATTHEWS ROAD
EATON COUNTY, MICHIGAN

FIGURE NO. 1

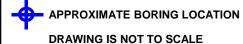
PSI PROJECT NO. 0408731

DRAWN BY: ESR DATE: 08/21/2013





LEGEND





BORING LOCATION DIAGRAM
2013 MISCELLANEOUS SOIL BORINGS
FIVE POINT HIGHWAY
MAUER ROAD TO MATTHEWS ROAD
EATON COUNTY, MICHIGAN

FIGURE NO. 2

PSI PROJECT NO. 0408731

DRAWN BY: ESR DATE: 08/21/2013

DATE	STAF	RTED:	_		8	8/12/13	DRILL COMPANY:	PS				F	30RII	NG	B-01
		PLETI				8/12/13	DRILLER: E. Motcheck		: E. Motched	ck					
COME	PLETIC	ON DE	PTI	┥ _		26.5 ft	_ DRILL RIG:	CME-55		_	Water		/hile Drillin	-	8 feet
BENC		_				N/A	DRILLING METHOD:		' HSA		S		pon Comp		N/A
ELEV		_			N	I/A	SAMPLING METHOD:		SS	_	\sqcup	_	et Cave [Jeptn	9 feet
LATIT							HAMMER TYPE:	Automa	atic				CATION: ocation D	iaaram	
LONG		_	+00		OFFS	SET: 5' R	_ EFFICIENCY	N/A S. Rah		_		Joining L	ocation b	agram	
REMA	_		+00		OFF	DEI: DR	REVIEWED BY:	S. Ran	е	_					
		1.101.10							ŝ		ST	ANDARD) PENETR	ATION	
_					ŝ			uo	ر S) ر				ST DATA	7111011	
eet)	et)	g	g	o.) Spe			cati	ind	%		N in I	blows/ft @		
u (f	(feet)	C L	Ę	e S	i.	MATE	RIAL DESCRIPTION	Ssifi	9.	ē,	×	Moistu	re 📮	PL	Additional
atio	Depth, (Graphic Log	Sample Type	Sample No.	ery	170 (1 =	INITE DECOME FICH	Cla	s pe	Moisture,	0		25	LL 50	
Elevation (feet)	De	Ö	Sar	Sa	Recovery (inches)			USCS Classification	SPT Blows per 6-inch (SS)	ž		OTDE	NOTUL		-
ш					&			👸) T		١,	STRE ▲ Qu	NGTH, tsf ₩	Qp	
	_								S		0	Qu	2.0	Q ρ 4.0	
	- 0 -					7.5" ASPHALT									
	-					5.5" Brown fine t	o medium SAND WITH	SP	-	13		*			
	- 1 18 Brown fine to n					Brown fine to me	edium SAND, trace Gravel, t	trace SP	5-8-8			9			
		Clay, moist (FIL Gray fine to med					_)	/	N=16						
	Silt, moist (FILL							ace				\			Drove stone; low
	2 2							SP	10-11-8			🍃			recovery
	- 5 -	\bowtie							N=19		-	$-\!\!\!\!/-$			<u> </u>
		\bowtie								143	/			>>>	
		715 7	М	3	18	Dark brown PEA	T, very moist to wet (PT)		W-O-H	143				"	1
	-	1/ 1/	Μ	3	10			PT	N=0		Ĭ .				
		71/2			Z	₽		PI			1				
		1, 11,	$\overline{}$		7	7					1				
			X	4	18		ium SAND and PEAT, wet,	very	2-1-2	58	🛉			>>>	*
	– 10 –		/ V			loose (SP/pt)			N=3		-			<u>'</u>	<u> </u>
			-												
			М	_				SP/PT		47				×	
				5	18			01711	1-1-2 N=3		19				
	- 15 -								11-5						1
										90				>>>	*
			M	6	18	Brown fine SANI	D, trace peat, wet, loose (SF	D)	1-2-2					'''	Ì
	- 20 -			Ü	.0		2, 11 des peat, 11 et, 18 et (et	′	N=4						
	20														
								SP							
	_														
						Grav fine SAND	occasional peat seams, we	et.	-						
				7	18	loose (SP)	pode oddino, wo	-,	2-2-2	30	🔷		X		
	- 25 -		H					SP	N=4	50	-		+ ^ `		+
	L -		IXI	8	18				4-4-4	29	{	b	×		
		<u>(4,34,54)</u>	V			Boring terminate	d 26.5 feet below existing		N=8						
						ground surface.	 								
						Professions	al Service Industries, I	nc	DD	O IE	CT N	n ·	-	04087	31
):	7		77		reign Drive, Suite C	110.		OJE			013 Misc		s Borings
		#		5	ij	Lansing, MI					ΓΙΟN:			Point Hig	
			_		IJ		(517) 394-5700								Michigan

	STAF		_		8	3/12/13	DRILL COMPANY:	PSI				B	ORII	NG.	B-02
	COM			_		8/12/13	DRILLER: E. Motcheck		E. Motche	ck	<u>-</u>		le Drillir		18.5 feet
	PLETIC					21.5 ft N/A	DRILL RIG:	CME-55	1104	_	Water	_	n Comp	-	2.5 feet
	AMH: OITA	_				J/A	DRILLING METHOD: SAMPLING METHOD:		S		×	_	Cave D		3 feet
	TUDE:	_				WA	HAMMER TYPE:	Automat			\Box	NG LOCA			
	SITUDI						EFFICIENCY	N/A				oring Loc		agram	
STAT	ION:_	5	+00		OFFS	SET : 5' R	REVIEWED BY:	S. Rahe)						
REMA	ARKS:	None				-									
Elevation (feet)	o Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATE	RIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	× 0	N in blo Moisture	DATA ws/ft ©	PL LL 50	- Remains
		$\times\!\!\times\!\!\times$					nedium SAND WITH GRAV	/EL. SP							
	_					moist (FILL)		-/			_				
		\bigotimes		1	18	Gray fine to medi	um SAND, trace Gravel, mo	oist / Oi	3-2-3 N=5		9				
		1, 11,			7		'EY PEAT, very moist (PT)	/	11-3	35	$\perp I$		×		
		\\\\\\				-					\Box				Drove stone; low
		1, 11,	TVII	2	1			PT	2-1-1						recovery
	- 5 -	\\ \\ \\	$ U\rangle$						N=2		1				_
		1, 11,									Ш				
	-		1/				um SAND, occasional peat				$ \cdot $				
			X	3	18	seams, wet, very	loose (SP)		1-2-1	38	 			k	
			H					SP	N=3		Ш				
	-														
			М	4	10		medium SAND, trace Grave eams, wet, very loose (SP)	el,	211						
			\mathbb{N}	4	18	occasional peat s	earns, wet, very loose (SF)		2-1-1 N=2	40	ľ			×	
	- 10 -														
	 - 15 - 			5	18			SP	2-1-1 N=2	23	© 	×			
				6	18	Brownish gray fin Gravel, wet, loose	e to medium SAND, trace e (SP)	SP	1-2-3	16		×			
	20 -	. 0	$\frac{4}{3}$			Gray fine to coars	e SAND WITH GRAVEL, w	vet,	N=5		-				+
		0.0		7	18	loose (SP)	, ··	SP	2-3-3 N=6	10	9	\times			
	Boring termin ground surface						21.5 feet below existing		N-0						
					<u></u>		10 1 1 1 1 1					_			
					۲7		Service Industries, Ir	nc.			CT N		O N A!	04087	
	K	2	=	=		Lansing, MI	eign Drive, Suite C 48911			CAT	CI: ION:	201		ellaneou Point Hiç	us Borings ahway
L			<u> </u>		IJ	Telephone:	(517) 394-5700					E			Michigan

DATE	STAF	RTED:			8	3/12/13	DRILL COMPANY:	PSI				BORI	NG F	3_03
	COM					8/12/13	DRILLER: E. Motcheck		: E. Motched	ck				
COMI	PLETIC	ON DE	PTH	· _		36.5 ft	DRILL RIG:	CME-55		_	Water	While Drill ■	-	2 feet
	HMAF	_				N/A	DRILLING METHOD:	3 1/4"		_	8	▼ Upon Con	•	N/A
	ATION	_			N	I/A	_ SAMPLING METHOD:		S		\Box			5 feet
	TUDE:						HAMMER TYPE:	Automa	tic			ING LOCATION Boring Location [
	SITUDI						_ EFFICIENCY	N/A		_	See E	Boring Location i	Jiagram	
STAT	ION:_ ARKS:		-00		OFFS	SET :5' R	REVIEWED BY:	S. Rahe)					
KEIVIA	ANNO.	None							(s)		СТ	ANDARD PENET	DATION	
Elevation (feet)	h, (feet)	Graphic Log	Sample Type	Sample No.	ry (inches)	MAT	ERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	×	TEST DATA N in blows/ft	D PL	Additional
Eleva	o Depth,	Grap	Sam	Sam	Recovery			nscs c	SPT Blows	Mois	0	STRENGTH, ts	f	Remarks
	 		X	1	18 💆	moist (FILL) Brown fine to m peat, moist to w	o medium SAND WITH GRA edium SAND, trace Gravel, tet (FILL)	/ SP	1-1-3 N=4	41			×	
	 - 5 -			2	18 <u>\</u>	Gray fine to me	YEY PEAT, very moist (PT) dium SAND, trace Gravel, seams, wet, loose (SP)		5-3-2 N=5	24		×		
	- - -		X	3	18				4-3-3 N=6	26		×		
	 - 10 -		X	4	18				4-3-3 N=6	23		×		
	 - 15 - 		M	5	18			SP	3-3-1 N=4	24	0	×		
	20 - 			6	18	Light gray MAR	L, trace shells, very moist (C	OL)	3-1-1 N=2	80	<u></u>		>>>	
	 - 25 - 		X	7	18	Gray FAT CLA' to high plastic (/, very moist, very soft, medi CH)	um	W-O-H N=0	47			×	
	8 18							СН	2/18" N=1	25	*	*		
							Continued Next Page				\			
					二		al Service Industries, I	nc.			CT N		040873	
				2/	! 	3120 Sove	reign Drive, Suite C			OJE		2013 Mis		
	3120 Sovereign Drive, Suite C Lansing, MI 48911 Telephone: (517) 394-5700								LO	CA1	TION:		Point High	
	S Z		_		4	i elepnone	:. (517) 394-5700					Eaton	County, M	iicnigan

DATE	STAI	RTED:			{	8/12/13	DRILL COMPANY:	PS				R	ORIN	JG F	3_N3
DATE	COM	PLET	ED:			8/12/13	DRILLER: E. Motcheck LO		: E. Motched	ck					
COM	PLETI	ON DE	PTI	н _		36.5 ft		CME-55			Water	_	ile Drillin	-	2 feet
	HMA	_				N/A	DRILLING METHOD:	3 1/4"			Va.	_	n Comp		N/A
	'ATIO					V/A	SAMPLING METHOD:		SS		$\overline{}$		t Cave D	epth	5 feet
	TUDE:						HAMMER TYPE:		atic			NG LOC			
	SITUD						EFFICIENCY	N/A		_	See I	Boring Loo	ation Dia	agram	
STAT	_		+00		OFFS	SET :5' R	REVIEWED BY:	S. Rahe	e						
KEIVIA	ARKS:	None	1						· ·		Τ				
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MA ⁻	ERIAL DESCRIPTION	USCS Classification	Blows per 6-inch (SS)	Moisture, %		N in blo Moisture	DATA ows/ft⊚ ⊿		Additional Remarks
Ξ			S	0)	Rec			NSC	SPT BI			Qu		Qp 4.0	
	-		M	9	18		TV OANID (СН	1-1-8	23		$^{ \rangle}$	2.0	4.0	
	35 -					Gray fine SIL non-plastic (S	Y SAND, trace Gravel, wet, loose, M)		N=9	9	_	$m{k}$			
		. ^	X	10	18	Gray fine to co	parse SAND WITH GRAVEL, wet,	J SP	5-4-4 N=8		(5			
						loose (SP)	stad 20 5 fact below eviction		11-0						
						ground surfac	ated 36.5 feet below existing								
4							nal Service Industries, Inc.		PR	OJE	CT N	O.:		040873	1
					ı į	3120 Sov	ereign Drive, Suite C			OJE		20			Borings
		7	Ţ	Ρĺ	ı I	Lansing,	VI 48911		LO	CAT	ΓΙΟN:			oint Hig	
						i elepnor	e: (517) 394-5700						Eaton Co	ounty, M	lichigan

DATE			-D.			8/12/13		_		OMPAN		PS		1-4-1				BC	DRII	NG	B-	04
DATE						8/12/ 35.0			RILLEI RILL R		tcheck LC	CME-55		/lotcnec	K		$\overline{\triangle}$		e Drillii			3 feet
BENC			.F 11	' –		N/A	<i>/</i> IL			IG. IG METH			, I" HSA		_	Water	Ī			oletion		N/A
ELEV		_				1/A 1/A				NG MET			SS		_	≊	$\overline{\mathbf{v}}$		Cave [8 feet
LATIT					<u> </u>	W//\				R TYPE:		Autom			_	\Box		LOCA		- op		
LONG									FFICIE			N/A	iatio							iagram	1	
STAT			+00		OFFS	SET:	5' R						ne									
REMA					_		<u> </u>					0			_							
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)		MATE	ERIA	AL DE	SCRIF	POIT	USCS Classification		SPT Blows per 6-inch (SS)	Moisture, %	× 0	Mo	TEST in blow isture	DATA ws/ft ©	PL LL Qp	50	Additional Remarks
	- 0 - 		M	1	18	5" B mois Gray (FIL Brov Silt,	t (FILL) / fine to me L)	dium nediur	SAND, n SANI	trace Gr D, trace 0	TH GRAVEL ravel, moist Gravel, trac	SP	N	3-2 =5	151			2.1	0	>>	>× Dro	ove stone; no covery
	- 5 - 	77 77 77 77 77 77 77 77 77 77 77 77 77	M	3	18	y						PT	W-	=3	294	 				>>		
	10 - - 10 - 			4	18	Ligh	t gray MAR	L, soi	me she	lls, very r	moist (OL)	OL	- 1	O-H =0	70					>>	•××	
	 - 15 - 			5	18	1	/ FAT CLAY soft, mediu				15			O-H =0	34	ФЖ 			×			
	 - 20 - 			6	18							СН		O-H =0	39	**				×		
	 - 25 -			7	18		/ fine SAND	Con	ntinued	Next Pag		SP CH		-5-2 =7				×				
					-						tries, Inc.					CT N	Ю.:			0408		
							120 Sove			e, Suit	e C					CT:		2013		ellaneo		
		7	V				ansing, M			04 572	10			LO	CAT	ION:	_	_		Point H		
	SZ.					16	elephone	9: (5	17)3	94-5/0	JU						_	Е	aton C	county,	Mich	ııgan

DATE					8	8/12/13 8/12/1	3	_	FR. F M	NY: lotcheck LO	PSI GGFD BY		eck		E	BORI	NG	B-04
COME						35.0		DRILL			CME-55	<u> </u>	<u> </u>	e		hile Drilli'		3 feet
BENC	HMAI	RK:			ı	V/A		DRILL	ING MET	HOD:	3 1/4"	HSA		Water		pon Com		N/A
ELEV	OITA	N:				/A		SAMP	LING ME	THOD:		SS		\Box		et Cave I	•	8 feet
LATIT								HAMM		<u> </u>		tic				CATION:		
LONG								_						See E	soring L	ocation D	nagram	
STAT REMA	_		+00		OFFS	EI: _	5' R	_ REVIE	WED BY:		S. Rahe	9						
. (2.00)		Tione										ŝ		ST	ANDARD	PENETR	RATION	
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)		MATE	RIAL D	ESCRI	PTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %		TES N in I Moistu	ST DATA plows/ft @	PL LL 50	. Tromans
	- 25 - - 30 - 			8	2	Sand	FAT CLAY, seams, ver olastic (CH)	y moist, v	aal fine to very soft,	medium medium to	СН	3-2-1 N=3	27			× ×	4.0	Drove stone; low recovery
			M	0	10		fine to med pockets, we			onal Sandy	SP	F 6 7						
	- 35 -		\mathbb{N}	9	18				,	•	5P	5-6-7 N=13	17		$^{\diamond}\times$			
	- 30 -					Boring surface		d 35 feet	below exi	sting ground								
	Professional Service Industries, Inc.													CT N	_	•	04087	
	Professional Service Industries, Inc. 3120 Sovereign Drive, Suite C Lansing, MI 48911 Telephone: (517) 394-5700												ROJE	ECT: TION:	2		ellaneou Point Hig	s Borings
			<u> </u>		IJ		lephone:			00		-	.JUA					/lichigan

DATE	STAF	RTED:			8	3/12/13	DRILL COMPANY:	PS				F	RORII	NG E	2_05
	COM					8/12/13	DRILLER: E. Motcheck LO		: E. Motche	ck					
	PLETI			_		20.0 ft	DRILL RIG:	CME-55		_	Water	_	hile Drilli	-	7 feet
	HMAF	_				N/A	DRILLING METHOD:	3 1/4"		_	 		on Com		N/A
	ATION					I/A	SAMPLING METHOD:		SS		\Box		et Cave I		9 feet
	TUDE:						HAMMER TYPE:	Automa N/A	itic	_			ATION: ocation D		
STAT	SITUDI		+00		OFFS	SET : 5' R	REVIEWED BY:			_		Joining Lo	ocation D	agram	
	ARKS:		+00		OFF	DEI: DR	KEVIEWED DT:	S. Ran	.						
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	ery (inches)	MATE	RIAL DESCRIPTION	USCS Classification	Blows per 6-inch (SS)	Moisture, %		TES	PENETR T DATA llows/ft @		Additional Remarks
Elev	- 0 -	Gr	Sar	Š	Recovery	8" ASPHALT		SOSN	SPT Blov	Ž	0	STREM	NGTH, tsf **	I .	
	L.	XXXX					medium SAND WITH GRAVEI	L, SP							
			M	1	10	moist (FILL)		_/ SP	2-1-1						
		<u> </u>		'	10	\trace Silt, moist (I Black PEAT, trac	e wood, very moist (PT)	_/ PT	N=2	128				>>×	
		7 77 77 7	\bigvee	2	12	Gray and black M very moist (PT)	IARL AND PEAT, trace shells,	PT	2-1-1 N=2	171				>>X	
	- 5 -	71 7				Black SANDY PE	AT, very moist (PT)								
		1/ 1/	\Box					PT		45				$ \times $	
	L _	71/7	∃XII	3	18 5	7			2-2-2		\$				
			:/\U			Dark gray fine to loose to medium	medium SAND, trace Silt, wet	.,	N=4						
						loose to medium	uense (SF)								
	L _		M		Z	_				26			X		
			:XI	4	18				2-2-2 N=4		9				
	- 10 -								11-4		+				
											\	$\setminus $			
								SP							
	- - -		M	5	18			J.	4-6-8 N=14						
	- 15 -											$\top \setminus$			
												\			
												\			
	L _												$\setminus \mid$		
													\		
	-		X	6	18				7-13-14				9		
	20 -		V			Boring terminated	d 20 feet below existing ground	1	N=27				_		
						surface.	. =0 .00t 20.0tt 0.10tm.g g. 0a								
4					7 •		I Service Industries, Inc	; .			CT N	-		040873	
						3120 Sovere	eign Drive, Suite C			ROJE		20		ellaneous	
			U			Lansing, MI	48911 (517) 394-5700		LC	JCA1	TION:			Point High County, Mi	
					-	r diopriorio.	(017)0010700						Laton	ourity, ivii	orngari

	STAI		_			3/13/13		_ DRILL COMPAI		PS CED BY		2014			BORI	NG	B-0	6
	E COM PLETION					8/13/1 55.0		DRILLER: E. M DRILL RIG:		GED BY 3ME-55	E. MOTCH	eck_			Vhile Dril			8 feet
				_		<u>55.0</u> N/A	IL			3 1/4"	LICA		ater		Jpon Con	-		N/A
	CHMAI					N/A N/A		DRILLING MET SAMPLING ME			SS		š	_	Vet Cave	•		25 feet
	/ATION TUDE:	_			I'	W/A		_ HAMMER TYPE		Automa				_	CATION	•		20 1001
	SITUDI							_ EFFICIENCY		N/A	ilic				_ocation I			
STAT			3+00	`	OEES	SET:	5' R	_ REVIEWED BY:		S. Rahe						a.g. a		
	ARKS:		,,,,,,	,	_ 01 1 0	, <u> </u>	J 10	_ NEVIEWED D1.	-	O. I Carro	<u> </u>	_						
											(SS)		STA		D PENET			
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	ry (inches)		MATE	RIAL DESCRI	PTION	USCS Classification	Blows per 6-inch (SS)	Moisture, %	×		ST DATA blows/ft oure	⊚ I PL I LL	- 1	Additional
Elevat	Deptl	Grap	Samp	Sam	Recovery					nscs c	SPT Blows	Mois		STRE Qu	ENGTH, ts		50	Remarks
	ļ ₀ -										<u> </u>		0	Qu	2.0	4.	0	
		- - - - - -				√3" Da	SPHALT ark brown fii VEL, moist	ne to medium SAN	D WITH	SP SP		7	×					
				1	18	1" AS 6" BI	SPHALT	SAND, trace crush	ned concrete,	SP	18-20-26 N=46							
	Silt, moist (FI						n fine to me	edium SAND, trace	Gravel, trace		6-9-6							
	Gray fine to of (FILL) Dark brown F							se SAND, trace Gr	avel, moist	SP	N=15	14	_					
	3 18						brown PEA	T, very moist (PT)			1-1-1 N=2	560	9			>>	*	
	-	<u> </u>			<u> </u>	7					., _							
	10	<u> </u>	4XII	4	18					PT	W-O-H N=0	489				>>	*	
	 		1															
	 - 15 -	1, NI,		5	6	Light	gray MARL	., some shells, very	moist (OL)		W-O-H N=0	228				>>	× -	
												193				>>	×	
	6 18									OL	W-O-H N=0		9					
	 - - -			7	18	7 Dorl	gray, some	Clav			W-O-H N=0	168	 			>>	×	
	- 25 - 				<u>-\</u>	Dair		·			N-U							
								Continued Next Pa	•									
1					5			al Service Indus				ROJE		_		04087		
					T /			reign Drive, Sui	te C			ROJE		2	2013 Mis			
		7	J		II		nsing, M	48911 (517) 394-57	00		L	OCAT	ION:			Point Hi		
			_	_	- #	16	HEDUNDE.	101/1394-5/	L JL J						⊢at∩n	U.OLINTV	IV/IIChia	an

DATE	STA	RTED:	_		3	3/13/13	DRILL COMPANY:	PS				R	ORII	NG E	3-06
	COM					8/13/13	DRILLER: E. Motcheck L		: E. Motche	ck					
	PLETI		PTI	٠ _		55.0 ft	DRILL RIG:	CME-55					ile Drillir		8 feet
	CHMAI	_				N/A	DRILLING METHOD:	3 1/4"			S .		on Comp		N/A
	ATION				N	I/A	SAMPLING METHOD:		SS				t Cave D	peptn	25 feet
	TUDE:						HAMMER TYPE:	Automa	itic			IG LOCA oring Loc		agram	
	SITUDI				0556	NET : 51 D	EFFICIENCY	N/A			OCC D	Jillig Loc	alion Di	agram	
STAT	ION:_ ARKS:		3+00)	OFFS	SET : 5' R	REVIEWED BY:	S. Rah	<u> </u>						
1 (T. (10.	THORIC							ŝ		STA	NDARD I	DENIETR	ATION	
					<u>6</u>			L.	SPT Blows per 6-inch (SS)		JULA		DATA	ATION	
eet)	₹	g	Be	o.	je			cati	inct	%		N in blo	ows/ft ©		
,	(feet)	ر د ا	Ţ	Z	Ë	MATE	RIAL DESCRIPTION	Ssiff	9-	ē,	×	Moisture		PL	Additional
atio	Ę,	Graphic Log	l ble	Sample No.	ery	IVIATE	VIAL DESCIVIL FIGH	S S	s pe	Moisture,	0		25	LL 50	Remarks
Elevation (feet)	Depth,	Gre	Sample Type	Sal	Recovery (inches)			USCS Classification	NO!	ž					
Ш			0		Å.			l S	E			STREN			
									R.		0	Qu	₩ 2.0	Qp 4.0	
	† -					Light gray MARL,	some shells, very moist (OL))		189	ř –	T		>>X	
	-	├ ─	М	8	18				W-O-H	109					
	- 30 -		Μ	0	10				N=0		Ť				
	30 -	<u> </u>	1												
	-	+==]												
	L _	[+												
			1												
	-							OL		126					
	L -		M	_	40				\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.	126	I			>> X	
			\mathbb{N}	9	18				W-O-H N=0	'	P T				
	- 35 -								11 0						
	-		+												
		<u> </u>	i l												
															
	-		+												
	L _		1/1			Gray FAT CLAY,	occasional fine Sand seams,								
			Ж	10	4		oft, medium to high plastic		W-O-H	36	∮ ₩		$ $ \times		
	40 -					(CH)			N=0						
	ļ -		1												
	-														
			1												
								СН		26			×		
			X	11	18			СП	W-O-H	1	⋪₩				
	45 -		7						N=0		 	+			
	L _										Ι\				
			1												
	-														
	-										\				
										20	\	X			
			X	12	18				1-1-6		🔷		*		
	- 50 -					Gray LEAN CLAY low plastic (CL)	, trace Gravel, moist, very sti	ff,	N=7			+	-		
	L _					low plastic (CL)						\setminus			
			1									\			
	-		1					CL				\			
	L -	<i>\\\\\</i>										\			
										15		\times			
	-	\ ////	1 X₽	13	18	Occasional red Sa	andstone pockets		8-9-11			9	*		
	55 -	<i>\////</i>	7 V					d	N=20						
						surface.	55 feet below existing groun	u							
4						Professional	Service Industries, Inc	_ 	PF	O.IF	CT NC).:		040873	
):			77		eign Drive, Suite C			ROJE			13 Misce	ellaneous	
		<i>#</i> :	5		ij	Lansing, MI					ION:			Point High	
			_		IJ		(517) 394-5700							ounty, M	

	STAF		_		3	3/13/13	DRILL COMPANY:	PS				F	BORII	VG.	B-07
	COM					8/13/13	DRILLER: E. Motcheck		: E. Motche	ck_	L				
	PLETIC					55.0 ft	DRILL RIG:	CME-55		_	Water	_	hile Drillir oon Comp	-	47.5 feet N/A
	HMAF	_				N/A	DRILLING METHOD:				Š		ave Depth		N/A N/A
	'ATION TUDE:	_			N	I/A	SAMPLING METHOD:		SS tip	_			CATION:	ı	IN/A
	I UDE: SITUDI						HAMMER TYPE: EFFICIENCY	N/A	ILIC				ocation Di	iagram	
STAT			+00)	OFFS	SET: 5' R	REVIEWED BY:			_		3		J	
	ARKS:			<u>'</u>	_ 01 1 0	<u> </u>		O. Itali	<u>-</u>						
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATE	RIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	× 0	TES N in t	PENETR ST DATA blows/ft © re 25 NGTH, tsf **	PL LL 50	. Tremains
	0 -					12" Asphalt and s	subgrade						2.0	4.0	Thickness
	 		M	1	18	Mixed light brown	, gray and black fine to coar AVEL, possible foundry san	rse d SP	14-50/3"	9	>			>>@	undetermined because material was under water
	 - 5 -			2	18		orown fine to coarse SILTY AVEL, moist (FILL)		15-19-25 N=44	6					
	 			3	18			SM	8-19-11 N=30	7	×				Drove stone; no
	- 10 -	77 7 7 77 7		4	0	Dark brown PEAT	Γ, very moist (PT)		8-7-6 N=13	455				>>>	recovery
	 15 - 			5	18			PT	2/18" N=1	195	©			>>>	<
	 - 20 - 	/, \\ /, \\ /, \\		6	18	Dark gray MARL,	some shells, very moist (O	L) OL	W-O-H N=0	208	(a)			>>>	<
	- 25 - - 2			7	18		YEY PEAT, very moist (PT)	PT	W-O-H N=0	126				>>>	< -
							Continued Next Page								
					79		l Service Industries, Ir	nc.			CT NO			04087	
						3120 Sovere	eign Drive, Suite C			OJE		20			s Borings
3120 Sovereign Drive, Suite C Lansing, MI 48911 Telephone: (517) 394-5700								LC	CAT	ION:			Point Hig		
	۸				4	i cichilolie.	(317) 384-3700						⊏at0H C	ounty, I	/lichigan

	STAF				8	3/13/13	DRILL COMPANY:	PSI				R		NG E	3_07
	COM					8/13/13	DRILLER: E. Motcheck		E. Motche	<u>ck</u>	<u>.</u>				
	PLETI					55.0 ft	DRILL RIG:	CME-55		_	Water		ile Drillir on Comp		47.5 feet N/A
	HMAF	_				N/A	DRILLING METHOD:			_	S		e Depth		N/A N/A
	'ATION TUDE:	_			N	I/A	SAMPLING METHOD: HAMMER TYPE:	Automa	S	_		NG LOCA		!	IN/A
	SITUDI						EFFICIENCY	N/A	uc			Boring Loca		iagram	
STAT			+00	1	OFFS	SET: 5' R	REVIEWED BY:		<u> </u>	_		<u>-</u>		g	
	ARKS:		. 00	1	_ 01 1 0	<u> </u>	NEVIEWED D1:	O. Italic	•						
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	MATE	RIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	× 0	N in blo Moisture	DATA Dws/ft © A Page 125	PL LL 50	Additional Remarks
	L.								S		0		2.0	4.0	
	- 30 -		X	8	18	Dark brown CLA\	/EY PEAT, very moist (PT		W-O-H N=0	52				>>×	
				9	18		occasional fine Silty Sand t, very soft, medium to hig		W-O-H N=0	29	● *		×		
	 40 -		M	10	18	,		СН	W-O-H N=0	20	● *	×			
	 - 45 -		X	11	18				W-O-H N=0	19	**	×			
	- 50 -			12	14		dium SILTY CLAYEY SAN d, trace Gravel, wet, loose		2-3-4 N=7	17		×			
	 - 55 -		M	13	18	(SP)	o, trace Silt, wet, medium of	SP	5-6-6 N=12	27		0	×		
						Professiona	I Service Industries,	Inc	pp	O IF	CT N	o ·	1	040873	1
			7		77		eign Drive, Suite C			OJE		-	13 Misce	ellaneous	
		73	5	5 5	ij	Lansing, MI	48911				ION:			Point High	
L			_		ı		(517) 394-5700							ounty, M	

DATE	STAI	RTED:			8	3/13/13	DRILL COMPANY:	PSI					BORII	NG	B-08
		PLETE				8/13/13	DRILLER: E. Motcheck		E. Motched	<u>k</u>			Vhile Drillii		43.5 feet
		ON DE	PTF	1 _		50.0 ft	DRILL RIG:	CME-55		-	Water	_	Jpon Com	-	43.5 Teet N/A
BENC		_				N/A	DRILLING METHOD: SAMPLING METHOD:	3 1/4"	HSA SS	-	Š	_	Dry Cave D		2.5 feet
LATII		_			<u>''</u>	I/A	HAMMER TYPE:	Automa		_			CATION:	Срит	2.5 1001
LONG							EFFICIENCY	N/A	llic				ocation D	iagram	
STAT		_	+00)	OFFS	SET : 5' R	REVIEWED BY:								
REM/	_														
Elevation (feet)	O Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)		ERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	× 0	TE N in Moistu	D PENETR SST DATA blows/ft © ure 25 LENGTH, tsf 2.0	PL LL 50	- Normanio
	 		M	1	18	\(FILL) _\4" ASPHALT	SAND, trace debris (slag), meter to medium SAND, trace Grast (FILL)	SP SP	11-14-6 N=20	166			9	>>>	*
	 - 5 -	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	M	2	18	Dark brown Pl	EAT, moist (PT) ace wood, very moist (PT)		2-2-2 N=4	632	1			>>>	Drove stone; no
				3	0			PT	1-1-1 N=2	173	0			>>>	recovery
	- 10 - 	1, 11,		4	18	Gray MARL, ti (OL)	ace shells, trace Clay, very m	noist	W-O-H N=0	(• 				
	 - 15 - 			5	18			OL	W-O-H N=0	177 (9 			>>>	× -
	 - 20 - 			6	18				W-O-H N=0	173 (() 			>>>	*
	 - 25 - 			7	18	Dark brown Cl PEAT, very me	LAYEY MARL, trace shells, so	ome PT	W-O-H N=0	140 ⁽	(a)			>>>	<u>*</u>
							Continued Next Page								
4							nal Service Industries,	Inc.	PR	OJE	CT N			04087	
					y II	3120 Sov	ereign Drive, Suite C		PR	OJE	CT:		2013 Misc		
Lansing, MI 48911 Telephone: (517) 394-5700								LO	CAT	ION:			Point Hig		
	نه کا				_	i elebiion	c. (317)384-370 0						⊏aton C	ourity, N	Vichigan

DATE COMPLETED: 8/13/13 DRILLER: E. Motcheck LC							OGGED BY: F Motcheck				BORING B-08									
COMF						50.0 f		_	 _ RIG:		CME-55	L. MOTOR	OK	ē	$\bar{\nabla}$	While	e Drillin	ng	4	3.5 feet
BENC				_		/A		_	_	THOD:		HSA		Water	Ţ	Upon	Comp	letion		N/A
ELEV						A				ETHOD:		S			$ar{oldsymbol{\Lambda}}$	Dry C	Cave D	epth		2.5 feet
LATIT	UDE:							HAMI	MER TYP	E:	Automat	tic				OCA1				
LONG								_	CIENCY					See I	3oring	Loca	tion Di	agram		
STAT	_		+00		OFFSE	ET: _	5' R	REVIE	WED BY	′ :	S. Rahe	;								
REMA	IKNO:	None										<u> </u>		СТ	4 N ID 4		NETD	ATION		
Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)					IPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	× 0	N Moi:	rest control in blow sture to the student to the st	DATA vs/ft	PL LL 50	Addit Rem	
		1/1/2	1				orown CLA` , verv mois		RL, trace	shells, some			113	;				>>	<	
		<u> </u>	IXII	8	18	ILAI	, very mois	i (OL)			PT	W-O-H		ф						
	- 30 - 					Gray l very n (CH)	FAT CLAY, noist, very s	occasic soft, med	nal Silty S	Sand seams, gh plastic		N=0								
													37	1			>	f		
			\mathbb{X}	9	18						CH	W-O-H N=0		ΦЖ						
	- 35 - 											•								
									ery soft,	medium to										
	- 40 -		M	10	18	high p	lastic (CH)					W-O-H N=0	15	Φ*	×					
	 				<u> </u>	Gravi	fine to med	ium SAN	JD WITH	SILT, trace	СН									
				11	18	Grave	I, occasion	al fine S	ilty Sand	seams, wet,		5-6-6	18		þ	\times				
	- 45 - 					mediu	m dense (\$	SP-SM)			SP-SM	N=12								
		0	M	12	18		fine to coar			RAVEL, trace	SP	9-9-5								
	- 50 -	0 0		12						isting ground		N=14	13	_	*					
						surfac	ce.													
						Pro	fessiona	l Serv	ice Indi	ıstries, Inc.	'	PI	RO.IF	CT N	O.:	-		040873	31	
		9	7		77	312	20 Sover	eign D	rive, Su				ROJE			2013	Misce		s Borings	
	į.		J				nsing, MI			700		LC	OCA1	ΓΙΟN:	_			Point Hig		
			_		_	16	ephone:	(517)	394-31	700						E	aton C	ounty, N	ııcnıgan	

	TE COMPLETED: 8/14/13 DRILLER: E. Motcheck LOGGED I								PSI D RV: E Motobook			BORING B-09					
	PLETI(32.0 ft		DRILL RIG:		CME-55	. L. MOLGIN	<u> </u>	Ä	∑ Wh	nile Drillin	g	16.5 feet
	CHMAI					N/A		-	METHOD:		HSA		Water		on Comp		N/A
	/ATIO	_				V/A			METHOD:		SS			▼ We	et Cave D	epth	4.5 feet
LATI	TUDE:								YPE:		ntic			NG LOC			
LONG	SITUD	E: _						EFFICIENC		N/A			See E	Boring Lo	cation Dia	agram	
STAT	_		7 +00)	OFF	SET:	5' R	REVIEWED	BY:	S. Rah	е						
REMA	ARKS:	None											_				
Elevation (feet)	O Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)		MATERIAL DESCRIPTION 7" ASPHALT			USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	× 0	TES' N in bl Moisture STREN	PENETRA T DATA lows/ft e 25 IGTH, tsf # 2.0		Additional Remarks
	T " -					1											
	-	₩					own fine to EL, moist (medium SAN	D WITH	SP							
	-	1		1	18			e wood, very r	noist (PT)		3-2-3 N=5	249				>>×	
		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	_							DT		475	$\parallel \parallel$			>>X	
	-	<u> </u>	IV	2	18 7	7				PT	1-1-1						
	- 5 -	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	7/ VIII	_	'-	<u>*</u>					N=2		<u> </u>				
		<u> </u>											1				
	-		1			Gray N	//ARL, som	e shells, very	moist (OL)				1				
	L -		⊒XΓ	3	8						W-O-H	117	φ			>>X	
			Ш							OL	N=0						
	-									OL							
	-		M	,	40						W O II						
		71/2 7/	₹VI	4	18	Dark b	rown MAR	L, trace shells	, some peat, very	/	W-O-H N=0	131	Ť			>>X	
	10 -	1, 11,				moist (,	,			131					
	-	<u> </u>															
		1, 11,								PT							
	_	<u> </u>															
	-	1, 11,															
			1				//ARL, trace	e shells, trace	roots, very moist								
		 	₫ΧI	5	18	(OL)					W-O-H	97	φ .			>>×	
	- 15 -		/ \								N=0				-		
		<u> </u>	1														
		<u> </u>	+		\ \frac{7}{2}	<u> </u>				OL							
	-	-	1														
	L -	<u> </u>	+														
		 										64				>>×	
	-		∃XI	6	18						W-O-H		*				
	20 -					Brown	ish gray SA	ANDY SILTY (to low plastic	CLAY, very moist	,	N=0						
						very so	ort, Silgritiy	to low plastic	(CL-IVIL)								
	-																
	-									CL-ML							
										OL-IVIL							
												32			$ \times $		
	-			7	6						W-O-H		 				
	- 25 -										N=0		<u></u>				
							(Continued Ne.	xt Page								
4					_				ndustries, Inc.				CT N			0408731	
					T /			eign Drive,	Suite C			ROJE		20		llaneous I	
		クす	IJ	7			sing, MI		5700		L	JCA1	ION:			oint Highv	
.	سَالِ اللهِ				_	1 616	epriorie.	(517)394	-5100						Laton C	ounty, Mic	ınyan

DATE	DATE STARTED: 8/14/13 DRILL COMPANY:						PSI	——— I BURING BUN				3_NQ			
	COM					8/14/13	DRILLER: E. Motcheck LO		E. Motche	ck					
COM	PLETI	ON DE	PTI	Η _		32.0 ft		CME-55			Water		nile Drillii	-	16.5 feet
BENC	CHMAI	RK:				N/A	DRILLING METHOD:	3 1/4"	HSA		ai		on Com		N/A
ELEV	'ATIO	N :			N	N/A	SAMPLING METHOD:		SS		>	<u>▼</u> We	et Cave [Depth	4.5 feet
	TUDE:						HAMMER TYPE:		tic				ATION:		
	SITUDI						EFFICIENCY	N/A			See B	oring Lo	cation D	ıagram	
STAT	_		7+00)	OFFS	SET :5' R	REVIEWED BY:	S. Rahe	9						
REMA	ARKS:	None			1	T			Blows per 6-inch (SS)	1					
Elevation (feet)	- Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)		MATERIAL DESCRIPTION Brownish gray SANDY SILTY CLAY, very moist,			Moisture, %	× 0	TES N in b Moisture	PENETR T DATA lows/ft © e	PL LL 50	Additional Remarks
						very soft, slightly	very soft, slightly to low plastic (CL-ML) Gray fine to medium SAND, occasional Clay					\			
	- 30 -		X V	9	18	pockets, wet, loo	se to medium dense (SP)	SP	5-6-6 N=12 3-4-5 N=9	24 19		\parallel	×		
						Professiona	al Service Industries, Inc.		PF	ROJE	CT NO).:		040873	31
Professional Service Industries, Inc. 3120 Sovereign Drive, Suite C Lansing, MI 48911 Telephone: (517) 394-5700							PROJECT: 2013 Miscellaneous Borings LOCATION: Five Point Highway Eaton County, Michigan			hway					

DATE COMPLETED: BORING B-10 DATE COMPLETED: COMPLETED: COMPLETED: DATE COMPLETED: D	DATE STARTED: 8/14/13 DRILL COMPANY:						PS				B		VG B	<u>-10</u>		
HAMMER TYPE: EFFICIENCY NA See BRING LOCATION:					_					: E. Motche	ck					
HAMMER TYPE: EFFICIENCY NA See BRING LOCATION:	COM	PLETIC	ON DE	PT	Н _							<u>ਵ</u> ੇ	<u>¥</u> wi		-	
HAMMER TYPE: EFFICIENCY NA See BRING LOCATION:	BENC	HMAF	RK:									S	_			
STATION: 19-90	ELEV	ATION	1 :			1	N/A			SS		$\overline{}$			epth	3 feet
19-00 OFFSET: 5'R REVIEWED BY: S. Rahe										atic						
### Additional Remarks Comparison Compa	LONG	ITUDI	E: _					EFFICIENCY				See E	Boring Lo	cation D	agram	
Continue		_		+00)	OFF	SET : <u>5'</u> R	REVIEWED BY:	S. Rah	e						
6" ASPHALT 10" Brown fine to medium SAND WITH SP GRAVEL, moist (FIL) 11 B 6" Gry fine to medium SAND, trace Silt, moist V(FIL) 12 2 2 18 Brown 14 18 Coccasional fine to medium SAND, wet, medium dense (SP) 101 SP W-O-H N=0 101 SP W-O-H N=0 SP SP S-6-7 N=13 Boring terminated 10 feet below existing ground	REMA	ARKS:	None				T									
1 1 18 From fine to medium SAND WITH SP GRAVELING (FILL) Fighty fine to medium SAND, trace Silt, moist (FILL) Fighty fine to medium SAND, trace Silt, moist (FILL) Fighty fine to medium SAND, trace Silt, moist (FILL) Fighty fine to medium SAND, trace Silt, moist (FILL) Fighty fine to medium SAND, wet, medium dense (SP) Occasional fine to medium SAND, wet, medium dense (SP) SP 5-6-7 SP 5-6-7 SP 5-6-7 SP 5-6-7 SP 5-6-7 N=13	Elevation (feet)		Graphic Log	Sample Type	Sample No.	Recovery (inches)		RIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)		× 0	TES N in b Moisture	T DATA lows/ft © e 25 IGTH, tsf	PL LL 50	
1 1 1 1 1 1 1 1 1 1			~~~					readings CAND WITH								
1 18 6 Gray fine to medium SAND, trace Silt, moist SP 4-3-4 N=7 170 N=3 N=3 N=3 N=3 N=3 N=4 N=7 N=3 N=4 N=7 N=4 N=5 N=5 N=5 N=1 N=5 N=5 N=1 N=5 N=5 N=1 N=5 N=5 N=1 N=5		-					GRAVEL moist (FILL)	SP							
Black PEAT, very moist (PT) 2 2 18 Brown PT 3-2-1 N=3 Occasional fine to medium Sand pockets Gray fine to medium SAND, wet, medium dense (SP) SP 5-6-7 N=13 PT 3-2-1 N=3 N-3 101 N-O-H N=0 SP 5-6-7 N=13			\bowtie	3 XI	1	18	6" Gray fine to me	edium SAND, trace Silt, moist	SP	4-3-4		©	,			
Boring terminated 10 feet below existing ground SP 190 >>> 190 >>> >>> 101 >>> 101 >>> 101 >>> 101 >>> 101 >>> 101 >>> 101 >>> 101			77.	V				and the CDT		N=7	170	\perp /			>> ×	
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		- 10 -						1 10 feet below existing ground								
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Telephone: (517) 394-5700 Eaton County, Michigan		Telephone: (517) 394-5700							Eaton County, Michigan							

DATE STARTED: 8/14/13					8		DRILL COMPANY:	PSI				R	ORII	NG I	R ₋ 11
	COM			_		8/14/13	DRILLER: E. Motcheck L		E. Motche	<u>ck</u>	_				
	PLETIC			_		15.0 ft	DRILL RIG:	CME-55			Water	_	ile Drillir on Comp		8 feet N/A
	HMAF					N/A	DRILLING METHOD:				S		Cave D		5.5 feet
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Elevation (feet)	o Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)		RIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	× 0	N in blo	DATA	PL LL 50	Additional Remarks
	 			1	18	moist (FILL) 6" Brown fine to r trace Silt, moist (I Brown fine to me Silt, occasional cl	nedium SAND WITH GRAVE nedium SAND, trace Gravel, FILL) dium SAND, trace Gravel, tra ay lenses, moist (FILL) occasional Clay lenses, mois	SP SP	6-9-9 N=18	7	×	© 			
	 - 5 -			2	18 <u>\</u>	to wet (FILL)	occasional olay lenses, mos	SP	6-7-11 N=18	11		×			Drove stone; no
	 			3	0 7	<u>Z</u>			50/2"	18		×		>>@	
	 - 10 - 		<u> </u>	4	18	Black occasional	fine to medium Sand seams	PT	3-3-4 N=7	57	 			>>>	
	 - 15 -	<u> </u>		5	18	,	ND, trace Peat, wet, loose (S	SP	3-4-2 N=6	27	_		×		
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GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System (USCS), AASHTO 1988 and ASTM designations D2487 and D-2488 are used to identify the encountered materials unless otherwise noted. Coarse-grained soils are defined as having more than 50% of their dry weight retained on a #200 sieve (0.075mm); they are described as: boulders, cobbles, gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are defined as silts or clay depending on their Atterberg Limit attributes. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size.

DRILLING AND SAMPLING SYMBOLS

SFA: Solid Flight Auger - typically 4" diameter

flights, except where noted.

HSA: Hollow Stem Auger - typically 31/4" or 41/4 I.D.

openings, except where noted.

M.R.: Mud Rotary - Uses a rotary head with

Bentonite or Polymer Slurry

R.C.: Diamond Bit Core Sampler

H.A.: Hand Auger

P.A.: Power Auger - Handheld motorized auger

SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.

ST: Shelby Tube - 3" O.D., except where noted.

RC: Rock Core
TC: Texas Cone

BS: Bulk Sample

PM: Pressuremeter

CPT-U: Cone Penetrometer Testing with Pore-Pressure Readings

SOIL PROPERTY SYMBOLS

N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. Split-Spoon.

N₆₀: A "N" penetration value corrected to an equivalent 60% hammer energy transfer efficiency (ETR)

Q.: Unconfined compressive strength, TSF

Q₀: Pocket penetrometer value, unconfined compressive strength, TSF

w%: Moisture/water content, %

LL: Liquid Limit, %

PL: Plastic Limit, %

PI: Plasticity Index = (LL-PL),%

DD: Dry unit weight, pcf

▼,∇,▼ Apparent groundwater level at time noted

RELATIVE DENSITY OF COARSE-GRAINED SOILS ANGULARITY OF COARSE-GRAINED PARTICLES

Relative Density	N - Blows/foot	<u>Description</u>	<u>Criteria</u>				
Very Loose	0 - 4 4 - 10	Angular:	Particles have sharp edges and relatively plane sides with unpolished surfaces				
Loose Medium Dense	10 - 30	Subangular:	Particles are similar to angular description, but have rounded edges				
Dense Very Dense	30 - 50 50 - 80	Subrounded:	Particles have nearly plane sides, but have well-rounded corners and edges				
Extremely Dense	80+	Rounded:	Particles have smoothly curved sides and no edges				

GRAIN-SIZE TERMINOLOGY

PARTICLE SHAPE

<u>Component</u>	Size Range	<u>Description</u>	Criteria
Boulders:	Over 300 mm (>12 in.)	Flat:	Particles with width/thickness ratio > 3
Cobbles:	75 mm to 300 mm (3 in. to 12 in.)	Elongated:	Particles with length/width ratio > 3
Coarse-Grained Gravel:	19 mm to 75 mm (¾ in. to 3 in.)	Flat & Elongated:	Particles meet criteria for both flat and
Fine-Grained Gravel:	4.75 mm to 19 mm (No.4 to 3/4 in.)		elongated
Coarse-Grained Sand:	2 mm to 4.75 mm (No.10 to No.4)		

Medium-Grained Sand: 0.42 mm to 2 mm (No.40 to No.10) Fine-Grained Sand: 0.075 mm to 0.42 mm (No. 200 to No.40)

Silt: 0.005 mm to 0.075 mm

Clay: <0.005 mm

RELATIVE PROPORTIONS OF FINES

<u>Descriptive Term</u> % <u>Dry Weight</u> Trace: < 5%

With: 5% to 12%

Modifier: >12%

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GENERAL NOTES (Continued)

CONSISTENCY OF FINE-GRAINED SOILS MOISTURE CONDITION DESCRIPTION

Q _U - TSF 0 - 0.25 0.25 - 0.50 0.50 - 1.00 1.00 - 2.00 2.00 - 4.00 4.00 - 8.00 8.00+	N - Blows/foot 0 - 2 2 - 4 4 - 8 8 - 15 15 - 30 30 - 50 50+	Consistency Very Soft Soft Firm (Medium Stiff) Stiff Very Stiff Hard Very Hard	Description Dry: Absence of moisture, dusty, dry to the touch Moist: Damp but no visible water Wet: Visible free water, usually soil is below water table RELATIVE PROPORTIONS OF SAND AND GRAVEL Descriptive Term Trace: < 15% With: 15% to 30%
			Modifier: >30%

STRUCTURE DESCRIPTION

Description	Criteria	Description	Criteria
Stratified:	Alternating layers of varying material or color with	Blocky:	Cohesive soil that can be broken down into small
	layers at least 1/4-inch (6 mm) thick		angular lumps which resist further breakdown
Laminated:	Alternating layers of varying material or color with	Lensed:	Inclusion of small pockets of different soils
	layers less than 1/4-inch (6 mm) thick	Layer:	Inclusion greater than 3 inches thick (75 mm)
Fissured:	Breaks along definite planes of fracture with little	Seam:	Inclusion 1/8-inch to 3 inches (3 to 75 mm) thick
	resistance to fracturing		extending through the sample
Slickensided:	Fracture planes appear polished or glossy,	Parting:	Inclusion less than 1/8-inch (3 mm) thick
	sometimes striated		

SCALE OF RELATIVE ROCK HARDNESS ROCK BEDDING THICKNESSES

Q _{IJ} - TSF Consistency Description Criteria	
Very Thick Bedded Greater than 3-foot (>1.0 m)	
2.5 - 10 Extremely Soft Thick Bedded 1-foot to 3-foot (0.3 m to 1.0)	m)
10 - 50 Very Soft Medium Bedded 4-inch to 1-foot (0.1 m to 0.3	m)
50 - 250 Soft Thin Bedded 11/4-inch to 4-inch (30 mm to	100 mm)
250 - 525 Medium Hard Very Thin Bedded ½-inch to 1¼-inch (10 mm to	30 mm)
525 - 1,050 Moderately Hard Thickly Laminated 1/8-inch to ½-inch (3 mm to 1	0 mm)
1,050 - 2,600 Hard Thinly Laminated 1/8-inch or less "paper thin" (<3 mm)

ROCK VOIDS

Voids	Void Diameter	(Typically Sedi	
	<6 mm (<0.25 in)	Component	Size Range
	6 mm to 50 mm (0.25 in to 2 in)	Very Coarse Grained	>4.76 mm
0	50 mm to 600 mm (2 in to 24 in)	Coarse Grained	2.0 mm - 4.76 mm
,	,	Medium Grained	0.42 mm - 2.0 mm
Cave	>600 mm (>24 in)	Fine Grained	0.075 mm - 0.42 mm
		Very Fine Grained	<0.075 mm

ROCK QUALITY DESCRIPTION

DEGREE OF WEATHERING

GRAIN-SIZED TERMINOLOGY

Rock Mass Description Excellent Good Fair	RQD Value 90 -100 75 - 90 50 - 75	Slightly Weathered:	Rock generally fresh, joints stained and discoloration extends into rock up to 25 mm (1 in), open joints may contain clay, core rings under hammer impact.				
Poor Very Poor	25 -50 Less than 25	Weathered:	Rock mass is decomposed 50% or less, significant portions of the rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.				
		Highly Weathered:	Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.				

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SOIL CLASSIFICATION CHART

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CL			SYMBOLS		TYPICAL
			GRAPH	LETTER	DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		(LITTLE OR NO FINES)		SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES
		(APPRECIABLE AMOUNT OF FINES)		sc	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	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, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		МН	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				СН	INORGANIC CLAYS OF HIGH PLASTICITY
				ОН	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			\(\frac{1}{2} \fr	PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

