

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1192 ST (p. 1 of 1)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **922.3** Hennepin Co. Coordinates: **N 148101 E 495438**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS							
							WC	DEN	LL	PL	%-#200			
1	FILL, mostly clayey sand with organic fines, a little plastic, trace roots, dark brown, frozen (A-2-6)	FILL		F			12							
2														
3	FILL, mostly gravelly silty sand, trace roots, brown, frozen (A-1-b)			F										
4	LEAN CLAY, brown, a little dark brown, firm (CL) (A-6)	FINE ALLUVIUM	7	M	SS	8	26							
5														
6														
7	GRAVELLY SAND, fine to medium grained, light brown, moist, medium dense, laminations of silt (SP) (A-1-b)	COARSE ALLUVIUM	24	M	SS	14								
8														
9	GRAVELLY SAND, fine to medium grained, light grayish brown, moist, medium dense (SP) (A-1-b)		28	M	SS	13								
10														
11	SAND WITH GRAVEL, medium grained, light brown, moist, medium dense (SP) (A-1-b)		23	M	SS	11								
12														
13	SAND WITH GRAVEL, medium to fine grained, brown, moist, medium dense (SP) (A-1-b)		16	M	SS	10								
14														
15	CLAYEY SAND, a little gravel, brown, very stiff, a lamination of silty sand (SC) (A-6)	TILL	19	M	SS	16	12							
16														
17	SANDY LEAN CLAY, a little gravel, gray and brown mottled, very stiff, laminations of sand, silty sand and sandy silt (CL) (A-6)		18	M/W	SS	17	17							
18														
19														
20														
21	<b>END OF BORING</b>													

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-19½'	3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
		3/3/14	12:47	21.0	19.5	20.9		20.7	
		3/3/14	12:55	21.0	19.5	20.8		19.5	
BORING COMPLETED: 3/3/14									
DR: TA LG: SG Rig: 85C									

AET CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL\_GDT 3/11/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1193 ST (p. 1 of 1)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **922.1** Hennepin Co. Coordinates: **N 147915 E 495015**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS							
							WC	DEN	LL	PL	%-#200			
1	FILL, mostly silty sand with organic fines and gravel, trace roots, dark brown (A-4)	FILL												
2	FILL, mostly sand with silt and gravel, dark brown, frozen (A-1-b)													
3														
4	GRAVELLY SAND, medium to fine grained, brown, moist, medium dense (SP) (A-1-b)	COARSE ALLUVIUM												
5														
6			15	M	SS	6								
7	SAND WITH SILT AND GRAVEL, medium to fine grained, brown, moist, medium dense (SP-SM) (A-1-b)													
8			13	M	SS	8								
9	CLAYEY SAND, a little gravel, brown, medium dense, laminations of sand (SC/SM) (A-2-4)	TILL												
10														
11			15	M	SS	16	7							
12	CLAYEY SAND, a little gravel, brown, a little light brown, medium dense, laminations and lenses of sand (SC/SM) (A-2-4)													
13			14	M	SS	12	10							
14														
15	CLAYEY SAND, a little gravel, brown, medium dense to loose, laminations of sand (SC/SM) (A-2-4)													
16			24	M	SS	0								
17														
18			10	▼	SS	17	12							
19	SILTY SAND, a little gravel, brown, loose (SM) (A-2-4)													
20			10	M/W	SS	17								
21	<b>END OF BORING</b>													

AET\_CORP W.COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 3/11/14

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-19½'	3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
		3/3/14	11:16	21.0	19.5	21.0		19.0	
		3/3/14	11:51	21.0	19.5	20.5		18.4	
BORING COMPLETED: 3/3/14									
DR: TA LG: SB Rig: 85C									

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1194 ST (p. 1 of 1)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **922.5** Hennepin Co. Coordinates: **N 147674 E 494365**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
1	FILL, mostly clayey sand with organic fines, a little gravel, trace roots, dark brown, frozen (A-2-6)	FILL					9					
2	FILL, mostly clayey sand, a little gravel, trace roots, dark brown (A-2-6)						8					
3	FILL, mostly clayey sand with organic fines, a little gravel and clayey sand, trace roots, dark brown, a little brown (A-2-6)						10	12				
4	FILL, mostly clayey sand with organic fines, a little gravel and clayey sand, trace roots, dark brown, a little brown (A-2-6)	COARSE ALLUVIUM	9	M	SS	10	12					
5	SAND, a little gravel, fine to medium grained, light brown, moist, medium dense (SP) (A-3)		27	M	SS	7						
6	GRAVELLY SAND, fine to medium grained, light brown, moist, medium dense (SP) (A-1-b)		22	M	SS	9						
7	CLAYEY SAND WITH GRAVEL, brown, a little light brown, very stiff, a lamination of sand (SC) (A-6)	TILL	19	M	SS	6	10					
8	SILTY SAND, a little gravel, brown, medium dense, a lens of sandy lean clay (SP-SM) (A-2-4)		15	M	SS	14						
9	CLAYEY SAND, a little gravel, brown, a little light brown, very stiff, a lamination of sand (SC) (A-2-6)		16	M	SS	11	10					
10	CLAYEY SAND, a little gravel, brown, stiff (SC) (A-6)		12	M	SS	16	12					
11	<b>END OF BORING</b>											

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-19½'	3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
		3/3/14	10:20	21.0	19.5	20.8		None	
BORING COMPLETED: 3/3/14									
DR: TA	LG: SG	Rig: 85C							

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 3/11/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1195 ST (p. 1 of 1)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **924.0** Hennepin Co. Coordinates: **N 147527 E 493948**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
1	FILL, mostly clayey sand with gravel, trace roots, dark brown, frozen (A-1-b)	FILL			F	SU	15					
2	FILL, mostly gravel with silt and sand, trace roots, dark brown, frozen (A-1-b)				F	SU						
3	FILL, mostly silty sand, a little gravel, trace roots, dark brown, frozen (A-2-4)				F	SU						
4	FILL, mostly silty sand, a little gravel, trace roots, dark brown, frozen (A-2-4)				F	SU						
5	FILL, mostly sand with silt, a little gravel, brown, frozen (A-1-b)	COARSE ALLUVIUM	29		M	SS	12					
6	FILL, mostly sand with silt, a little gravel, brown, frozen (A-1-b)											
7	SAND WITH GRAVEL, medium to coarse grained, light brown, moist, medium dense (SP) (A-1-b)	TILL	20		M	SS	12	10				
8	SAND WITH GRAVEL, medium to coarse grained, light brown, moist, medium dense (SP) (A-1-b)											
9	CLAYEY SAND, a little gravel, light brown to brown, very stiff (SC/SM) (A-2-4)		23		M	SS	14	7				
10	CLAYEY SAND, a little gravel, light brown to brown, very stiff (SC/SM) (A-2-4)											
11	CLAYEY SAND, a little gravel, light brown to brown, very stiff (SC/SM) (A-2-4)											
12	SAND, a little gravel, fine to medium grained, light brown, moist, medium dense, laminations of clayey sand (SP) (A-3)	COARSE ALLUVIUM	27		M	SS	14					
13	SAND, a little gravel, fine to medium grained, light brown, moist, medium dense, laminations of clayey sand (SP) (A-3)											
14	SAND WITH SILT, a little gravel, fine grained, brown, moist, medium dense, lenses of clayey sand (SP-SM) (A-3)		21		M	SS	14					
15	SAND WITH SILT, a little gravel, fine grained, brown, moist, medium dense, lenses of clayey sand (SP-SM) (A-3)											
16	SAND WITH SILT, a little gravel, fine grained, brown, moist, medium dense, lenses of clayey sand (SP-SM) (A-3)											
17	SANDY LEAN CLAY, a little gravel, brown, very stiff (CL) (A-6)	TILL	21		M	SS	6	12				
18	SANDY LEAN CLAY, a little gravel, brown, very stiff (CL) (A-6)											
19	CLAYEY SAND, a little gravel, brown, stiff, lenses of sand and silty sand (SC) (A-6; A-1-b)		14		M	SS	12	11				
20	CLAYEY SAND, a little gravel, brown, stiff, lenses of sand and silty sand (SC) (A-6; A-1-b)											
21	<b>END OF BORING</b>											

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS						NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG	
0-19½'	3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL		WATER LEVEL
		2/26/14	2:55	21.0	19.5	20.7			None
BORING COMPLETED: 2/26/14									
DR: TA LG: TM Rig: 85C									

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 3/11/14



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1196 SS (p. 1 of 1)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **924.2** Hennepin Co. Coordinates: **N 147321 E 493382**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS							
							WC	DEN	LL	PL	%-#200			
1	FILL, mostly gravelly silty sand, dark brown, frozen (A-1-b)	FILL		F										
2				F										
3				F										
4	FILL, mostly gravelly sand with silt, light grayish brown to brown (A-1-b)													
5			55	M		SS	12							
6														
7			50/4	M		SS	5							
8	SAND WITH GRAVEL, medium to fine grained, light grayish brown to light brown, moist, medium dense to dense (SP) (A-1-b) (possible fill)	COARSE ALLUVIUM OR FILL												
9														
10			27	M		SS	12							
11	SAND WITH GRAVEL, medium to fine grained, light grayish brown to light brown, moist, medium dense to dense (SP) (A-1-b) (possible fill)	COARSE ALLUVIUM OR FILL												
12			50	M		SS	12							
13	SILTY SAND, a little gravel, fine to medium grained, brown, moist, medium dense, lenses of clayey sand (SM) (A-2-4)	COARSE ALLUVIUM												
14			20	M		SS	12							
15	SILTY SAND, a little gravel, brown, medium dense, lenses of clayey sand (SM) (A-2-4)	TILL												
16			20	M		SS	10							
17	CLAYEY SAND, a little gravel, brown, stiff (SC/SM) (A-2-4)													
18			14	M		SS	12	10						
19	CLAYEY SAND, a little gravel, brown, stiff (SC/SM) (A-2-4)													
20			14	M		SS	12	10						
21	<b>END OF BORING</b>													

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 3/17/14

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-19½'	3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
		3/7/14	9:50	21.0	19.5	21.0		None	
BORING COMPLETED: 3/7/14									
DR: TA LG: JMMRig: 1C									

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1197 SS (p. 1 of 1)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **924.1** Hennepin Co. Coordinates: **N 147234 E 493146**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
1	FILL, mostly clayey sand with gravel, a little silty sand, pieces of concrete, trace roots, brown and dark brown, frozen (A-2-4)	FILL					10					
2	FILL, mostly gravel with silt and sand, brown, frozen (A-1-b)											
3	FILL, mostly silty sand with gravel, dark brown, frozen (A-1-b)											
4	FILL, mostly silty sand with gravel, dark brown, frozen (A-1-b)											
5	FILL, mostly sand with silt, a little gravel and clayey sand, trace roots, brown (A-1-b)			10	M	SS	4					
6	FILL, mostly sand with silt, a little gravel and clayey sand, trace roots, brown (A-1-b)											
7	GRAVELLY SAND, medium to fine grained, light brown, moist, dense (SP) (A-1-b)	COARSE ALLUVIUM	35	M	SS	12						
8	GRAVELLY SAND, medium to fine grained, light brown, moist, dense (SP) (A-1-b)											
9	SAND WITH GRAVEL, medium to coarse grained, light brown, moist, medium dense (SP) (A-1-b)			27	M	SS	12					
10	SAND WITH GRAVEL, medium to coarse grained, light brown, moist, medium dense (SP) (A-1-b)											
11	SAND, a little gravel, medium grained, light brown, moist, medium dense (SP) (A-1-b)		11	M	SS	12						
12	SAND, a little gravel, medium grained, light brown, moist, medium dense (SP) (A-1-b)											
13	SAND, a little gravel, medium grained, light brown, moist, medium dense (SP) (A-1-b)											
14	CLAYEY SAND, a little gravel, brown, a little light brown, very stiff, a lens of sand (SC/SM) (A-2-4)	TILL	16	M	SS	14	8					
15	CLAYEY SAND, a little gravel, brown, a little light brown, very stiff, a lens of sand (SC/SM) (A-2-4)											
16	CLAYEY SAND, a little gravel, brown, a little light brown, very stiff, laminations of sand (SC/SM) (A-2-4)			23	M	SS	14	8				
17	CLAYEY SAND, a little gravel, brown, a little light brown, very stiff, laminations of sand (SC/SM) (A-2-4)											
18	CLAYEY SAND, a little gravel, brown, hard, laminations of sand with silt (SC) (A-6)											
19	CLAYEY SAND, a little gravel, brown, hard, laminations of sand with silt (SC) (A-6)											
20	CLAYEY SAND, a little gravel, brown, hard, laminations of sand with silt (SC) (A-6)		37	M	SS	14	10					
21	GRAVELLY SAND WITH SILT, fine to medium grained, light brown, dense (SP-SM) (A-1-b) <b>END OF BORING</b>	COARSE *										

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-19½'	3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
		2/26/14	1:45	21.0	19.5	21.0		None	
BORING COMPLETED: 2/26/14									
DR: TA LG: TM Rig: 85C									

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 3/11/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1198 ST (p. 1 of 1)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **920.7** Hennepin Co. Coordinates: **N 147082 E 492729**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
1	FILL, mostly sand with organic fines, a little gravel, trace roots, dark brown (A-6)	FILL		F	SU		22				
2	FILL, mostly silty sand with gravel, brown, frozen (A-2-4)		F	SU							
3	FILL, mostly gravelly sand with silt, a little cinders/ash, dark brown, frozen (A-1-b)		F	SU							
4											
5	GRAVELLY SAND WITH SILT, medium to fine grained, light brown, moist, frozen to 5' then very dense (SP-SM) (A-1-b)	COARSE ALLUVIUM	52	F/M	SS	12					
6											
7	SAND WITH GRAVEL, medium grained, light brown, moist, medium dense (SP) (A-1-b)		25	M	SS	12					
8											
9											
10			22	M	SS	12					
11											
12	CLAYEY SAND, a little gravel, brown, a little light brown, very stiff, laminations of sand (SC/SM) (A-2-4)	TILL	20	M	SS	12	8				
13											
14	SILTY SAND, a little gravel, brown, a little light brown, moist, medium dense, lenses of sand (SM) (A-2-4)		16	M	SS	12					
15											
16			21	M	SS	14					
17											
18											
19	SILTY SAND, a little gravel, brown, a little light brown, medium dense, laminations of sand (SM/SC) (A-2-4)	19	M	SS	14						
20											
21	<b>END OF BORING</b>										

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-19½'	3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
		2/26/14	12:20	21.0	19.5	21.0		None	
BORING COMPLETED: 2/26/14									
DR: TA	LG: TM	Rig: 85C							

AET\_CORP\_W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 3/11/14

**SUBSURFACE BORING LOG**

AET JOB NO: **01-05697** LOG OF BORING NO. **1199 ST (p. 1 of 1)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **916.1** Hennepin Co. Coordinates: **N 146897 E 492214**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
1	FILL, mostly clayey sand with gravel, pieces of bituminous, trace roots, dark brown and brown, frozen (A-6)	FILL			F	SU	16					
2	FILL, mostly concrete, light brown		F	SU								
3	FILL, mostly silty sand with gravel, a little cinders/ash, black (A-2-4)		F	SS	12							
4	FILL, mostly clayey sand with organic fines, trace roots, dark brown, frozen (A-6)		F	SS	12	19						
5			F	SS	12	19						
6			F	SS	6	12						
7	LEAN CLAY, trace roots, brown, frozen (CL) (A-6)	FINE ALLUVIUM			F	SS	6	12				
8												
9	SAND WITH SILT, a little gravel, fine to medium grained, brown, moist, medium dense (SP-SM) (A-1-b)	COARSE ALLUVIUM	11		M	SS	12					
10												
11	SAND WITH SILT AND GRAVEL, trace roots, fine to medium grained, brown, moist, medium dense (SP-SM) (A-1-b)		19		M	SS	6					
12												
13	SAND WITH GRAVEL, fine to medium grained, light brown, moist, medium dense (SP) (A-1-b)		25		M	SS	6					
14												
15	SAND, a little gravel, medium grained, light brown, moist, medium dense (SP) (A-1-b)		17		M	SS	12					
16												
17	CLAYEY SAND, a little gravel, brown, very stiff (SC) (A-6)	TILL						9				
18												
19	CLAYEY SAND, a little gravel, brown, very stiff (SC/SM) (A-2-4)		27		M	SS	14	9				
20												
21	<b>END OF BORING</b>											

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
0-19½'	3.25" HSA	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
		2/26/14	11:00	21.0	19.5	21.0		None	
BORING COMPLETED: 2/26/14									
DR: TA LG: TM Rig: 85C									

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 3/1/14





# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1200 SW (p. 1 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **921.9** Hennepin Co. Coordinates: N **148374** E **496025**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
1	FILL, mostly sandy lean clay, a little gravel, trace roots, dark brown (A-6)	FILL	18	M	SS	16	20				
2	FILL, mostly gravelly sand with silt, a little clayey sand, grayish brown, a little black (A-1-b)		7	M	SS	12					
3	FILL, mostly silty sand, a little ash/cinders, brown and black (A-2-4)										
4	FILL, mostly sand with gravel, light brown and brown (A-1-b)		16	M	SS	12					
5			16	M	SS	14					
6											
7											
8											
9	FILL, mixture of sand with silt, clayey sand and lean clay, brown and light gray (A-3, A-6)		13	M	SS	16	18				
10											
11											
12	CLAYEY SAND, a little gravel, dark brownish gray, firm (SC) (A-6)	TILL	5	M	SS	8	17				
13											
14	GRAVELLY SAND WITH SILT, medium to fine grained, brownish gray to brown, moist to waterbearing, medium dense (SP-SM) (A-1-b)	COARSE ALLUVIUM	19	M/W	SS	8					
15											
16											
17											
18			11	W	SS	6					
19	SAND WITH SILT, a little gravel, fine to medium grained, grayish brown, waterbearing, medium dense (SP-SM) (A-3)		21	W	SS	1					
20											
21											
22	CLAYEY SAND, a little gravel, brown, a little light brown, very stiff, a lens of sand (SC/SM) (A-2-4)	TILL	21	M/W	SS	12	11				
23											
24	CLAYEY SAND, a little gravel, gray to brown, very stiff, a lens of silty sand (SC) (A-6)		23	M	SS	14	17				
25											
26											
27	SILTY SAND, a little gravel, fine to medium grained, brown, a little light brown, wet, medium dense, lenses and laminations of sand (SM) (A-2-4)	COARSE ALLUVIUM	18	M	SS	16					
28											
29											
30	CLAYEY SAND, a little gravel, grayish brown, stiff to soft, a lens of waterbearing sand with gravel at 45 1/2' (SC/SM) (A-2-4)	TILL	16	M	SS	8					
31											

AET CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 6/2/14

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS						NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL		
0-44 1/2'	3.25" HSA	5/8/14	9:25	18.5	17.0	17.0	16.0	
		5/8/14	9:35	18.5	17.0	17.0	15.0	
BORING COMPLETED: 5/8/14		5/8/14	10:30	46.0	44.5	44.5	36.0	
DR: SG LG: CD Rig: 91C								



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1200 SW (p. 2 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: N **148374** E **496025**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS						
							WC	DEN	LL	PL	%-#200		
33	CLAYEY SAND, a little gravel, grayish brown, stiff to soft, a lens of waterbearing sand with gravel at 45½' (SC/SM) (A-2-4) <i>(continued)</i>	TILL <i>(continued)</i>	4	M		SS	18	12					
34						SS	18	12					
35					4	M		SS	18	12			
36								SS	18	12			
37								SS	18	12			
38					9	M		SS	18	11			
39								SS	18	12			
40					5	M		SS	18	12			
41						SS	18	12					
42						SS	18	12					
43			5	M		SS	18	12					
44						SS	18	12					
45			8	M/W		SS	18	11					
46	<b>END OF BORING</b>												

AET CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 6/2/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1211 SB (p. 1 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **888.1** Hennepin Co. Coordinates: **N 152093 E 504048**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
1	14.5" Concrete Pavement	FILL			SU							
2	4" Void				SU							
3	FILL, mostly sand with silt, a little gravel and clayey sand, brown and gray (A-1-b)		5	M	SS	14						
4												
5			12	W	SS	16						
6												
7	ORGANIC CLAY, trace shells and roots, dark brown, soft to very soft, lenses and laminations of sapric peat (OH) (A-8)	SWAMP DEPOSIT	1	M	SS	18	180					
8												
9												
10												
11												
12												
13				WH	M	SS	18	201				
14												
15					2	M	SS	18	103			
16												
17												
18			3	M	SS	18	137					
19												
20												
21			3	M	SS	18	172					
22	ORGANIC CLAY, trace shells and roots, dark brown to black, a little brown and light gray, soft, laminations of silt and hemic peat (OH) (A-8)		4	M	SS	10	165					
23												
24												
25					4	M	SS	18	220			
26												
27												
28					2	M	SS	14	184			
29												
30												
31					3	M	SS	18	269			

AET\_CORP W-COORDINATES: 01-05697.GPJ AET+CPT+WELL.GDT 5/9/14

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-46'	4.25" HSA								
46-74.5'	RDF w/DM	5/6/14	11:33	6.0	4.5	4.2		4.5	
		5/6/14	1:43	41.0	42.0	32.0		16.6	
BORING COMPLETED: 5/6/14		5/6/14	2:00	41.0	42.0	29.1		13.2	
DR: SG	LG: CD	Rig: 91C							

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1211 SB (p. 2 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: N **152093** E **504048**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS							
							WC	DEN	LL	PL	%-#200			
33	ORGANIC CLAY, trace shells and roots, dark brown to black, a little brown and light gray, soft, laminations of silt and hemic peat (OH) (A-8) (continued)		3	M		SS	10	276						
34														
35						3	M	SS	18	125				
36														
37	ORGANIC CLAY, pieces of wood around 37.5', dark brownish gray, very soft (OH) (A-8)		1	M		SS	18	68						
38														
39	LEAN CLAY, brownish gray, stiff (CL) (A-6)	FINE ALLUVIUM	9	M		SS	18	26						
40														
41														
42	No sample taken at 42' due to blow up in hole (left advanced HSA in ground overnight)													
43														
44	GRAVELLY SAND, medium grained, brownish gray, waterbearing, medium dense to loose (SP) (A-1-b)	COARSE ALLUVIUM												
45														
46						12	W	SS	2					
47						11	W	SS	4					
48						7	W	SS	6					
49														
50														
51														
52														
53	GRAVELLY SAND, medium to coarse grained, brownish gray, waterbearing, loose (SP) (A-1-b)													
54														
55						9	W	SS	10					
56														
57														
58	CLAYEY SAND, a little gravel, grayish brown, very stiff (SC) (A-6)	TILL												
59														
60						18	W	SS	6	14				
61														
62														
63														
64														
65														
66			25	M		SS	4	15						
67														
68														
69														
68	LIMESTONE, weathered, gray	PLATTEVILLE FORMATION												
69														

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 5/9/14



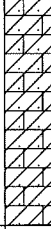


# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1211 SB (p. 3 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: N **152093** E **504048**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
71	LIMESTONE, weathered, gray ( <i>continued</i> )	 PLATTEVILLE FORMATION ( <i>continued</i> )	*	M	 SS	6						
72												
73						 SS						
74												
75				200/7	M			1				
	<b>END OF BORING</b> *23/.5 + 50/.5 + 100/.4											

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 5/9/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1213 SB (p. 1 of 3)**  
 PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**  
 SURFACE ELEVATION: **888.8** Hennepin Co. Coordinates: **N 152126 E 504117**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	qu
1	FILL, mostly clayey sand with gravel, a little sandy lean clay, trace roots, dark brown and black (A-1-b)	FILL	9	M	SS	16	12				
2			23	M	SS	12					
3	FILL, mostly sand with silt and gravel, a little sandy lean clay, brown, a little black (A-1-b)										
4			4	M	SS	2					
5											
6											
7	ORGANIC CLAY, trace roots and shells, brownish gray, dark brown and black, soft, lenses of hemic and sapric peat (OH) (A-8)	SWAMP DEPOSIT	2	M	SS	16	177				
8											
9											
10						TW	24	204	25		1010
11								190	26		Cons.
12											
13				2	M	SS	18	200			
14											
15				2	M	SS	18	182			
16											
17											
18			2	M	SS	18	108				
19											
20	SAPRIC PEAT, black, a little dark brownish gray (PT) (A-8)				TW	18	76	54		675	
21											
22											
23			4	M	SS	18	251				
24											
25	ORGANIC CLAY, trace roots, black to brownish gray, soft (CL) (A-8)		2	M	SS	18	261				
26											
27											
28			2	M	SS	18	51				
29											
30					M/W	18					
31		COARSE ALLUVIUM									

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-29'	3.25" HSA								
29-85'	RDF w/DM	5/1/14	10:15	30.5	29.0	27.6		12.1	
BORING COMPLETED: 5/1/14									
DR: SG LG: SB Rig: 1C									

AET\_CORP\_WCOORDINATES\_01-05697.GPJ\_AET+CPT+WELL.GDT\_5/19/14

# SUBSURFACE BORING LOG

AET JOB NO: 01-05697 LOG OF BORING NO. 1213 SB (p. 2 of 3)  
 PROJECT: Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis  
 Hennepin Co. Coordinates: N 152126 E 504117

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	qu	
33	SAND WITH GRAVEL, possible cobbles, medium grained, gray, waterbearing, medium dense to loose, lenses of sand with silt (SP) (A-1-b) (continued)	COARSE ALLUVIUM (continued)	9	W	SS	0						
34												
35			5	W	SS	0						
36												
37												
38					14	W	SS	3				
39												
40			7	W	SS	7						
41												
42												
43			6	W	SS	7						
44												
45	SAND WITH GRAVEL, medium to coarse grained, gray, waterbearing, loose (SP) (A-1-b)		6	W	SS	10						
46												
47	SANDY LEAN CLAY, little gravel, gray, very stiff (CL) (A-6)	TILL	18	M	SS	16	14					
48												
49												
50	GRAVEL WITH SAND, apparent cobbles, brown, waterbearing, medium dense (GP) (A-1-b)	COARSE ALLUVIUM	25	W	SS	2						
51												
52												
53	SAND, a little gravel, medium grained, brownish gray, waterbearing, medium dense (SP) (A-1-b)											
54												
55			11	W	SS	16						
56												
57												
58	GRAVELLY SAND, medium grained, grayish brown, waterbearing, medium dense (SP) (A-1-b)											
59												
60			20	W	SS	12						
61												
62	SAND WITH SILT, a little gravel, fine grained, brown, waterbearing, dense, a lens of sand (SP-SM) (A-3)											
63												
64												
65			37	W	SS	19						
66												
67												
68												
69	GRAVEL WITH CLAY AND SAND, brown, waterbearing, very dense (GP-GC) (A-1-b)											

AET\_CORP\_WCOORDINATES\_01-05697.GPJ\_AET-CPT+WELL.GDT\_5/20/14



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1213 SB (p. 3 of 3)**  
 PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**  
 Hennepin Co. Coordinates: **N 152126 E 504117**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	qu
71	GRAVEL WITH CLAY AND SAND, brown, waterbearing, very dense (GP-GC) (A-1-b) (continued)	COARSE ALLUVIUM OR COLLUVIUM (continued)	53	W	SS	3					
72											
73											
74											
75	SHALEY SANDSTONE, highly weathered to weathered, gray	ST. PETER FORMATION	43	W	SS	6					
76											
77											
78											
79	SANDSTONE, fresh, gray		25	W	SS	24					
80											
81											
82											
83	END OF BORING		270/5	W	SS	6					
84											
85											

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 5/20/14



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1214 SW (p. 1 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **889.9** Hennepin Co. Coordinates: **N 152175 E 504279**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
1	6" FILL, mostly silty sand with gravel, brown (A-1-b)	FILL	27	M	SS	14					
2	FILL, mostly gravelly silty sand, a little clayey sand, pieces of concrete and bituminous, dark brown, black and brownish gray (A-1-b)		4	M	SS	6					
4	FILL, mostly organic clay, a little gravel, trace roots, black (A-8)		2	M	SS	12	77				
7	HEMIC PEAT, brown and black (PT) (A-8)	SWAMP DEPOSIT	1	M	SS	14	364				
10	SAPRIC PEAT, black (PT) (A-8)		1	-	SS	0					
14	ORGANIC CLAY, black, a little gray, very soft, laminations of sand and lean clay (OH) (A-7-6)	MIXED ALLUVIUM	2	M	SS	12	129				
17	CLAYEY SAND WITH GRAVEL, gray, very soft to firm, lenses and laminations of waterbearing sand (SC) (A-2-6)		1	W	SS	24	28				
20			1	W	SS	4	19				
23			6	W	SS	14	21				
25	GRAVELLY SAND WITH SILT, medium grained, gray, waterbearing, very loose, a lens of clayey sand (SP-SM) (A-1-b)	COARSE ALLUVIUM	3	W	SS	4					
27	SAND WITH GRAVEL, medium grained, gray, waterbearing, loose to very loose, a lens of clayey sand at 27½' (SP) (A-1-b)		5	W	SS	6					
30			3	W	SS	6					

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-34½'	3.25" HSA								
34½-64.4'	RDF w/DM	8/5/14	10:35	19.0	17.0	16.9		13.5	
		8/5/14	10:45	19.0	17.0	16.8		6.2	
BORING COMPLETED: 8/5/14									
DR: DTS LG: TM Rig: 1C									

AET CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 8/14/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1214 SW (p. 2 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: **N 152175 E 504279**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
33	SAND WITH SILT, a little gravel, gray, waterbearing, very loose (SP-SM) (A-1-b)	COARSE ALLUVIUM <i>(continued)</i>	3	W	SS	12					
34	GRAVEL, gray, waterbearing, very loose (GP) (A-1-a)										
35											
36				4	W	SS	1				
37											
38	SAND WITH GRAVEL, medium to coarse grained, a little black, waterbearing, loose, a lens of sand with silt (SP) (A-1-b)			8	W	SS	6				
39											
40	GRAVEL WITH SAND, gray, waterbearing, loose (GP) (A-1-a)			5	W	SS	3				
41											
42	GRAVELLY SAND, medium to coarse grained, gray, waterbearing, loose (SP) (A-1-a)			8	W	SS	6				
43											
44											
45				11	W	SS	6				
46											
47	GRAVEL WITH SAND, gray, waterbearing, medium dense (GP) (A-1-a)		13	W	SS	6					
48											
49											
50			11	W	SS	6					
51											
52											
53											
54	CLAYEY SAND, a little gravel, brown, a little dark gray, hard, laminations of fat clay and waterbearing sand (SC) (A-6)	TILL	34	M/W	SS	14	14				
55											
56											
57											
58	SAND, a little gravel, fine to medium grained, grayish brown, medium dense (SP) (A-3)	COARSE ALLUVIUM									
59											
60				27	W	SS	12				
61											
62											
63											
64	GRAVEL WITH SILT AND SAND, grayish brown, waterbearing, very dense (GP-GM) (A-1-b)			100/2	W	SS	6				
65	LIMESTONE, weathered, light brown <b>END OF BORING</b>		*PLATTEVILLE FORMATION								

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 8/14/14



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1215 SW (p. 1 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **890.6** Hennepin Co. Coordinates: **N 152250 E 504420**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
1	3" FILL, mixture of silty sand with gravel, brown and dark brown (A-1-b)	FILL	43	M	SS	16					
2	FILL, mostly clayey sand, a little gravel and silty sand, pieces of brick, black and gray (A-6)		19	M	SS	8	15				
3											
4	FILL, mostly clayey sand, a little gravel, pieces of concrete and bituminous, trace roots, black (A-6) (petroleum-type odor)	SWAMP DEPOSIT	10	M	SS	8	12				
5											
6											
7	HEMIC PEAT, black and dark brown (PT) (A-8)		3		SS	13	380				
8											
9	ORGANIC CLAY WITH SAND, black to dark brown, soft, laminations of sand (OH) (A-8)	COARSE ALLUVIUM	4	M	SS	16	79				
10											
11											
12	GRAVEL WITH SAND, gray, waterbearing, medium dense (GP) (A-1-a)		11	W	SS	12					
13											
14	SAND, a little gravel, medium grained, gray, waterbearing, loose (SP) (A-1-b)	TILL	5	W	SS	6					
15											
16											
17	GRAVEL WITH SAND, possible cobbles, gray, waterbearing, loose to medium dense (GP) (A-1-a)		10	W	SS	1					
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30	GRAVELLY SAND, possible cobbles, medium to coarse grained, gray, waterbearing, loose (SP) (A-1-b)	TILL	6	W	SS	5					
31											
32											
33	CLAYEY SAND WITH GRAVEL, possible cobbles, brown, stiff, a lens of sand (SC) (A-6)		9	M	SS	11	15				

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 8/13/14

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-14½'	3.25" HSA								
14½-69½'	RDF w/DM	8/7/14	1:45	13.5	12.0	11.5		7.9	
BORING COMPLETED: 8/7/14									
DR: SG LG: SB Rig: 91C									



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1215 SW (p. 2 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: N **152250** E **504420**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
35	GRAVELLY SILTY SAND, possible cobbles, fine to medium grained, grayish brown, wet, medium dense (SM) (A-1-b)	COARSE ALLUVIUM	28	W	SS	4					
36											
37	GRAVELLY SAND WITH SILT, possible cobbles, fine to medium grained, brown, waterbearing, medium dense (SP-SM) (A-1-b)		18	W	SS	12					
38											
39	SAND WITH SILT AND GRAVEL, medium to fine grained, grayish brown and brown, waterbearing, medium dense, lenses of silty sand (SP-SM) (A-1-b)		27	W	SS	16					
40											
41											
42											
43	GRAVEL WITH SAND, brown, waterbearing, very dense (GP) (A-1-a) *32/.5 + 64/.5 + 36/.2		37	-	SS	0					
44											
45	SAND, a little gravel, brown, waterbearing, very dense (SP) (A-1-b)		16	W	SS	12					
46											
47	GRAVEL WITH SAND, brown, waterbearing, very dense (GP) (A-1-a) *32/.5 + 64/.5 + 36/.2		*	W	SS	6					
48											
49	SAND, a little gravel, brown, waterbearing, very dense (SP) (A-1-b)		100	W	SS	24					
50											
51	CLAYEY SAND, a little gravel, possible cobbles, brown, hard, laminations of waterbearing sand (SC) (A-2-6) **18/.5 + 53/.5 + 100/.4	TILL	**	M/W	SS	14	10				
52											
53											
54											
55	CLAYEY SAND, a little gravel, possible cobbles, brown, hard, laminations of waterbearing sand (SC) (A-2-6) **18/.5 + 53/.5 + 100/.4		293	M/W	SS	18	11				
56											
57	CLAYEY SAND, a little gravel, possible cobbles, brown, hard, laminations of waterbearing sand (SC) (A-2-6) **18/.5 + 53/.5 + 100/.4		***	M/W	SS	12	10				
58											
59	CLAYEY SAND, a little gravel, possible cobbles, brown, hard, laminations of waterbearing sand (SC) (A-2-6) **18/.5 + 53/.5 + 100/.4		***	M/W	SS	12	10				
60											
61	CLAYEY SAND, a little gravel, possible cobbles, brown, hard, laminations of waterbearing sand (SC) (A-2-6) **18/.5 + 53/.5 + 100/.4		***	M/W	SS	12	10				
62											
63	CLAYEY SAND, a little gravel, possible cobbles, brown, hard, laminations of waterbearing sand (SC) (A-2-6) **18/.5 + 53/.5 + 100/.4		***	M/W	SS	12	10				
64											
65	CLAYEY SAND, a little gravel, possible cobbles, brown, hard, laminations of waterbearing sand (SC) (A-2-6) **18/.5 + 53/.5 + 100/.4		***	M/W	SS	12	10				
66											
67	CLAYEY SAND, a little gravel, possible cobbles, brown, hard, laminations of waterbearing sand (SC) (A-2-6) **18/.5 + 53/.5 + 100/.4		***	M/W	SS	12	10				
68											
69	LIMESTONE, weathered, gray and light gray, a little brown <b>END OF BORING</b>	PLATTEVILLE FORMATION	100/.05	M/W	WASH SS	1/2					

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 8/13/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1219 SW (p. 1 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **902.8** Hennepin Co. Coordinates: **N 152380 E 504260**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	OC	LL	PL	%-#200
1	3.75" Bituminous pavement	FILL		M	SU						
2	3.5" FILL, mostly sand with silt and gravel, pieces of concrete, dark brown (A-1-b)		9	M	SS	12	11				
3	FILL, mostly clayey sand with gravel, a little silty sand, pieces of concrete and bituminous, dark brown, a little brown and light brown (A-2-6, A-2-4)		6	M	SS	4	17				
4											
5			2	M	SS	7	13				
6											
7			2	M	SS	0					
8											
9											
10			4	M	SS	12	13				
11											
12	FILL, mostly sand with gravel, a little clayey sand, light brown (A-1-b)		9	M	SS	4					
13											
14	FILL, mostly lean clay with gravel, slightly organic, a little sand, black, a little brown (A-6)		22	M	SS	6	21	3.8			
15											
16											
17	FILL, mostly sand with gravel, a little clayey sand, light brownish gray and light brown (A-1-b)		18	M	SS	6					
18											
19			18	W	SS	14					
20											
21											
22	SAND WITH SILT AND GRAVEL, fine to medium grained, grayish brown, a little gray and light tan, waterbearing, medium dense, laminations of silty sand and lean clay (SP-SM) (A-1-b)	COARSE ALLUVIUM	19	W	SS	6					
23											
24											
25	GRAVEL WITH SAND, grayish brown, waterbearing, loose (GP) (A-1-b)		8	W	SS	2					
26											
27	SAND WITH GRAVEL, medium grained, brownish gray, waterbearing, medium dense, a lens of clayey sand (SP) (A-1-b)		12	W	SS	18					
28											
29											
30	CLAYEY SAND, a little gravel, gray, very stiff (SC) (A-6)	TILL	17	M	SS	12	12				
31											

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 5/8/14

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-32'	3.25" HSA								
32-34½'	RDF w/DM	4/30/14	10:20	25.5	22.0	22.0		20.1	
		4/30/14	10:30	25.5	22.0	22.0		20.1	
BORING COMPLETED: 4/30/14									
DR: SG LG: SB Rig: 1C									



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1219 SW (p. 2 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: N **152380** E **504260**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	OC	LL	PL	%-#200	
33	SAND, medium to fine grained, gray, waterbearing, medium dense, a lens of clayey sand, laminations of sand with silt (SP) (A-1-b/A-2-4) (continued)	COARSE ALLUVIUM (continued)	15	W	X	SS	16					
34												
35	SAND, a little gravel, medium grained, brownish gray, waterbearing, loose (SP) (A-1-b)		7	W	X	SS	4					
36												
	<b>END OF BORING</b>											

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 5/8/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1220 SS (p. 1 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **891.7** Hennepin Co. Coordinates: **N 152357 E 504654**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
1	FILL, mostly crushed limestone base, light brown (A-1-b)	FILL	35	M	SS	22	10				
2	FILL, mixture of clayey sand and sandy lean clay, a little gravel, pieces of concrete, dark brown and gray (A-6)		10	M	SS	4	10				
3											
4											
5	FILL, mostly organic clay, a little gravel, trace roots, dark brown (A-8)		2	-	SS	0					
6											
7											
8	SAPRIC PEAT, black (PT) (A-8) (possible fill)	SWAMP DEPOSIT OR FILL	2	▼	SS	13	126				
9	LEAN CLAY, slightly organic, trace roots, black, soft (CL) (A-6)	FINE ALLUVIUM	3	M	SS	17	17				
10											
11											
12	GRAVELLY SAND WITH SILT, possible cobbles, medium to fine grained, gray, waterbearing, loose (SP-SM) (A-1-b)	COARSE ALLUVIUM	7	W	SS	6					
13											
14	SAND WITH SILT, a little gravel, possible cobbles, medium grained, gray, waterbearing, very loose (SP-SM) (A-1-b)		3	W	SS	7					
15											
16	SAND WITH SILT, a little gravel, possible cobbles, fine to medium grained, gray, waterbearing, loose (SP-SM) (A-3)		7	W	SS	1					
17											
18	GRAVEL WITH SAND, possible cobbles, gray, waterbearing, loose (GP) (A-1-a)		7	W	SS	3					
19											
20											
21											
22											
23			9	M	SS	1					
24											
25			7	W	SS	1					
26											
27											
28			8	W	SS	6					
29											
30	SAND WITH GRAVEL, possible cobbles, medium to fine grained, grayish brown, waterbearing, loose (SP) (A-1-b)		6	W	SS	3					
31											
32											

DEPTH: DRILLING METHOD

WATER LEVEL MEASUREMENTS

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

**0-14½'** **3.25" HSA**

DATE

TIME

SAMPLED DEPTH

CASING DEPTH

CAVE-IN DEPTH

DRILLING FLUID LEVEL

WATER LEVEL

**14½-69½'** **RDF w/DM**

**8/7/14**

**9:05**

**13.5**

**12.0**

**11.0**

**8.6**

BORING COMPLETED: **8/7/14**

DR: **SG** LG: **SB** Rig: **91C**

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 8/14/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1220 SS (p. 2 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: N **152357** E **504654**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
34	SAND WITH GRAVEL, possible cobbles, fine to medium grained, grayish brown, waterbearing, loose (SP) (A-1-b) (continued)	COARSE ALLUVIUM (continued)	8	W	SS	4					
35			6	W	SS	12					
36			6	W	SS	12					
37			7	W	SS	13					
38	SAND, a little gravel, fine to medium grained, grayish brown to brownish gray (SP) (A-3)		6	W	SS	12					
39			7	W	SS	13					
40	SAND, a little gravel, medium grained, grayish brown, waterbearing, medium dense (SP) (A-1-b)		9	W	SS	13					
41			13	W/M	SS	8	10				
42	CLAYEY SAND, a little gravel, possible cobbles, grayish brown (SC) (A-6)	TILL									
43	SAND, a little gravel, possible cobbles, medium to fine grained, grayish brown, waterbearing, medium dense (SP) (A-1-b)	COARSE ALLUVIUM	14	W	SS	5					
44			10	W	SS	2					
45	SAND WITH GRAVEL, possible cobbles, medium grained, grayish brown, waterbearing, loose (SP) (A-1-b)										
46	GRAVEL WITH SAND, possible cobbles, grayish brown, waterbearing, medium dense (GP) (A-1-a)		12	W	SS	2					
47			12	W	SS	2					
48	CLAYEY SAND WITH GRAVEL, brown, hard (SC) (A-6)	TILL									
49	GRAVEL WITH CLAY AND SAND, possible cobbles, gray, a little brown, waterbearing, very dense, laminations of sand (GP-GC) (A-1-a)	TILL OR COLLUVIUM	34	M/W	SS	16	11				
50			*	W	SS	14					
51	*140/.5 + 150/.5 + 84/.2										
52	LIMESTONE, weathered, gray and light gray	**	100/0	W	WASH	0					
53	END OF BORING	**PLATTEVILLE FORMATION									

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 8/13/14





# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1221 SU (p. 1 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **893.7** Hennepin Co. Coordinates: N **152515** E **504907**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS						
							WC	DEN	LL	PL	%-#200		
1	FILL, mostly silty sand with gravel, a little clayey sand, brown, a little dark brown (A-2-4)	FILL	21	M		SS	12						
2													
3				41	M		SS	2					
4	FILL, mostly sand with silt, a little gravel and clayey sand, brown (A-2-4)												
5				12	M		SS	12					
6													
7	FILL, mostly sand with silt, a little gravel and clayey sand, brown (A-1-b)			4	M		SS	12					
8													
9	FILL, mostly clayey sand with organic fines, a little gravel, trace roots, black (A-2-6)			1	M		SS	12	45				
10													
11													
12	SAPRIC PEAT, black (PT) (A-8)	SWAMP DEPOSIT											
13				4	M		SS	12	285				
14													
15	ORGANIC CLAY WITH SAND, a little gravel, dark brown, soft (OH) (A-6)			2	M		SS	18	29				
16													
17	BOGLIME, gray, very soft (OH) (A-6)												
18			WH	M		SS	18	32					
19													
20	LEAN CLAY, slightly organic, brownish gray, soft (CL) (A-6)	FINE ALLUVIUM											
21				2	M		SS	16	33				
22	SAND WITH SILT AND GRAVEL, medium to fine grained, gray, waterbearing, medium dense (SP-SM) (A-1-b)	COARSE ALLUVIUM											
23				12	W		SS	12					
24													
25	GRAVELLY SAND, medium to coarse grained, gray, waterbearing, medium dense (SP) (A-1-b)			20	W		SS	1					
26													
27													
28			13	W		SS	12						
29													
30	GRAVEL WITH SAND, brownish gray, waterbearing, medium dense (GP)												
31			19	W		SS	2						

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 6/23/14

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-24½'	3.25" HSA								
24½-74'	RDF w/DM	5/29/14	1:10	23.5	22.0	19.0		12.4	
		5/29/14	1:23	23.5	22.0	18.7		11.8	
BORING COMPLETED: 5/29/14									
DR: SG LG: TM Rig: 91C									



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1221 SU (p. 2 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: N **152515** E **504907**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
33	GRAVELLY SAND, medium to coarse grained, gray, waterbearing, medium dense (SP) (A-1-b) (continued)		20	W	SS	6					
34											
35			15	W	SS	6					
36											
37	GRAVELLY CLAYEY SAND, gray, very stiff (SC) (A-6)	TILL	20	W	SS	1	15				
38											
39	CLAYEY SAND WITH GRAVEL, gray, very stiff, laminations of waterbearing sand (SC) (A-6)		17	W	SS	6	14				
40											
41											
42	SANDY LEAN CLAY, a little gravel, gray, very stiff, laminations of waterbearing sand (CL) (A-6)		23	W	SS	12	21				
43											
44											
45			32	-	SS	0					
46	CLAYEY SAND, a little gravel, grayish brown to brown, hard (SC) (A-6)		44	W	SS	16	11				
47											
48											
49											
50			36	W	SS	14	11				
51											
52											
53											
54											
55			44	W	SS	16	11				
56											
57											
58	SILTY SAND, a little gravel, grayish brown, dense (SM) (A-2-4)		48	W	SS	14					
59											
60											
61											
62											
63	SAND WITH SILT, a little gravel, fine to medium grained, grayish brown, moist, very dense, lenses of clayey sand (SP-SM) (A-2-4)	COARSE ALLUVIUM	93/5	W	SS	12					
64											
65											
66											
67											
68	LIMESTONE, weathered to generally fresh, gray	PLATTEVILLE FORMATION									
69				W	SS	1					

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 6/23/14



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1221 SU (p. 3 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: **N 152515 E 504907**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
71	LIMESTONE, weathered to generally fresh, gray (continued)	PLATTEVILLE FORMATION (continued)	125/1		WASH							
72												
73												
74												
	<b>END OF BORING</b>		100/0		SS	0						

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 6/23/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1222 SU (p. 1 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **911.3** Hennepin Co. Coordinates: **N 152618 E 504861**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	OC	LL	PL	%-#200
1	FILL, mostly silty sand with gravel, a little clayey sand, pieces of bituminous, trace roots, black and dark brown (A-1-b)	FILL	13	M	SS	15					
2			22	M	SS	5					
3	FILL, mostly sand with gravel, possible cobbles, a little clayey sand, brown and light brown, a little black (A-1-b)		18	M	SS	1					
4			12	M	SS	13					
5			8	M	SS	15					
6			15	M	SS	17					
7			6	M	SS	12	15				
8			5	M	SS	15	27				
9	FILL, mixture of sandy lean clay and lean clay, a little gravel and sand, brown and dark brown, a little black (A-6)		7	M	SS	10					
10			15	W	SS	5					
11	FILL, mostly sand with silt and gravel, brown (A-1-b)		5	W	SS	18					
12			6	W	SS	12					
13	FILL, mostly sand with gravel, a little clayey sand, brown (A-1-b)		21	M	SS	15	245				
14											
15	FILL, mostly gravelly sand, brownish gray and dark brownish gray (A-1-b)										
16											
17											
18											
19											
20											
21	HEMIC PEAT, brown to dark brown (PT)	SWAMP DEPOSIT									
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-29½'	3.25" HSA								
29½-89½'	RDF w/DM	4/29/14	9:55	26.0	24.5	24.5		23.5	
		4/29/14	10:05	26.0	24.5	24.5		23.5	
BORING COMPLETED: 4/29/14									
DR: SG LG: SB Rig: 1C									

AET\_CORP\_WCOORDINATES\_01-05697.GPJ AET+CPT+WELL.GDT 5/8/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1222 SU (p. 2 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: **N 152618 E 504861**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	OC	LL	PL	%-#200
33	FAT CLAY, slightly organic, trace roots, black, stiff (CH) (A-7-6) (continued)	FINE ALLUVIUM (continued)	9	M	SS	15	61	3.0			
34	FAT CLAY, gray, soft (CH) (A-7-6)										
35											
36			4	M	SS	16	41				
37	GRAVELLY SAND, medium grained, gray, waterbearing, loose (SP) (A-1-b)	COARSE ALLUVIUM	10	W	SS	8					
38											
39	SAND WITH GRAVEL, possible cobbles at 42', medium to fine grained, brownish gray, waterbearing, medium dense (SP) (A-1-b)			22	W	SS	4				
40											
41				50/4	W	SS	1				
42											
43											
44											
45			17	W	SS	0					
46											
47	GRAVELLY SAND, medium grained, brownish gray, waterbearing, medium dense (SP) (A-1-b)		11	W	SS	4					
48											
49	CLAYEY SAND, brownish gray, very stiff, lenses and laminations of waterbearing sand (SC) (A-6)	MIXED ALLUVIUM	24	M/W	SS	13	14				
50											
51											
52											
53	SAND, a little gravel, medium grained, brownish gray, waterbearing, medium dense, a lens of gravel (SP) (A-1-b)	COARSE ALLUVIUM	13	W	SS	8					
54											
55											
56											
57											
58	SAND, a little gravel, fine grained, brownish gray, waterbearing, dense (SP) (A-3)		40	W	SS	13					
59											
60											
61											
62											
63	SAND, a little gravel, medium to fine grained, grayish brown, waterbearing, medium dense (SP) (A-1-b)		19	W	SS	8					
64											
65											
66											
67											
68	CLAYEY SAND, a little gravel, grayish brown, very stiff (SC) (A-6)	MIXED ALLUVIUM OR TILL									
69											

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 5/8/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1222 SU (p. 3 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: N **152618** E **504861**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	OC	LL	PL	%-#200	
71	CLAYEY SAND, a little gravel, grayish brown, very stiff (SC) (A-6) (continued)	MIXED ALLUVIUM OR TILL (continued)	28	M	SS	18	12					
72												
73	SAND WITH SILT, fine grained, brown, waterbearing, medium dense, a lens of sand with gravel (SP-SM) (A-3)	COARSE ALLUVIUM	30	W	SS	16						
74												
75												
76												
77	CLAYEY SAND WITH GRAVEL, grayish brown, hard (SC/SM) (A-2-6)	MIXED ALLUVIUM OR TILL	39	W	SS	14	11					
78												
79												
80	SILTY SAND, brown, a little grayish brown, dense, a lens of clayey sand with gravel (SM) (A-2-4)	TILL	32	W	SS	12						
81												
82												
83												
84												
85	LIMESTONE, weathered, light gray	PLATTEVILLE FORMATION	100/0	W	SS	0						
86	<b>END OF BORING</b>											

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 5/8/14



AMERICAN  
ENGINEERING  
TESTING, INC.

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1227 SW (p. 1 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **886.9** Hennepin Co. Coordinates: **N 155737 E 511331**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
1	FILL, mostly silty sand with gravel, pieces of bituminous and brick, black and dark brown (A-1-b)	FILL	8	M		12					
2											
3	FILL, mixture of sand with silt and silty sand with gravel, a little sandy lean clay, light brown, brown and dark brown (A-1-b)			18	M		14				
4											
5				15	M		8				
6											
7	FILL, mostly sand with silt, a little gravel, brown (A-1-b)			15	W		8				
8											
9	FILL, mostly sand with gravel, a little clayey sand, light brown, brownish gray and brown (A-1-b)			20	W		10				
10											
11				13	W		12				
12											
13	FILL, mostly clayey sand with gravel, a little organic clay, brownish gray, a little black (A-2-6)			5	W		10	12			
14											
15	HEMIC PEAT, brown (PT) (A-8)		SWAMP DEPOSIT	9	M		14	357			
16											
17	ORGANIC CLAY WITH GRAVEL, black, firm (OH) (A-8)			5	M		2	142			
18											
19	ORGANIC CLAY, trace shells and roots, brownish gray, soft (OH) (A-8)			2	M		2	114			
20											
21			2	M		16	207				
22											
23			2	M		14	109				
24											
25			8	W		6					
26	SAND WITH SILT, a little gravel, medium to fine grained, dark brownish gray, waterbearing, loose, a lens of clayey sand (SP-SM) (A-1-b)	COARSE ALLUVIUM									
27											
28											
29											
30											
31											

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 5/8/14

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-14½'	3.25" HSA								
14½-24½'	RDF w/DM	4/29/14	9:30	13.5	12.0	11.5		9.4	
		4/29/14	9:40	13.5	12.0	11.3		7.4	
BORING COMPLETED: 4/29/14									
DR: TA LG: SHS Rig: 69C									



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1227 SW (p. 2 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: **N 155737 E 511331**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
33 -	SAND, a little gravel, medium to coarse grained, gray, a little black, waterbearing, loose (SP) (A-1-b) <i>(continued)</i>	COARSE ALLUVIUM <i>(continued)</i>	8	W	X	SS	11					
34												
35 -	SAND, a little gravel, medium grained, gray, a little black, waterbearing, loose (SP) (A-1-b)		7	W	X	SS	8					
36												
37												
38 -	SAND, a little gravel, fine to medium grained, gray, waterbearing, loose (SP) (A-3)		9	-	X	SS	0					
39												
40												
41	<b>END OF BORING</b>											

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 5/8/14





AMERICAN  
ENGINEERING  
TESTING, INC.

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1228 SS (p. 1 of 4)**  
 PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**  
 SURFACE ELEVATION: **874.5** Hennepin Co. Coordinates: **N 157076 E 515260**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
1-2	FILL, mostly silty sand with organic fines, with gravel, pieces of concrete and plastic, trace roots, dark brown (A-2-4)	FILL	11	M	SS	4					
2-3	FILL, mostly silty sand, a little gravel, dark brown (A-2-4)		10	M	SS	17					
4-5	FILL, mostly sand with silt, a little gravel, brown (A-3)		15	M	SS	14					
6-7	FILL, mostly silty sand with gravel, dark brown (A-1-b)		12	M	SS	15					
8-9	FILL, mostly silty sand, a little gravel, sandy lean clay and ashes/cinders, brown and dark brown (A-2-4)		7	M	SS	16					
10-11			16		SS	15					
12-13			13	W	SS	15					
14-15			18	W	SS	16					
16-17	FILL, mostly silty sand with gravel, gray to dark brown (A-1-b)		10	W	SS	8					
18-19			15	W	SS	15					
20-21			20	M	SS	12	210				
22-23			17	M	SS	12	239				
24-25	SAPRIC PEAT, black (PT) (A-8)		SWAMP DEPOSIT	16	M	SS	12	172			
26-27											
28-29	ORGANIC CLAY, trace roots, dark brown, very stiff, laminations of sapric peat (OH) (A-8)										

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-49'	3.25" HSA								
49-114½'	RDF w/DM	5/15/14	9:45	16.0	14.5	15.0		13.8	
		5/15/14	9:55	16.0	14.5	14.6		13.4	
BORING COMPLETED:	5/15/14	5/15/14	11:00	38.5	37.0	34.0		31.0	
DR: TK	LG: SB	Rig: 85C							

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 5/22/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1228 SS (p. 2 of 4)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: **N 157076 E 515260**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
33	SANDY LEAN CLAY, slightly organic, trace roots, dark brownish gray, firm (CL) (continued)	TILL (continued)	6	M	SS	18	70				
34	SILTY SAND, a little gravel, gray, medium dense (SM) (A-2-4)	TILL	12	W	SS	16					
35											
36	SILTY SAND WITH GRAVEL, medium to fine grained, gray, wet, loose (SM) (A-1-b)	COARSE ALLUVIUM	10	W	SS	18					
37											
38											
39											
40	GRAVEL, gray and brown, waterbearing, medium dense (GP) (A-1-a)		30	W	SS	1					
41											
42											
43											
44											
45	SAND WITH GRAVEL, coarse to medium grained, gray, waterbearing, medium dense (SP) (A-1-a)		13	W	SS	1					
46											
47											
48	SAND WITH GRAVEL, medium to fine grained, brownish gray, waterbearing, medium dense (SP) (A-1-b)		14	W	SS	6					
49											
50											
51											
52	SAND, fine to medium grained, brown, waterbearing, medium dense (SP) (A-3)		23	M	SS	13					
53											
54											
55	SAND, a little gravel, medium to fine grained, brown, waterbearing, medium dense (SP) (A-1-b)		15	W	SS	11					
56											
57	SAND WITH SILT AND GRAVEL, medium to fine grained, brown, waterbearing, medium dense (SP) (A-1-b)		24	W	SS	7					
58											
59											
60											
61	SAND WITH SILT AND GRAVEL, medium to fine grained, brown, waterbearing, medium dense (SP) (A-1-b)										
62											
63											
64											
65											
66											
67											
68	SAND, a little gravel, medium to fine grained, brown, waterbearing, medium dense (SP) (A-1-b)		15	W	SS	11					
69											
69	SILTY SAND, a little gravel, fine to medium grained, gray, wet, medium dense (SM) (A-2-4)										

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 5/22/14



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1228 SS (p. 3 of 4)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: N **157076** E **515260**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
71	SILTY SAND, a little gravel, fine to medium grained, gray, wet, medium dense (SM) (A-2-4) (continued)		24	W	X	SS	13					
72												
73	SAND WITH SILT, a little gravel, fine to medium grained, grayish brown, waterbearing, medium dense (SP-SM) (A-1-b)		16	W	X	SS	4					
74												
75												
76												
77	SAND, fine to medium grained, grayish brown, waterbearing, medium dense (SP) (A-3)		21	W	X	SS	10					
78												
79												
80												
81	SAND WITH GRAVEL, possible cobbles, medium to fine grained, gray, waterbearing, medium dense (SP) (A-1-b)		13	W	X	SS	4					
82												
83												
84												
85												
86												
87	LEAN CLAY, possible cobbles, gray, hard (CL) (A-6)	FINE ALLUVIUM	38	M	X	SS	3	29				
88												
89												
90												
91	SAND, a little gravel, medium to fine grained, gray, waterbearing, medium dense (SP) (A-1-b)	COARSE ALLUVIUM	13	W	X	SS	10					
92												
93												
94	SANDY LEAN CLAY, a little gravel, possible cobbles, grayish brown, hard (CL) (A-6)	TILL	32	M	X	SS	7	25				
95												
96												
97												
98												
99												
100												
101												
102												
103												
104												
105												
106												
107												

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 6/3/14



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1228 SS (p. 4 of 4)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: **N 157076 E 515260**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS										
							WC	DEN	LL	PL	%-#200						
108	SANDY LEAN CLAY, a little gravel, possible cobbles, grayish brown, hard (CL) (A-6) <i>(continued)</i>	TILL <i>(continued)</i>															
109																	
110	SANDSTONE, fresh, white, light brown and light gray	ST. PETER FORMATION	100/2	W	SS	3											
111																	
112																	
113																	
114																	
	<b>END OF BORING</b>		100/25	W	SS	3											

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 5/22/14



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1229 SV (p. 1 of 4)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **872.8**

Hennepin Co. Coordinates: **N 157322**

**E 515455**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
1	FILL, mostly clayey sand with gravel, a little silty sand with organic fines, brown, a little black (A-6)	FILL	10	M	SS	18	11				
2	FILL, mostly silty sand, a little gravel, pieces of coal, dark brown and black (A-2-4)		9	M	SS	10					
3	FILL, mostly sand, a little gravel, light brown and brown (A-3, A-1-b)		6	M	SS	10					
4			5	M	SS	8					
5			14	M	SS	4					
6			4	M	SS	3					
7			8	M	SS	10					
8	FILL, mostly clayey sand with gravel, brown and black (A-6)		7	M	SS	16	27				
9	FILL, mostly sand with silt, a little gravel, trace roots, brown (A-1-b)		6	M	SS	18	26				
10	SILTY CLAY, trace roots, gray, a little brown, firm (CL-ML) (A-4)		FINE ALLUVIUM	7	M	SS	18	29			
11	SILT, light brown, a little brown and gray, wet, loose, a lens of lean clay at 20' (ML) (A-4)			7	M	SS	18	32			
12	SILTY CLAY, grayish brown, a little brown, firm (CL-ML) (A-4)	8		W	SS	12					
13	SAND WITH SILT, fine grained, brownish gray, wet, loose, laminations of silt (SM) (A-2-4)	COARSE ALLUVIUM	7	W	SS	18					
14			9	W	SS	18					
15											
16	SAND WITH SILT, fine grained, gray, waterbearing, loose (SP-SM) (A-3)		9	W	SS	18					
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 5/22/14

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS						
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
0-44'	3.25" HSA							
44-124½'	RDF w/DM	5/15/14	12:00	21.0	19.5	19.5		None
		5/15/14	12:40	21.0	19.5	18.4		16.6
BORING COMPLETED: 5/15/14								
DR: SG LG: CD Rig: 91C								

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1229 SV (p. 2 of 4)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: **N 157322 E 515455**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
33	SILTY SAND, fine grained, gray, wet, very loose (SM) (A-2-4) <i>(continued)</i>	FINE ALLUVIUM	2	W/M	SS	18	39					
34	LEAN CLAY, brownish gray, soft to firm (CL) (A-6)		4	M	SS	18	35					
35			6	M	SS	18	37					
36												
37												
38												
39	LEAN CLAY WITH SAND, dark brownish gray, stiff, laminations of waterbearing sand (CL) (A-6)	COARSE ALLUVIUM	11	M/W	SS	18						
40	SAND WITH SILT, a little gravel, medium to fine grained, dark grayish brown, waterbearing, medium dense to very loose (SP-SM) (A-1-b)		3	W	SS	18						
41												
42	SANDY LEAN CLAY, dark grayish brown to grayish brown, very stiff (CL) (A-6)	TILL	17	M	SS	16	20					
43			20	M	SS	18	17					
44			16	M	SS	18	18					
45												
46												
47												
48												
49												
50												
51												
52												
53												
54												
55												
56												
57												
58												
59	SAND WITH GRAVEL, medium grained, brown, waterbearing, dense (SP) (A-1-b)	COARSE ALLUVIUM	31	W	SS	6						
60												
61												
62												
63	GRAVELLY SAND, medium grained, brown, waterbearing, very dense (SP) (A-1-b)		70	W	SS	6						
64												
65												
66												
67												
68												
69												

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 5/22/14



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1229 SV (p. 3 of 4)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: **N 157322 E 515455**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
71	SAND WITH GRAVEL, medium grained, brown, waterbearing, medium dense (SP) (A-1-b) <i>(continued)</i>		19	W	X	SS	10					
72												
73	SAND, a little gravel, medium to fine grained, brown, waterbearing, medium dense (SP) (A-1-b)		35	W	X	SS	12					
74												
75												
76												
77												
78	SAND, a little gravel, medium grained, brown, waterbearing, medium dense (SP) (A-1-b)		25	W	X	SS	12					
79												
80												
81	SAND, medium to fine grained, brown, waterbearing, medium dense (SP) (A-1-b)		19	W	X	SS	8					
82												
83												
84												
85												
86												
87												
88	SAND, a little gravel, medium grained, grayish brown, waterbearing, medium dense (SP) (A-1-b)		21	W	X	SS	6					
89												
90												
91												
92												
93	SAND, fine grained, brown, waterbearing, medium dense, a lens of sand with silt (SP) (A-3)		13	W	X	SS	8					
94												
95												
96	SAND, a little gravel, medium grained, grayish brown, waterbearing, medium dense (SP) (A-1-b)		14	W	X	SS	10					
97												
98												
99												
100	SAND, fine grained, brown, waterbearing, medium dense, a lens of sand with silt (SP) (A-3)		15	W	X	SS	10					
101												
102	SAND, a little gravel, medium grained, grayish brown, waterbearing, medium dense (SP) (A-1-b)											
103												
104												
105												
106												
107												

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 5/22/14



# SUBSURFACE BORING LOG

AET JOB NO: 01-05697 LOG OF BORING NO. 1229 SV (p. 4 of 4)  
 PROJECT: Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis  
 Hennepin Co. Coordinates: N 157322 E 515455

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
108	CLAYEY SAND WITH GRAVEL, brown, very stiff, laminations of wet silty sand (SC) (A-6)	TILL	28	M/W	SS	16	14					
109												
110												
111	GRAVEL WITH SAND, grayish brown, waterbearing, dense (GP) (A-1-b)	COARSE ALLUVIUM	49	W	SS	8						
112												
113												
114												
115												
116												
117	SANDSTONE, fresh, light gray	ST. PETER FORMATION	200/2	W	SS	2						
118												
119												
120												
121	END OF BORING		150/2	W	SS							
122												
123												
124												

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 5/22/14



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1230 SV (p. 1 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **873.0** Hennepin Co. Coordinates: **N 157440 E 515584**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
1-2	FILL, mostly clayey sand, with organic fines, a little gravel and silty sand, trace roots, dark brown (A-2-6, A-2-4)	FILL		6	M	SS	14					
3-5	FILL, mostly sand, a little gravel, sand with silt and silty sand, pieces of wood, trace roots, brown, a little black (A-1-b)			5	M	SS	12					
6-7				7	M	SS	4					
8-9				7	M	SS	8					
10-11	FILL, mostly clayey sand, a little gravel, trace roots, brown and dark brown (A-6)			7	M	SS	14	13				
12-14	FILL, mostly sand with silt and gravel, brown, a little dark brown (A-1-b)			6	M	SS	10					
15-16				22	M	SS	10					
17-18	SILT, brown, wet, loose (ML) (A-4)	FINE ALLUVIUM		9	W	SS	14	34				
19-21	LEAN CLAY, light grayish brown, a little brown, firm, laminations of silt (CL) (A-4)			8	M/W	SS	18	37				
22-23	SILTY CLAY, gray, soft (CL-ML) (A-4)			4	M	SS	18	35				
24-26	SAND WITH SILT, fine grained, gray, waterbearing, medium dense (SP-SM) (A-3)	COARSE ALLUVIUM		12	W	SS	6					
27-28	SANDY SILT, gray, wet, loose (ML) (A-4)	FINE ALLUVIUM		8	W	SS	12	31				
29-31	SILTY SAND, fine grained, gray, wet, loose (SM) (A-4)	COARSE ALLUVIUM		8	W	SS	16					

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-49'	3.25" HSA								
49-99½'	RDF w/DM	5/14/14	9:36	21.0	19.5	19.5		18.9	
		5/14/14	9:48	21.0	19.5	19.0		16.2	
BORING COMPLETED: 5/15/14									
DR: SG LG: CD Rig: 91C									

AET CORP W-COORDINATES 01-05697.GPJ\_AET+CPT+WELL.GDT 6/20/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1230 SV (p. 2 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: **N 157440 E 515584**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
33	SILTY SAND, fine grained, gray, wet, loose (SM) (A-4) (continued)	COARSE ALLUVIUM (continued)	6	W	SS	18					
34	LEAN CLAY, gray, firm (CL/CH) (A-7-6)	FINE ALLUVIUM	6	M	SS	18	41				
35											
36	FAT CLAY, gray, a little light grayish brown, firm, laminations of silt (CH) (A-7-6)		8	M	SS	18	43				
37											
38											
39	LEAN CLAY, gray, stiff, laminations of sand (CL) (A-6)		6	M	SS	18	28				
40											
41											
42	SANDY LEAN CLAY, gray, very stiff, a lens of waterbearing gravelly sand at 45' (CL) (A-6)	TILL	15	M	SS	16	20				
43											
44	CLAYEY SAND, a little gravel, trace roots, brownish gray, a little black, very stiff to hard, a lamination of organic clay at 47½ (SC) (A-6)		17	M/W	SS	18	18				
45											
46											
47			20	M	SS	18	27				
48											
49											
50			27	M	SS	18	15				
51											
52											
53			24	M	SS	18	17				
54											
55											
56			32	M	SS	12	17				
57											
58											
59	SAND WITH SILT AND GRAVEL, fine to medium grained, brown, waterbearing, medium dense (SP-SM) (A-1-b)	COARSE ALLUVIUM	30	W	SS	8					
60											
61											
62	GRAVEL WITH SAND, brown, moist, very dense (GP) (A-1-b)										
63											
64											
65											
66											
67											
68											
69											

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 6/20/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1230 SV (p. 3 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: N **157440** E **515584**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
71	GRAVEL WITH SAND, brown, moist, very dense (GP) (A-1-b) (continued)	COARSE ALLUVIUM (continued)	82	M/W	SS	8						
72												
73												
74												
75												
76												
77												
78												
79												
80												
81												
82												
83												
84												
85			64	M/W	SS	-						
86												
87												
88												
89												
90			57	M/W	SS	10						
91												
92												
93												
94												
95												
96	SAND, fine to medium grained, brown, moist, very dense (SP) (A-3)		80	-	SS	0						
97												
98												
99												
100												
101			64	M/W	SS	16						
	<b>END OF BORING</b>											

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 6/20/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1232 SB (p. 1 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **885.6** Hennepin Co. Coordinates: **N 155935 E 511798**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
1	FILL, mostly sandy silt, a little silty sand and gravel, trace roots, dark brown (A-4)	FILL	10	M	SS	6					
2											
3	FILL, mostly sand with gravel, light brown (A-1-b)		13	M	SS	10					
4	FILL, mostly lean clay, a little sand, light grayish brown (A-4)										
5			5	M	SS	14	18				
6											
7	FILL, mostly sand with silt and gravel, trace roots, grayish brown, a little black (A-2-4)										
8											
9											
10	SAND WITH SILT, a little gravel, trace roots, medium to fine grained, light brownish gray, a little grayish brown, moist, medium dense to loose, lenses of silty sand and clayey sand (SP-SM) (A-1-b)	COARSE ALLUVIUM	17	M	SS	14					
11											
12											
13				6	M/W	SS	10				
14											
15	SAND, a little gravel, medium to fine grained, light grayish brown, waterbearing, loose (SP) (A-1-b)			7	M/W	SS	8				
16											
17				7	W	SS	2				
18											
19											
20	SAND, a little gravel, medium grained, light brownish gray, waterbearing, medium dense (SP) (A-1-b)		23	W	SS	18					
21											
22	GRAVEL WITH SAND, brown, waterbearing, medium dense (GP) (A-1-a)		28	W	SS	4					
23											
24											
25	SAND WITH GRAVEL, fine to medium grained, brown, waterbearing, dense (SP)		31	W	SS	6					
26											
27											
28	GRAVEL WITH SAND, brown, waterbearing, loose to medium dense (GP)		10	W	SS	0					
29											
30											
31			11	W	SS	2					

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-29½'	3.25" HSA								
19½-67'	RDF w/DM	4/30/14	9:15	13.5	12.0	12.7		None	
		4/30/14	9:50	21.0	19.5	17.4		16.2	
BORING COMPLETED: 5/1/14									
DR: TA LG: TK Rig: 69C									

AET CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 5/9/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1232 SB (p. 2 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: **N 155935 E 511798**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
33	GRAVEL WITH SAND, brown, waterbearing, loose to medium dense (GP) (continued)	COARSE ALLUVIUM (continued)	11	W	SS	6						
34	GRAVEL WITH CLAY AND SAND, brown, waterbearing, medium dense (GP-GC) (A-1-b)		27	W	SS	6						
36	CLAYEY SAND WITH GRAVEL, lenses of silty sand, brown, hard to stiff (SC) (A-2-6)	TILL	36	M	SS	14	12					
37			32	M	SS	8	12					
38												
39												
40												
41												
42												
43												
44												
45												
46												
47												
48	CLAYEY SAND, a little gravel, brown, stiff to hard (SC) (A-2-6)		15	M/W	SS	6	13					
49			17	M	SS	14	11					
50												
51												
52												
53												
54												
55												
56												
57												
58												
59												
60			100/9	M	SS	16	11					
61												
62												
63												
64	LIMESTONE, weathered, gray to light gray	PLATTEVILLE FORMATION	100/1	M	SS	16						
65			M	WASH								
66												
67	<b>END OF BORING</b>											

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 5/9/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1235 SB (p. 1 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **886.5** Hennepin Co. Coordinates: **N 156089 E 512229**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS						
							WC	DEN	LL	PL	%-#200		
1	FILL, mostly sand with silt, ash/cinders, trace roots, black (A-1-b)	FILL	5	M		SS	14						
2	FILL, mostly sand with silt and gravel, trace roots, brown (A-1-b)		15	M		SS	10						
4	FILL, mostly clayey sand, a little gravel, sand with silt and lean clay, trace roots, dark brownish gray and brown (A-6)		7	M		SS	10	18					
6	FILL, mostly sand and sand with silt, with gravel, light brown and brown (A-1-b)		8	M		SS	12						
9	FILL, mostly clayey sand, trace roots, a little sandy lean clay and sand with silt, dark brown and black (A-6)		9	M		SS	10	21					
12	SAND WITH SILT, trace roots, fine to medium grained, brownish gray, moist, medium dense, laminations of clayey sand (SP-SM) (A-3)		COARSE ALLUVIUM	12	M		SS	12					
15	SAND WITH GRAVEL, medium grained, brownish gray, waterbearing, loose (SP) (A-1-b)			9	W		SS	16					
17	SAND, fine grained, light brown, waterbearing, medium dense (SP) (A-3)			12	W		SS	10					
20	GRAVEL WITH SAND, brown, waterbearing, medium dense (GP) (A-1-b)			18	W		SS	4					
22	SAND, a little gravel, fine to medium grained, brown, waterbearing, medium dense (SP) (A-3)			15	W		SS	10					
25				16	W		SS	8					
28	GRAVEL WITH SAND, brownish gray, waterbearing, loose to medium dense (GP) (A-1-b)	17		W		SS	2						

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
<b>0-19'</b>	<b>3.25" HSA</b>								
<b>19-65.6'</b>	<b>RDF w/DM</b>	<b>5/1/14</b>	<b>12:45</b>	<b>18.5</b>	<b>17.0</b>	<b>16.8</b>		<b>16.5</b>	
BORING COMPLETED: <b>5/1/14</b>									
DR: <b>TA</b> LG: <b>TK</b> Rig: <b>69C</b>									

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 5/14/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1235 SB (p. 2 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: **N 156089 E 512229**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
33	SAND WITH GRAVEL, medium grained, grayish brown, waterbearing, loose to medium dense (SP) (A-1-b) (continued)		10	W	SS	12					
34											
35											
36	SAND, a little gravel, medium to fine grained, grayish brown, waterbearing, medium dense (SP) (A-1-b)		13	W	SS	8					
37											
38											
39											
40	CLAYEY SAND, a little gravel, grayish brown, a little brown, very stiff, a lens of waterbearing sand (SC/SM) (A-2-4)	TILL	18	W	SS	14	11				
41											
42											
43											
44											
45	CLAYEY SAND, a little gravel, brownish gray, firm (SC/SM) (A-2-4)		6	W	SS	22	13				
46											
47											
48											
49	CLAYEY SAND, with gravel, grayish brown, firm (SC) (A-6)		7	W	SS	2	14				
50											
51											
52	CLAYEY SAND, with gravel, grayish brown, firm (SC/SM) (A-2-4)		6	W	SS	3	17				
53											
54											
55											
56											
57	SILTY SAND, a little gravel, brownish gray, very dense, a lens of sand (SM) (A-2-4)		*	W	SS	12	9				
58											
59	LIMESTONE, weathered, gray	PLATTEVILLE FORMATION			WASH						
60											
61	<b>END OF BORING</b> *11/.5 + 22/.5 + 46/.5 + 100.1										
62											
63											
64											
65											
66											
67											

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 5/20/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1236 SB (p. 1 of 2)**  
 PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**  
 SURFACE ELEVATION: **886.1** Hennepin Co. Coordinates: **N 156052 E 512391**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	OC	LL	PL	%-#200	
1	FILL, mixture of sand with silt and silty sand, with gravel, a little ash/cinders, pieces of brick and coal, brown and dark brown, a little black (A-1-b and A-2-4)	FILL	9	M	SS	16						
2			7	M	SS	6						
3			3	M	SS	8						
4			4	M	SS	10						
5												
6												
7												
8												
9												
10	FILL, mostly sand, light brown, a little brown (A-1-b)		13	M/W	SS	12						
11												
12	FIBRIC PEAT, brown to dark brown, a lens of hemic peat (PT) (A-8)	SWAMP DEPOSIT	4	M	SS	14	311					
13	ORGANIC CLAY, dark brown, a little gray to black, soft, laminations of sand to around 14' (OH) (A-8)						60					
14	LEAN CLAY, slightly organic, dark brown, soft (CL/OL) (A-6)	FINE ALLUVIUM	2	M	SS	18	35					
15	LEAN CLAY, trace roots, gray, to stiff (CL) (A-6)		6	M	SS	16	27	2.8				
16												
17												
18												
19												
20												
21	SAND WITH SILT, a little gravel, medium grained, brownish gray, waterbearing, medium dense (SP-SM) (A-1-b)	COARSE ALLUVIUM	11	M/W	SS	16	26					
22												
23												
24	SAND WITH GRAVEL, medium grained, light brownish gray, waterbearing, loose (SP) (A-1-b)		7	W	SS	10						
25												
26												
27	SAND WITH SILT AND GRAVEL, medium to fine grained, black, waterbearing, medium dense to loose (SP-SM) (A-1-b)		11	W	SS	6						
28												
29												
30												
31												
32												

AET CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 5/14/14

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-24½'	3.25" HSA								
24½-69½'	RDF w/DM	5/2/14	11:00	21.0	19.5	17.2		16.5	
BORING COMPLETED: 5/2/14									
DR: TA LG: TK Rig: 69C									



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1236 SB (p. 2 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: N **156052** E **512391**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	OC	LL	PL	%-#200	
34	SAND WITH SILT AND GRAVEL, medium to fine grained, black, waterbearing, medium dense to loose (SP-SM) (A-1-b) <i>(continued)</i>	COARSE ALLUVIUM <i>(continued)</i>	10	W	SS	0						
35												
36												
37												
38												
39	SAND, a little gravel, medium grained, brownish gray, waterbearing, loose (SP) (A-1-b)	COARSE ALLUVIUM	9	W	SS	1						
40												
41												
42												
43												
44												
45												
46												
47												
48												
49	CLAYEY SAND, a little gravel, brown, very stiff (SC) (A-6)	TILL	25	W	SS	12	10					
50												
51												
52												
53												
54												
55												
56												
57												
58												CLAYEY SAND, a little gravel, brown, firm (SC) (A-2-6)
59												
60												
61												
62												
63												
64												
65												
66												
67												
68	LIMESTONE, weathered, gray	PLATTEVILLE FORMATION	100.1	W	SS							
69												
	END OF BORING											

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 5/14/14

**SUBSURFACE BORING LOG**

AET JOB NO: **01-05697** LOG OF BORING NO. **1238 SB (p. 1 of 2)**  
 PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**  
 SURFACE ELEVATION: **888.4** Hennepin Co. Coordinates: **N 156173 E 512701**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS						
							WC	DEN	LL	PL	%#200		
1	FILL, mixture of sand with silt and silty sand, with gravel, a little sand and clayey sand, pieces of glass, trace roots, dark brown, light brown and brown (A-1-b)	FILL	11	M		SS	18						
2			26	M									18
3			25	M									14
4	SAND, a little gravel, fine grained, light brown, moist, medium dense (SP) (A-3)	COARSE ALLUVIUM	25	M		SS	14						
5			19	M									14
6	SAND WITH GRAVEL, medium grained, light brown, moist, medium dense (SP) (A-1-b)		17	M		SS	10						
7			18	M									10
8			17	M									10
9	SAND WITH SILT AND GRAVEL, medium grained, brown, a little light brown and light tan, moist, medium dense, a lens of silt at 15', laminations of silty sand (SP-SM) (A-1-b)		18	M		SS	10						
10			17	M									10
11	SAND, a little gravel, medium grained, brown, a little light tan, waterbearing, loose, laminations of silt (SP)		8	W		SS	18						
12			17	W									6
13	SAND, fine grained, light brown, waterbearing, loose (SP) (A-3)		17	W		SS	6						
14	GRAVELLY SAND WITH SILT, medium to fine grained, brown, waterbearing, medium dense (SP-SM) (A-1-b)		23	W		SS	6						
15	GRAVELLY SAND, medium grained, brownish gray, a little light tan, waterbearing, medium dense, laminations of silt around 22.5' (SP) (A-1-b)		12	W		SS	6						
16	SAND WITH GRAVEL, medium to fine grained, brownish gray, waterbearing, medium dense (SP) (A-1-b)		20	W		SS	6						
17			15	W									14
18	SILT SAND, a little gravel, grayish brown, waterbearing, medium dense (SM) (A-2-4)	TILL	15	W		SS	14						
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 5/12/14

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-17'	3.25" HSA								
17-34.6'	RDF w/DM	5/5/14	11:45	18.5	17.0	18.0		16.7	
		5/5/14	11:55	18.5	17.0	17.4		16.3	
BORING COMPLETED:	5/5/14								
DR: TA	LG: TK	Rig: 69C							



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1238 SB (p. 2 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: N **156173** E **512701**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
33	SILTY SAND, a little gravel, grayish brown, waterbearing, medium dense (SM) (A-2-4) <i>(continued)</i>	TILL <i>(continued)</i>	28	W	SS	0					
34											
	LIMESTONE, weathered, light gray <b>END OF BORING</b>	* *PLATTEVILLE FORMATION	100.1	W	SS	1					

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 5/9/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1250 SV (p. 1 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **853.3** Hennepin Co. Coordinates: **N 164623 E 519335**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	qu
1	FILL, mostly clayey sand with organic fines, a little gravel and sand with silt, trace roots, dark brown, a little light brown (A-2-4, A-1-b)	FILL	22	M	SS	5	17				
2	FILL, mostly sand with silt, a little gravel, light brown (A-1-b)		15	M	SS	12					
4	SANDY LEAN CLAY, slightly organic, a little gravel, trace roots, black, a little grayish brown, firm, a lens of clayey sand (CL) (A-6)	TOPSOIL OR FILL	8		SS	16	21				
7	FAT CLAY, slightly organic, trace roots, gray to dark gray, a little light gray, firm, laminations of silt (CH) (A-7-6)	FINE ALLUVIUM	5	M	SS	18	55				
9	OC = 2.7%, 7'-8½' sample		11	M	TW	18	55	69	89	28	1095
12	LEAN CLAY, gray, firm, laminations of waterbearing sand (CL) (A-6)		8	M/W	SS	16	27				
14	GRAVEL WITH SILT AND SAND, brownish gray, waterbearing, medium dense (GP) (A-1-b)	COARSE ALLUVIUM	14	W	SS	2					
16			18	W	SS	2					
19	GRAVELLY SAND WITH SILT, medium grained, brownish gray, waterbearing, medium dense (SP-SM) (A-1-b)		21	W	SS	6					
23	GRAVEL WITH SILT AND SAND, brownish gray, waterbearing, medium dense (GP) (A-1-b)		21	-	SS	0					
25			15	W	SS	2					
27	SAND WITH GRAVEL, medium grained, gray, waterbearing, medium dense (SP) (A-1-b)		13	W	SS	5					
30			15	W	SS	6					

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-14½'	3.25" HSA								
14½-99½'	RDF w/DM	6/9/14	8:58	16.0	14.5	13.0		7.0	
		6/9/14	9:04	16.0	14.5	11.4		5.6	
BORING COMPLETED: 6/9/14									
DR: SHS LG: JM Rig: 68C									

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 6/20/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1250 SV (p. 2 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: **N 164623 E 519335**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	qu
33	SAND WITH GRAVEL, medium to fine grained, gray, waterbearing, medium dense (SP) (A-1-b) (continued)		13	W	SS	8					
34											
35			16	W	SS	5					
36											
37	SAND, a little gravel, medium to fine grained, gray, waterbearing, medium dense (SP) (A-1-b)		22	-	SS	0					
38											
39			21	W	SS	10					
40											
41			16	W	SS	8					
42											
43	GRAVELLY SAND WITH SILT, medium to fine grained, brownish gray, waterbearing, medium dense (SP-SM) (A-1-b)		22	W	SS	4					
44											
45			22	-	SS	0					
46											
47	SAND WITH GRAVEL, medium grained, gray, waterbearing, medium dense (SP) (A-1-b)		20	W	SS	6					
48											
49			22	W	SS	8					
50											
51	SAND WITH GRAVEL, medium to fine grained, grayish brown, waterbearing, medium dense (SP) (A-1-b)		15	W	SS	6					
52											
53			18	W	SS	4	23				
54											
55	SILTY CLAY, brown, very stiff (CL-ML) (A-4)	FINE ALLUVIUM									
56											
57											
58											
59	LEAN CLAY, brown, hard, laminations of wet silt (CL) (A-4)										
60											
61											
62											
63											
64											
65											
66											
67											
68											
69											
69											

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 6/20/14



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1250 SV (p. 3 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: N **164623** E **519335**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	qu	
71	LEAN CLAY, brown, hard, laminations of wet silt (CL) (A-4) (continued)		54	M/W		12	21					
72												
73												
74			55	M/W		12	19					
75												
76												
77	SAND, a little gravel, medium to fine grained, brown, waterbearing, dense (SP) (A-1-b)		43	W		8						
78												
79												
80	SILTY SAND, a little gravel, brown, very dense (SM) (A-2-4)		76	W		12						
81												
82												
83	SAND, fine grained, brown, waterbearing, very dense (SP) (A-3)		53	W		10						
84												
85												
86	SAND, a little gravel, fine to medium grained, brown, waterbearing, dense (SP) (A-1-b)		36	W		6						
87												
88												
89	SAND WITH SILT AND GRAVEL, medium to fine grained, brown, waterbearing, very dense, laminations of silty sand (SP-SM) (A-1-b)		117	W		6						
90												
91												
92	<b>END OF BORING</b>											
93												
94												
95												
96												
97												
98												
99												
100												
101												

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 6/20/14



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1251 SS (p. 1 of 1)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **850.5** Hennepin Co. Coordinates: **N 164799 E 519703**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS				
							WC	DEN	LL	PL	%-#200
1	FILL, mostly silty sand with organic fines, a little gravel, trace roots, black (A-2-4)	FILL	9	M	SS	16					
2	FILL, mostly sand with silt and gravel, brown (A-1-b)		14	M	SS	8					
3											
4	FILL, mostly gravelly clayey sand, a little sand with silt, brown (A-1-b)		16	M	SS	6					
5											
6	FILL, mostly gravelly sand with silt, brownish gray (A-1-b) (petroleum-type odor)		19	M	SS	10					
7	CLAYEY SAND WITH GRAVEL, gray, very stiff to stiff (SC) (A-6) (petroleum-type odor)	TILL	9	M	SS	10	16				
8											
9	CLAYEY SAND, a little gravel, gray, stiff, laminations of waterbearing sand (SC) (A-6) (petroleum-type odor)		11	M/W	SS	10	17				
10											
11	SAND WITH SILT AND GRAVEL, medium to fine grained, gray, waterbearing, medium dense, a lens of silty sand (SP-SM) (A-1-b) (petroleum-type odor)	COARSE ALLUVIUM	13	W	SS	10					
12											
13	SAND WITH SILT, a little gravel, medium to fine grained, waterbearing, medium dense (SP-SM) (A-1-b) (petroleum-type odor)		11	W	SS	12					
14											
15	CLAYEY SAND, a little gravel, gray, very stiff, laminations of waterbearing sand (SC) (A-6)	TILL	17	M/W	SS	16	13				
16											
17	SAND WITH SILT, a little gravel, medium to fine grained, gray, waterbearing, loose to medium dense (SP-SM) (A-1-b)	COARSE ALLUVIUM	6	W	SS	14					
18											
19											
20											
21											
22											
23											
24											
25											
26	<b>END OF BORING</b>										

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 6/23/14

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
<b>0-24½'</b>	<b>3.25" HSA</b>	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
		<b>6/11/14</b>	<b>10:00</b>	<b>26.0</b>	<b>24.5</b>	<b>24.2</b>		<b>12.5</b>	
		<b>6/11/14</b>	<b>10:10</b>	<b>26.0</b>	<b>24.5</b>	<b>11.5</b>		<b>11.5</b>	
BORING COMPLETED: <b>6/11/14</b>									
DR: <b>JM</b> LG: <b>SHS</b> Rig: <b>68C</b>									

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1254 ST (p. 1 of 1)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **846.4** Hennepin Co. Coordinates: **N 164982 E 520221**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
1	FILL, mostly silty sand with gravel, a little sand, pieces of brick, trace roots, black, a little brown (A-2-4)	FILL	22	M		SS	16					
2			27	M		SS	16					
3												
4	FILL, mixture of silty sand and clayey sand, with gravel, brown (A-1-b, A-6)		8	M		SS	12					
5												
6	SAND, fine to medium grained, brown and gray, moist, medium dense, a lens of lean clay (SP) (A-3)	COARSE ALLUVIUM	26	M		SS	12					
7												
8	SAND WITH GRAVEL, medium grained, brown to light brown, waterbearing, dense to loose, a lens of sand with silt at 10' (SP) (A-1-b)		37	W		SS	14					
9			9	W		SS	16					
10												
11	SAND, a little gravel, medium grained, light brown, waterbearing, dense (SP) (A-1-b)		31	W		SS	6					
12												
13	SAND WITH SILT AND GRAVEL, medium to coarse grained, brown, waterbearing, dense (SP-SM) (A-1-b)		35	M		SS	8					
14												
15	GRAVEL WITH SILT AND SAND, brown, a little gray, waterbearing, dense, laminations of lean clay (GP) (A-1-a)		32	W		SS	8					
16												
17	<b>END OF BORING</b>											

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 6/20/14

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-14½'	3.25" HSA								
14½-19½'	RDF w/DM	6/11/14	11:44	16.0	14.5	11.1		8.8	
		6/11/14	11:54	16.0	14.5	11.0		9.2	
BORING COMPLETED: 6/11/14									
DR: JM LG: SHS Rig: 68C									





# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1255 ST (p. 1 of 1)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **841.2** Hennepin Co. Coordinates: **N 165167 E 520699**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS						
							WC	DEN	LL	PL	qu		
1	FILL, mostly clayey sand with gravel, pieces of brick, trace roots, dark brown (A-6)	FILL	16	M		SS	14	8					
2	FILL, mostly sand with silt and gravel, a little silty sand, grayish brown and black (A-1-b)		39	M		SS	12						
3													
4													
5	FILL, mostly lean clay, gray (A-6)		6	M		SS	10	35					
6													
7	LEAN CLAY, gray, a little brown, firm, laminations of sand and silt (CL) (A-6)	FINE ALLUVIUM	5	M		SS	14	31					
8													
9	FAT CLAY, brownish gray to dark gray, firm (CH) (A-7-6)												
10													
11													
12													
13													
14													
15	LEAN CLAY, brownish gray, a little black and gray, firm, laminations of fat clay and silt (CL) (A-7-6)			5	M		SS	16	42				
16													
17													
18			1	M		SS	18	31					
19													
20	FAT CLAY, dark gray, a little brown and gray, very stiff, a lens of sand, laminations of silt (CH) (A-7-6)		27	M		SS	10	47				1280	
21	<b>END OF BORING</b>												

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS						NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG	
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL		WATER LEVEL
<b>0-19½'</b>	<b>3.25" HSA</b>	<b>6/11/14</b>	<b>2:11</b>	<b>21.0</b>	<b>19.5</b>	<b>20.0</b>			<b>16.4</b>
		<b>6/11/14</b>	<b>2:21</b>	<b>21.0</b>	<b>19.5</b>	<b>19.5</b>			<b>13.1</b>
BORING COMPLETED: <b>6/11/14</b>									
DR: <b>JM</b> LG: <b>SHS</b> Rig: <b>68C</b>									

AET\_CORP\_W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 6/20/14



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1256 SS (p. 1 of 1)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **914.9** Hennepin Co. Coordinates: **N 153746 E 507398**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS							
							WC	DEN	LL	PL	%-#200			
1	FILL, mixture of clayey sand and silty sand, a little gravel, pieces of glass, dark brown (A-2-6)	FILL	13	M		SS	12							
2	SAND, a little gravel, medium to fine grained, light brown, moist, very dense (SP) (A-1-b)	COARSE ALLUVIUM	53	M		SS	6							
3														
4	SAND, fine grained, light brown, moist, medium dense (SP) (A-3)		16	M		SS	12							
5														
6	SAND WITH GRAVEL, medium grained, brown, moist, medium dense (SP) (A-1-b)		15	M		SS	12							
7														
8	SAND, a little gravel, fine to medium grained, light brown, moist, medium dense (SP) (A-1-b)		11	M		SS	12							
9														
10	SAND, a little gravel, medium to fine grained, light brown, moist, medium dense (SP) (A-1-b)		10	M		SS	6							
11														
12	SAND WITH GRAVEL, medium grained, light brown, moist, medium dense (SP) (A-1-b)		11	M		SS	6							
13														
14	SAND, a little gravel, fine to medium grained, light brown, moist, medium dense (SP) (A-1-b)		19	M		SS	12							
15														
16	SAND WITH GRAVEL, medium to fine grained, brown, moist, medium dense (SP)		20	M		SS	12							
17														
18			19	M		SS	12							
19														
20	SAND WITH GRAVEL, medium to fine grained, brown, moist, medium dense (SP)		30	M		SS	12							
21														
22														
23														
24														
25														
26	<b>END OF BORING</b>													

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 6/17/14

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
<b>0-24½'</b>	<b>3.25" HSA</b>	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
		<b>5/23/14</b>	<b>10:20</b>	<b>26.0</b>	<b>24.5</b>	<b>25.7</b>		<b>None</b>	
BORING COMPLETED: <b>5/23/14</b>									
DR: <b>SG</b> LG: <b>TM</b> Rig: <b>91C</b>									

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1257 SS (p. 1 of 2)**  
 PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**  
 SURFACE ELEVATION: **886.2** Hennepin Co. Coordinates: **N 155692 E 511355**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS						
							WC	DEN	LL	PL	%-#200		
1	FILL, mixture of gravelly silty sand and sand with silt, trace roots, dark brown and brown (A-2-4, A-1-b)	FILL	28	M		SS	4						
2			12	M		SS	6						
3													
4	FILL, mostly sand with silt and gravel, a little silty sand, trace roots, brown, a little dark brown (A-1-b)		10	M		SS	6						
5													
6													
7													
8													
9													
10			8	M/W		SS	4						
11													
12	FILL, mostly sand, a little gravel and sapric peat, trace roots, gray and black (A-1-b, A-8)		3	W		SS	6						
13													
14													
15			4	W	SS	6	27						
16													
17	FILL, mixture of clayey sand and clayey sand with organic fines, a little gravel, trace roots, gray and black (A-6)		5	M/W		SS	8	20					
18													
19	SILTY SAND, a little gravel, gray, wet, loose to medium dense, lenses of clayey sand (SM/SC) (A-2-4)	TILL	10	M/W		SS	8						
20													
21													
22													
23			14	-		SS	0						
24	SAND, a little gravel, medium grained, gray, waterbearing, very loose to loose, a lens of sand with silt around 28' (SP) (A-1-b)	COARSE ALLUVIUM											
25			3	-		SS	0						
26													
27													
28			8	W		SS	6						
29													
30													
31			7	W	SS	6							

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-19½'	3.25" HSA								
19½-29½'	RDF w/DM	6/3/14	2:03	13.5	12.0	12.1		10.2	
		6/3/14	2:13	21.0	19.5	19.9		15.8	
BORING COMPLETED: 6/4/14		6/4/14	7:30	21.0	19.5	19.0		12.8	
DR: JM	LG: SHS	Rig: 68C							

AET\_CORP\_W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 6/10/14



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1257 SS (p. 2 of 2)**  
 PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**  
 Hennepin Co. Coordinates: N **155692** E **511355**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
33	SAND WITH GRAVEL, medium grained, gray, waterbearing, loose to medium dense (SP) (A-1-b) (continued)		7	W	X	SS	3					
34												
35			7	W	X	SS	3					
36												
37												
38			11	-	X	SS	0					
39												
40	CLAYEY SAND, a little gravel, brown, very stiff (SC) (A-6)	TILL	23	M	X	SS	14	14				
41												
42	CLAYEY SAND WITH GRAVEL, brown, firm (SC/SM) (A-2-4)		5	M	X	SS	1	14				
43												
44												
45			7	M	X	SS	3	14				
46	<b>END OF BORING</b>											

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 6/10/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1260 SB (p. 1 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **910.1** Hennepin Co. Coordinates: **N 150873 E 501319**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS						
							WC	DEN	LL	PL	%-#200		
1	FILL, mixture of sand with silt and silty sand, a little gravel, light brown and black (A-1-b)	FILL	15	M		SS	14						
2			15	M		SS	12						
3													
4	FILL, mostly clayey sand, a little gravel and sand, grayish brown, a little light brown and dark brown (A-6)		6	M		SS	12	19					
5													
6													
7													
8	FILL, mostly sand with silt and gravel, a little clayey sand, light brown and dark brown (A-1-b, A-6)		8	M		SS	4	14					
9													
10													
11													
12													
13	ORGANIC CLAY, a little gravel and sand, trace roots, black, very stiff (OH) (A-8) (possible fill)	SWAMP DEPOSIT OR FILL	9	M		SS	10						
14													
15													
16													
17													
18													
19	SAND WITH SILT, a little gravel, fine to medium grained, gray and brown, waterbearing, medium dense to dense (SP-SM) (A-1-b)	COARSE ALLUVIUM	26	M		SS	12						
20													
21													
22	GRAVELLY SAND WITH SILT, fine to medium grained, grayish brown, waterbearing, very dense (SP-SM) (A-1-b)		25	W		SS	12						
23													
24	SAND WITH SILT AND GRAVEL, fine to medium grained, dark brownish gray, waterbearing, very dense (SP-SM) (A-1-b)		31	W		SS	10						
25													
26	CLAYEY SAND, a little gravel, brown to grayish brown, hard to stiff, a lens of waterbearing sand with silt (SC) (A-6, A-1-b)	TILL	71	W		SS	10						
27													
28													
29	CLAYEY SAND, a little gravel, brown to grayish brown, hard to stiff, a lens of waterbearing sand with silt (SC) (A-6, A-1-b)	TILL	56	W		SS	10						
30													
31													
			42	M/W		SS	12	10					

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 6/2/14

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-19½'	3.25" HSA								
19½-74½'	RDF w/DM	5/27/14	10:01	21.0	19.5	19.6		17.9	
		5/27/14	10:11	21.0	19.5	19.6		16.9	
BORING COMPLETED: 5/27/14									
DR: JM LG: SHS Rig: 68C									

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1260 SB (p. 2 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: N **150873**, E **501319**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS						
							WC	DEN	LL	PL	%-#200		
33		TILL (continued)	14	M/W	SS	16	14						
34	CLAYEY SAND, a little gravel, grayish brown, soft to firm (SC/SM) (A-2-4)												
35			4	M	SS	18	13						
36													
37													
38				5	-	SS	0						
39													
40				8	-	SS	0						
41													
42													
43				4	M	SS	18	15					
44													
45			15	-	SS	0							
46													
47													
48			5	M	SS	18	12						
49													
50			7	M	SS	18	12						
51													
52													
53	CLAYEY SAND WITH GRAVEL, brownish gray, hard (SC) (A-6)												
54													
55			64	M	SS	14	10						
56													
57													
58													
59													
60				98	M	SS	14	9					
61													
62													
63													
64													
65			103	M	SS	12	11						
66													
67													
68													
69													

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 6/2/14







# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1260 SB (p. 3 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: **N 150873 E 501319**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS						
							WC	DEN	LL	PL	%-#200		
71	CLAYEY SAND WITH GRAVEL, brownish gray, hard (SC) (A-6) <i>(continued)</i>		69	M		SS	16	10					
72													
73													
74								SS	10	8			
75	<b>END OF BORING</b>		100/3	M		SS	10	8					

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 6/2/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1261 SB (p. 1 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **910.1** Hennepin Co. Coordinates: **N 150910 E 501389**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
1	FILL, mixture of sand with silt and clayey sand, a little gravel, dark brown and brown (A-2-4)	FILL	7	M		12						
2												
3			9	M		12						
4												
5	FILL, mostly sand, a little gravel and clayey sand, light brown and brown, a little dark brown (A-1-b)	FILL	14	M		10						
6												
7												
8												
9												
10												
11			5	M		8						
12	SAND WITH GRAVEL, fine to medium grained, light brown, a little brown, moist, very dense, laminations of clayey sand (SP) (A-1-b) (possible fill)	COARSE ALLUVIUM OR FILL	56	M		1						
13												
14	SAND WITH SILT AND GRAVEL, medium to fine grained, light brown, moist, medium dense (SP-SM) (A-1-b)	COARSE ALLUVIUM	19	M			8					
15												
16	SAND, a little gravel, medium grained, light brown, waterbearing, loose (SP) (A-1-b)	COARSE ALLUVIUM	10	W			10					
17												
18	SAND WITH SILT AND GRAVEL, medium to fine grained, dark brown, waterbearing, medium dense (SP-SM) (A-1-b)	COARSE ALLUVIUM	30	W		2						
19												
20	SILTY SAND WITH GRAVEL, fine to medium grained, gray, wet, dense (SM) (A-2-4)	COARSE ALLUVIUM	32	W		2						
21												
22	SAND WITH SILT AND GRAVEL, fine to medium grained, dark brown, waterbearing, medium dense (SP-SM) (A-1-b)	COARSE ALLUVIUM	29	W		10						
23												
24	GRAVEL WITH SILT AND SAND, dark brown, waterbearing, very dense (GP-GM) (A-1-a)	COARSE ALLUVIUM	69	W		10						
25												
26												
27												
28			123	W		3						
29												
30												
31												

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 6/2/14

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS						NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG	
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL		WATER LEVEL
0-29½'	3.25" HSA								
29½-84½'	RDF w/DM	5/28/14	9:08	21.0	19.5	19.9			18.5
		5/28/14	9:18	21.0	19.5	19.5			17.0
BORING COMPLETED: 5/28/14									
DR: JM LG: SHS Rig: 68C									





# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1261 SB (p. 2 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: N **150910'** E **501389**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS						
							WC	DEN	LL	PL	%-#200		
33	SILTY SAND, a little gravel, brown, wet, very dense, lens of clayey sand, lens of sand with silt (SM) (A-2-4) (continued)	TILL (continued)	56	M/W	SS	10							
34	CLAYEY SAND, a little gravel, brown to grayish brown, firm to soft, lenses of silty sand (SC/SM) (A-2-4)		7	M/W	SS	18	13						
35			6	M/W	SS	18	14						
36			4	M/W	SS	18	14						
37			4	M/W	SS	18	13						
38			4	-	SS	0							
39			5	M/W	SS	18	15						
40			4	M/W	SS	18	13						
41			7	M/W	SS	12	15						
42			5	M/W	SS	10	13						
43			63	CLAYEY SAND, a little gravel, grayish brown, very stiff (SC) (A-6)	19	M	SS	14	10				
44			64		65	66	67	CLAYEY SAND WITH GRAVEL, grayish brown, hard (SC/SM) (A-2-4)	97	M	SS	10	11
45			68		69								

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 6/2/14



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1261 SB (p. 3 of 3)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: N **150910** E **501389**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
71	CLAYEY SAND WITH GRAVEL, grayish brown, hard (SC/SM) (A-2-4) (continued)		38	M	SS	12	11					
72												
73												
74												
75	SANDY LEAN CLAY, a little gravel, brown, hard (CL/SC) (A-6)		40	M	SS	16	12					
76												
77												
78												
79	END OF BORING		116	M	SS	14	8					
80												
81												
82												
83	END OF BORING		88/7	M	SS	14	16					
84												
85	END OF BORING											

AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 6/2/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1262 ST (p. 1 of 1)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

SURFACE ELEVATION: **884.7** Hennepin Co. Coordinates: **N 155950 E 512188**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS						
							WC	DEN	LL	PL	%-#200		
1	FILL, mostly sand with silt and gravel, brown (A-1-b)	FILL	3	M		SS	12						
2													
3			6	M		SS	10						
4													
5	FILL, mostly silty sand, a little gravel, sand, ashes/cinders and brick, brown and black (A-2-4)		6	M		SS	14						
6													
7													
8			3	M		SS	6						
9													
10			15	M		SS	10						
11													
12	SAND, a little gravel, medium grained, brown to grayish brown, waterbearing, medium dense to loose (SP) (A-1-b)	COARSE ALLUVIUM	20	W		SS	8						
13													
14			7	W		SS	16						
15													
16	SAND WITH SILT AND GRAVEL, fine to medium grained, grayish brown, waterbearing, dense (SP-SM) (A-1-b)		6	W		SS	20						
17													
18	SANDY LEAN CLAY, a little gravel, possible cobbles, dark grayish brown, very stiff (CL) (A-6)	TILL	23	W/M		SS	8	15					
19													
20			16	M		SS	10	16					
21													
22	SAND WITH SILT, a little gravel, grayish brown, waterbearing, medium dense, lenses of clayey sand (SP-SM) (A-2-4)	COARSE ALLUVIUM	17	W		SS	18						
23													
24	SILTY SAND, a little gravel, grayish brown, wet, medium dense, lenses of clayey sand (SM) (A-2-4)		27	W		SS	16						
25													
26	GRAVELLY SAND, medium grained, grayish brown, waterbearing, medium dense, lenses of silty sand (SP) (A-1-b)		15	W		SS	6						
27													
28													
29													
30													
31	<b>END OF BORING</b>												

DEPTH: DRILLING METHOD		WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-19½'	3.25" HSA								
19½-29½'	RDF w/DM	6/4/14	9:55	13.5	12.0	12.5		12.1	
		6/4/14	10:10	13.5	12.0	12.5		11.7	
BORING COMPLETED: 6/4/14									
DR: DS LG: GH Rig: 41C									

AET\_CORP W-COORDINATES 01-05697.GPJ AET-CPT+WELL.GDT 6/10/14

# SUBSURFACE BORING LOG

AET JOB NO: **01-05697** LOG OF BORING NO. **1263 SB (p. 1 of 2)**  
 PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**  
 SURFACE ELEVATION: **884.9** Hennepin Co. Coordinates: **N 155750 E 511696**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
1	FILL, mixture of sand with silt and silty sand with gravel, light brown and black (A-1-b, A-2-4)	FILL	10	M		SS	12					
2												
3			11	M		SS	14					
4	FILL, mostly silty sand with organic fines, a little gravel ash/cinders, trace roots, black (A-2-4)	FILL	4	M		SS	12					
5												
6			2	M/W		SS	6					
7	FILL, mixture of silty sand with organic fines and clayey sand, a little gravel and ashes/cinders, pieces of wood and glass, trace roots, black (A-2-4)	FILL	3	M		SS	6					
8												
9			3	M		SS	6					
10												
11			3	M		SS	6					
12	SAPRIC PEAT, dark brownish gray to dark brown (PT) (A-8)	SWAMP DEPOSIT										
13												
14			3	M		SS	12	165				
15												
16			3	M		SS	1					
17	ORGANIC CLAY, pieces of wood (roots), trace roots, gray, lenses and laminations of boglime (OH) (A-6)	SWAMP DEPOSIT	3	M		SS	4	146				
18												
19			3	M		SS	14	106	72			
20	SAND, a little gravel, medium grained, gray, waterbearing, loose, lenses of sand with silt (SP) (A-1-b)	COARSE ALLUVIUM	7	W		SS	8					
21												
22			9	W		SS	8					
23	SAND, a little gravel, medium to fine grained, gray, waterbearing, loose, lenses of sand with silt (SP) (A-1-b)	COARSE ALLUVIUM										
24												
25			9	W		SS	8					

DEPTH:	DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
		DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-29½'	3.25" HSA								
29½-64.7'	RDF w/DM	6/4/14	12:59	28.5	27.0	24.8		12.7	
		6/4/14	1:05	28.5	27.0	24.7		12.1	
BORING COMPLETED: 6/4/14									
DR: JM LG: SHS Rig: 68C									

AET\_CORP\_W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 6/12/14



# SUBSURFACE BORING LOG

AET JOB NO: **01-05697**

LOG OF BORING NO. **1263 SB (p. 2 of 2)**

PROJECT: **Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis**

Hennepin Co. Coordinates: N **155750** E **511696**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS					
							WC	DEN	LL	PL	%-#200	
33	GRAVEL WITH SAND, gray, waterbearing, loose (GP) (A-1-b) (continued)		10	W	X	SS	1					
34												
35												
36	SAND, a little gravel, medium grained, waterbearing, loose (SP) (A-1-b)		9	-	X	SS	0					
37												
38												
39												
40												
41	CLAYEY SAND, a little gravel, apparent cobble at 55', brown, soft to stiff (SC/SM) (A-2-4)	TILL	5	W	X	SS	3					
42												
43												
44												
45												
46												
47												
48												
49												
50												
51	CLAYEY SAND, a little gravel, brown, hard (SC) (A-6)		2	W/M	X	SS	18	16				
52												
53												
54												
55												
56	END OF BORING		7	W/M	X	SS	18	12				
57												
58												
59												
60												
61	END OF BORING		10	W/M	X	SS	10	14				
62												
63												
64	END OF BORING		28	W/M	X	SS	12	13				
65												
66	END OF BORING		117	-	X	SS	0					
67												
68	END OF BORING		50/3	M	X	SS	10	10				
69												
70	END OF BORING		100/1	-	X	SS	0					
71												
72	END OF BORING											
73												

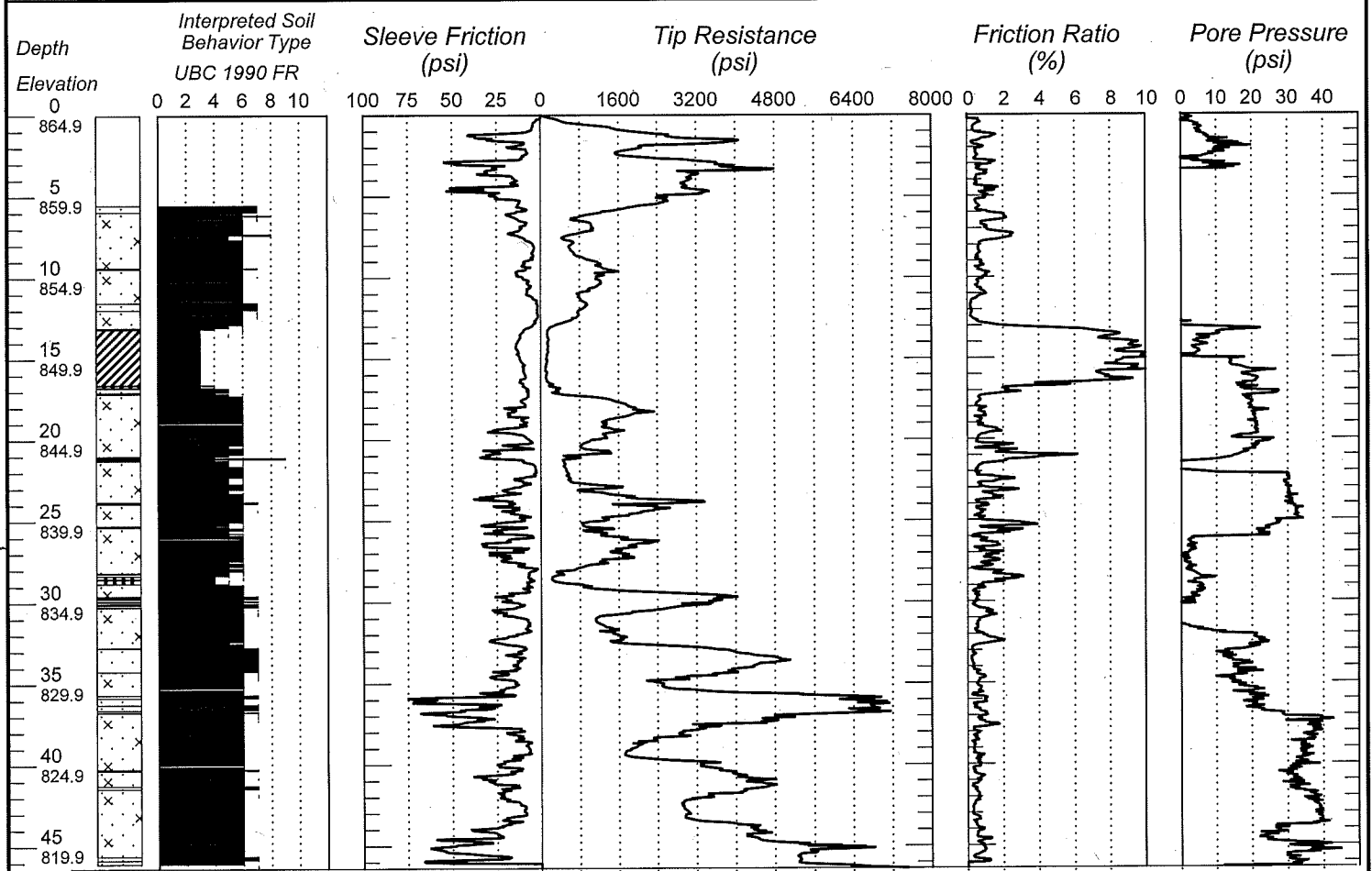
AET\_CORP W-COORDINATES 01-05697.GPJ AET+CPT+WELL.GDT 6/12/14



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TESTING

# CONE PENETRATION TEST RESULTS

AET JOB NO: <u>01-05697</u>		SOUNDING NO.
PROJECT: <u>Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis</u>		<u>1111 CT (p. 1 of 1)</u>
Location _____	CPT Machine <b>20</b>	Surface Elevation <b>864.9</b>
	CPT Operator <b>Adams</b>	
Hennepin Co. Coordinates: X=517776 Y=161291 (feet)		Cone # <b>4583.119xx</b> Date Completed: 8/1/13



Bottom of Hole 46.37791

AET CPT GRAPH

Edit: Date: 8/20/13  
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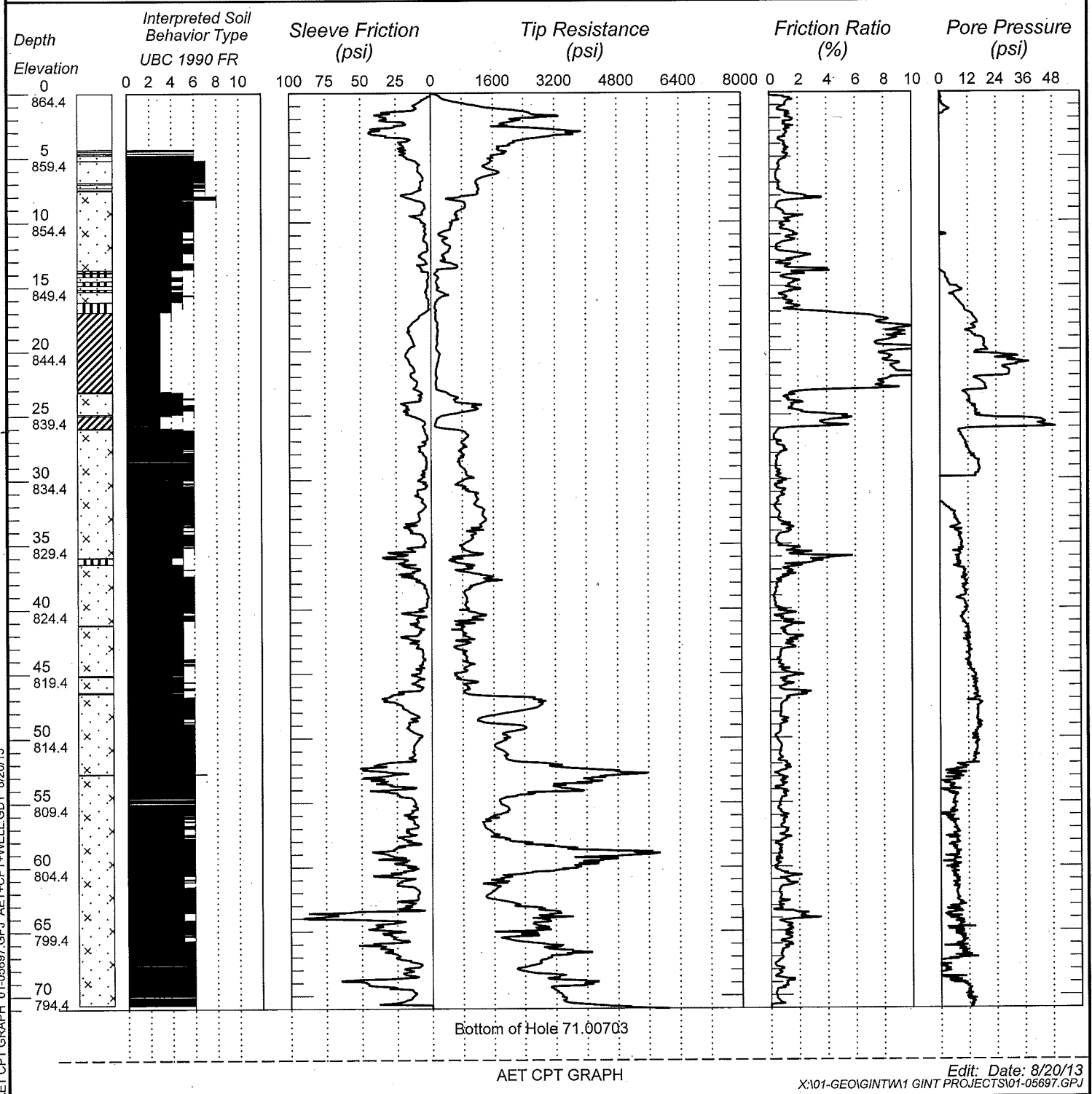
AET CPT GRAPH 01-05697.GPJ AET+CPT+WELL.GDT 8/20/13



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# CONE PENETRATION TEST RESULTS

AET JOB NO: <u>01-05697</u>		SOUNDING NO.
PROJECT: <u>Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis</u>		1112 CT (p. 1 of 1)
Location _____	CPT Machine <b>20</b>	Surface Elevation
	CPT Operator <b>Adams</b>	<b>864.4</b>
Hennepin Co. Coordinates: X=517785 Y=161381 (feet)	Cone # <b>4583.119xx</b>	Date Completed: 8/1/13



AET CPT GRAPH 01-05697.GPJ AET+CPT+WELL.GDT 8/20/13



# CONE PENETRATION TEST RESULTS

AET JOB NO: 01-05697

SOUNDING NO.

PROJECT: Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis

1113 CT (p. 1 of 1)

Location \_\_\_\_\_

CPT Machine **20**

Surface Elevation

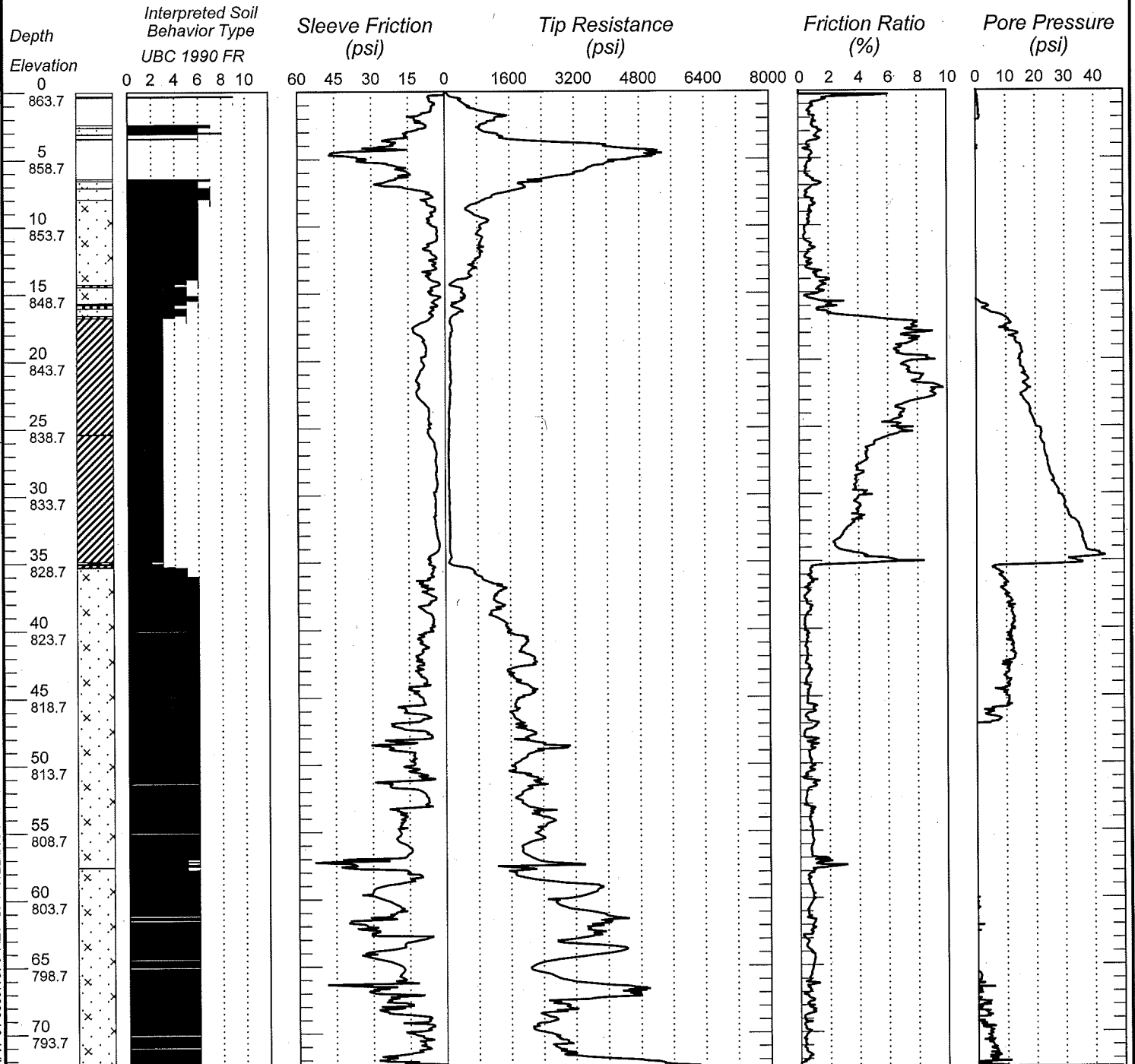
CPT Operator **Adams**

**863.7**

Hennepin Co. Coordinates: X=517802 Y=161564 (feet)

Cone # **4583.119xx**

Date Completed: 8/1/13



Bottom of Hole 72.59409

AET CPT GRAPH

Edit: Date: 8/20/13

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AET CPT GRAPH\_01-05697.GPJ\_AET+CPT+WELL\_GDT\_8/20/13

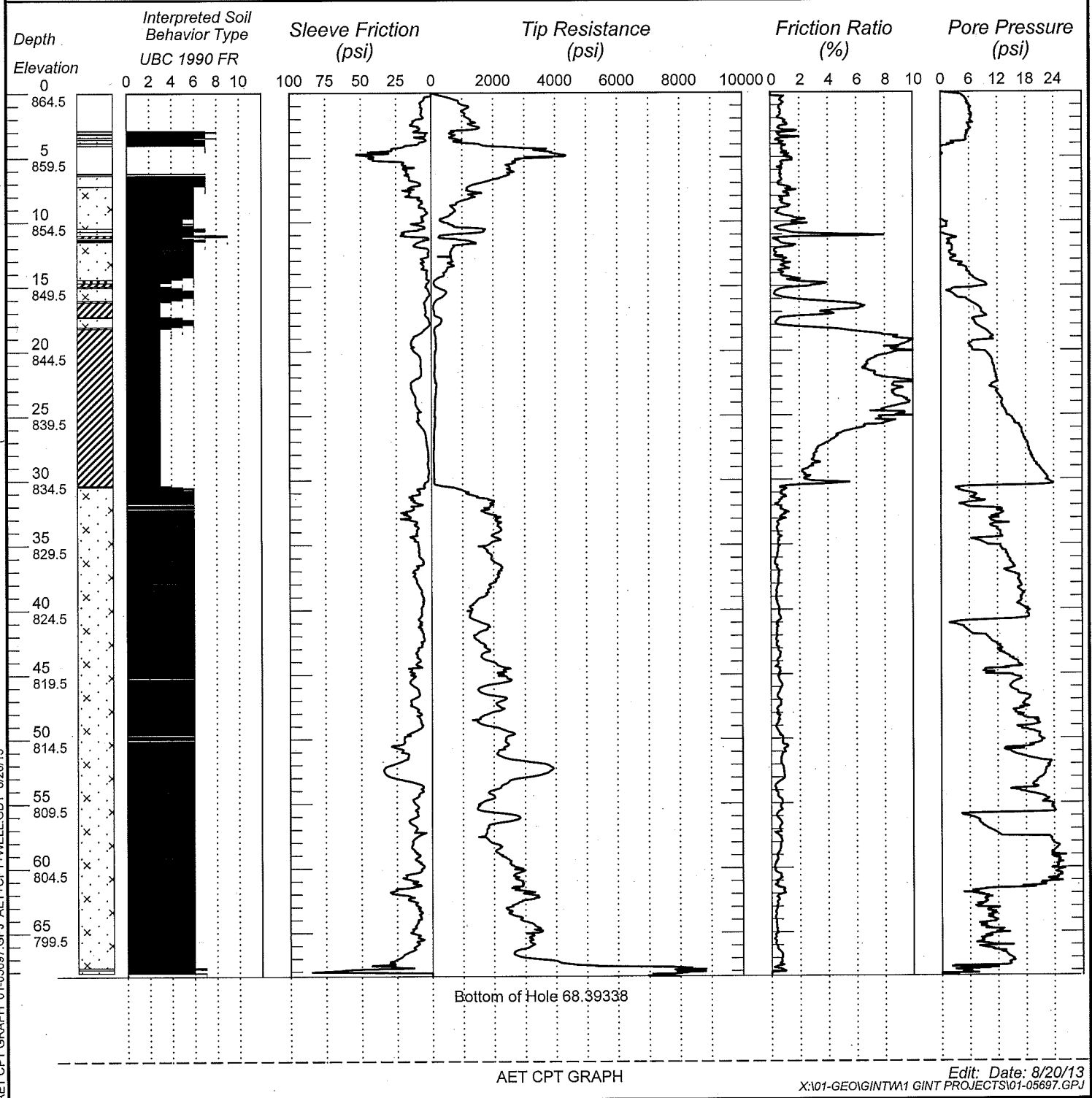




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# CONE PENETRATION TEST RESULTS

AET JOB NO: <u>01-05697</u>		SOUNDING NO.
PROJECT: <u>Southwest Light Rail Transit Project, PEC East; Hopkins to Minneapolis</u>		1114 CT (p. 1 of 1)
Location _____	CPT Machine <b>20</b>	Surface Elevation <b>864.5</b>
	CPT Operator <b>Adams</b>	
Hennepin Co. Coordinates: X=517785 Y=161666 (feet)		Cone # <b>4583.119xx</b> Date Completed: 8/1/13



AET CPT GRAPH 01-05697.GPJ AET+CPT+WELL.GDT 8/20/13

AET CPT GRAPH

Edit: Date: 8/20/13  
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# American Engineering Testing, Inc.

# Monitoring Well/Piezometer Log

AET Job No.: 01-05697

Well No.: 1066 PS

Project: Southwest Light Rail Transit Project, PEC East

Unique Well No.: \_\_\_\_\_

Location: N155687, E511232

Drilling Method: HSA

Date Installed: 5/15/13

Drilling Fluids (type): None

Project Manager: JV

Completed by: SG/SB

## Annular Space Details

Type of Surface Seal: Concrete

Type of Annular Sealant: Bentonite Grout

Type of Bentonite Seal (Granular Pellet): None

Type of Sand Pack: #30 Red Flint Sand

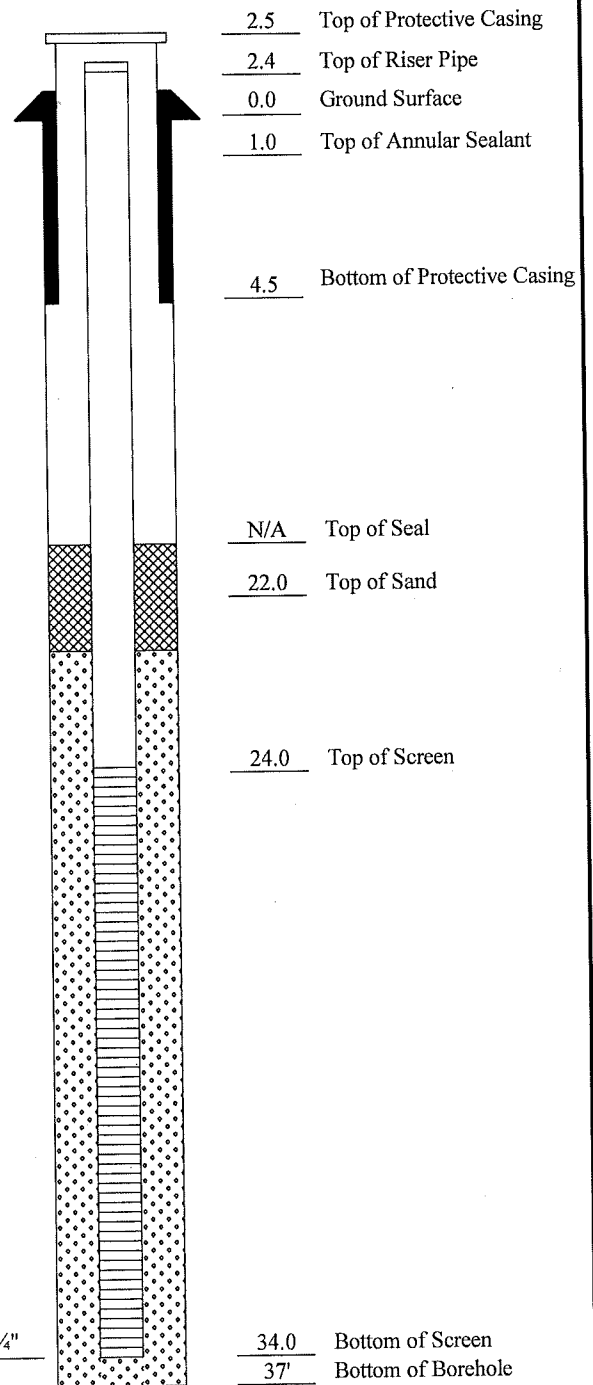
## Well Construction Materials

	Stainless Steel Specify Type	PVC Specify Type	Other Specify Type
Riser Coupling Joint	---	2 " FT	---
Riser Pipe Above w.t.	---	2 " FT	---
Riser Pipe Below w.t.	---	2 " FT	---
Screen	---	2 " FT	---
Protective Posts	---	None	---
Protective Casing	---	---	6" Steel

## Measurements

to 0.1 ft (where applicable)

Protective Casing Length	7' Steel
Riser Pipe Length	26.4'
Screen Length	10'
Screen Slot Size	.010"
Top of Riser Elevation	890.2
Ground Surface Elevation	887.8
Depth to Water	14.4' (5/15/13)
Water Elevation	873.4' (5/15/13)
Other	873.8' (6/6/13 & 7/10/13)
	874.3' (5/15/14)



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## SIEVE ANALYSIS TEST RESULTS

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**PROJECT:**  
Southwest LRT, PEC East  
Hopkins to Minneapolis, Minnesota

**AET NO.:** 01-05697

**DATE:** August 19, 2014

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**TEST METHOD:** General conformance with ASTM:D6913, Method A

**RESULTS:**

Boring Number	1005 SB	1038 ST	1041 ST
Sample Depth	4½'-6'	19½'-21'	19½'-21'
Dry Sample Weight (gms)	140.71	264.92	381.49
Sieve Size or Number	Percent Passing by Weight		
1"	100	100	100
¾"	91	100	87
⅝"	91	94	83
½"	89	88	78
⅜"	85	81	73
#4	80	74	63
#10	68	68	52
#20	54	54	41
#40	36	20	23
#100	18	4.8	12
#200	14	3.8	8.8

*Note: The small sample size limits the accuracy of the test, and the sample may not necessarily be representative of the entire layer shown on the boring log*

## SIEVE ANALYSIS TEST RESULTS

**PROJECT:**  
 Southwest LRT, PEC East  
 Hopkins to Minneapolis, Minnesota

**AET NO.:** 01-05697  
**DATE:** June 22, 2014

**TEST METHOD:** General conformance with ASTM:D6913, Method A

**RESULTS:**

Boring Number	1009	1010	1044	1044	1064	1073	1073
Sample Depth	2'-3½'	4½'-6'	2'-3½'	4½'-6'	2'-4'	2'-4'	4½'-6½'
Dry Sample Weight (gms)	237.12	289.00	236.44	158.45	167.75	289.79	291.9
Sieve Size or Number	Percent Passing By Weight						
1-1/2"	100	100	100	100	100	100	100
1"	100	89	100	100	100	89	100
3/4"	100	87	94	100	100	89	100
5/8"	100	86	94	90	91	85	100
1/2"	96	78	94	90	87	82	98
3/8"	93	73	92	83	83	78	94
#4	82	66	88	78	75	70	84
#10	70	54	84	71	64	56	70
#20	54	41	70	61	52	38	50
#40	32	25	45	47	41	23	30
#100	17	13	17	23	26	10	13
#200	13	9.6	12	18	21	7.9	10

*Note: The small sample size limits the accuracy of the test, and the sample may not necessarily be representative of the entire layer shown on the boring log.*

## SIEVE ANALYSIS TEST RESULTS

**PROJECT:**  
Southwest LRT, PEC East  
Hopkins to Minneapolis, Minnesota

**AET NO.:** 01-05697  
**DATE:** June 22, 2014

**TEST METHOD:** General conformance with ASTM:D6913, Method A

**RESULTS:**

Boring Number	1074	1078	1080	1080	1081	1084	1092
Sample Depth	2'-4'	2'-4'	2'-4'	4½'-6½'	2'-4'	2'-4'	2'-4'
Dry Sample Weight (gms)	279.79	175.51	287.96	260.60	248.99	267.66	263.00
Sieve Size or Number	Percent Passing By Weight						
1-1/2"	100	100	100	100	100	100	100
1"	100	100	85	100	100	100	100
3/4"	89	100	85	86	100	95	93
5/8"	84	100	79	86	100	95	93
1/2"	82	97	72	84	95	89	91
3/8"	80	92	69	84	93	89	91
#4	71	84	62	76	81	81	79
#10	59	70	52	67	68	68	62
#20	45	54	41	54	52	50	47
#40	28	38	27	37	31	29	31
#100	10	22	12	12	7.9	11	15
#200	7.5	19	8.9	8.3	5.2	8.2	11

*Note: The small sample size limits the accuracy of the test, and the sample may not necessarily be representative of the entire layer shown on the boring log.*



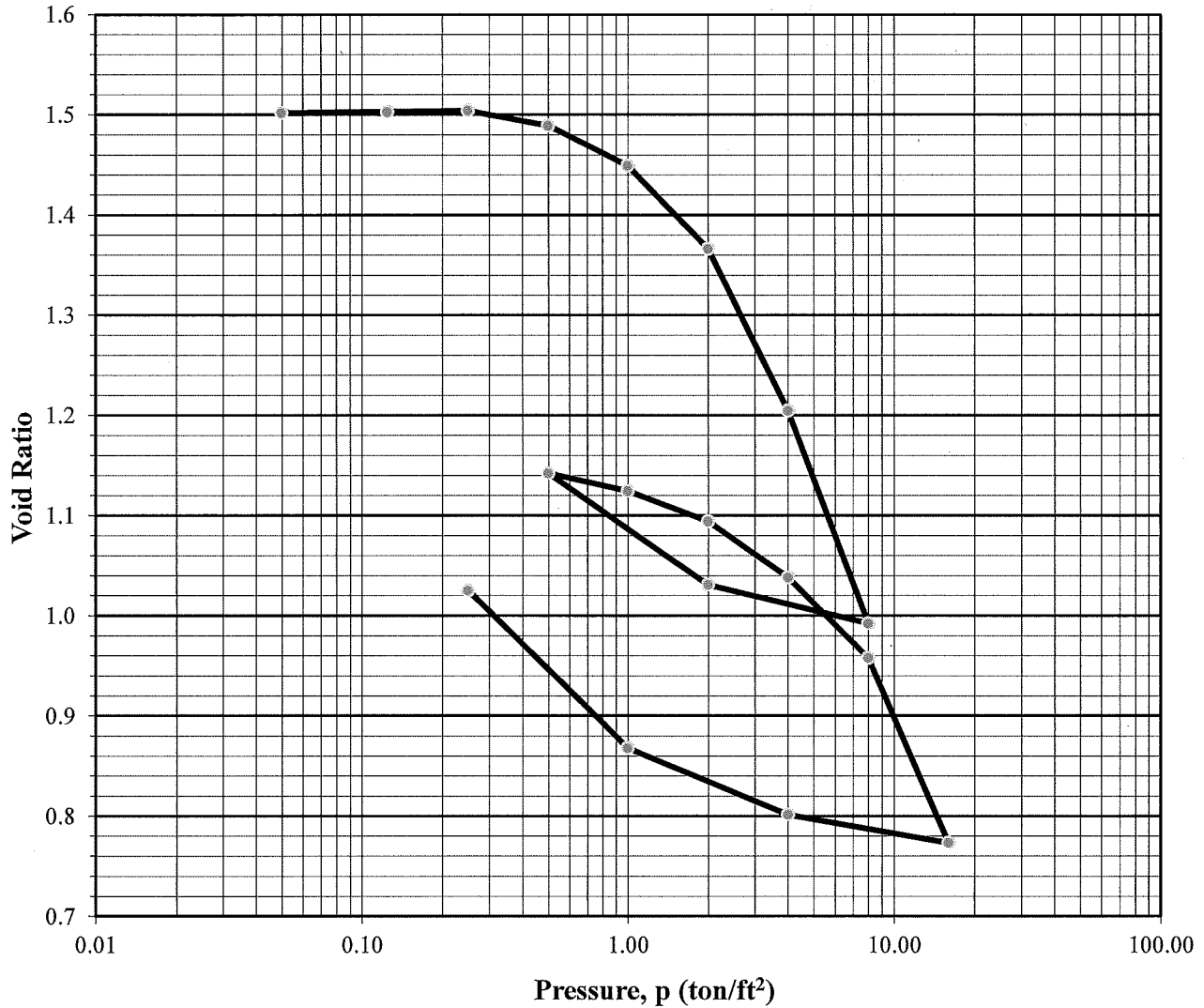
**AMERICAN  
ENGINEERING  
TESTING, INC.**

**Consolidation Test Results: Void Ratio vs. Pressure**

**Project:**  
SW Light Rail Transit  
Minneapolis to Hopkins

**AET No.:** 01-05697

**Date:** 6/24/2013



	<b>Before</b>	<b>After</b>	<b>Liquid Limit (%):</b>	94	<b>Test Date:</b> 5/23/13
<b>Water Content (%):</b>	57.49	54.39	<b>Plastic Limit (%):</b>	63	
<b>Dry Density (pcf):</b>	59.79	67.87	<b>Plasticity Index (%):</b>	31	
<b>Saturation (%):</b>	91.62	108.09	<b>Specific Gravity:</b>	2.40	
<b>Void Ratio:</b>	1.5026	1.0261			Measured
<b>Sample Description:</b> Organic Silt (OH)					
<b>Boring Number:</b>	B-1012		<b>Depth:</b>	44.5-46.5	
<b>Remarks:</b> Test conducted in general accordance with ASTM D2435			<b>Soil Parameters:</b>		
			Preconsolidation Pressure (Pc): 1.7 tsf		
			Compression Index (Cc): 0.715		
			Recompression Index (Cr): 0.135		
<b>Tested By:</b> Benjamin Pomroy			<b>Reviewed By:</b> Jeff Voyer		



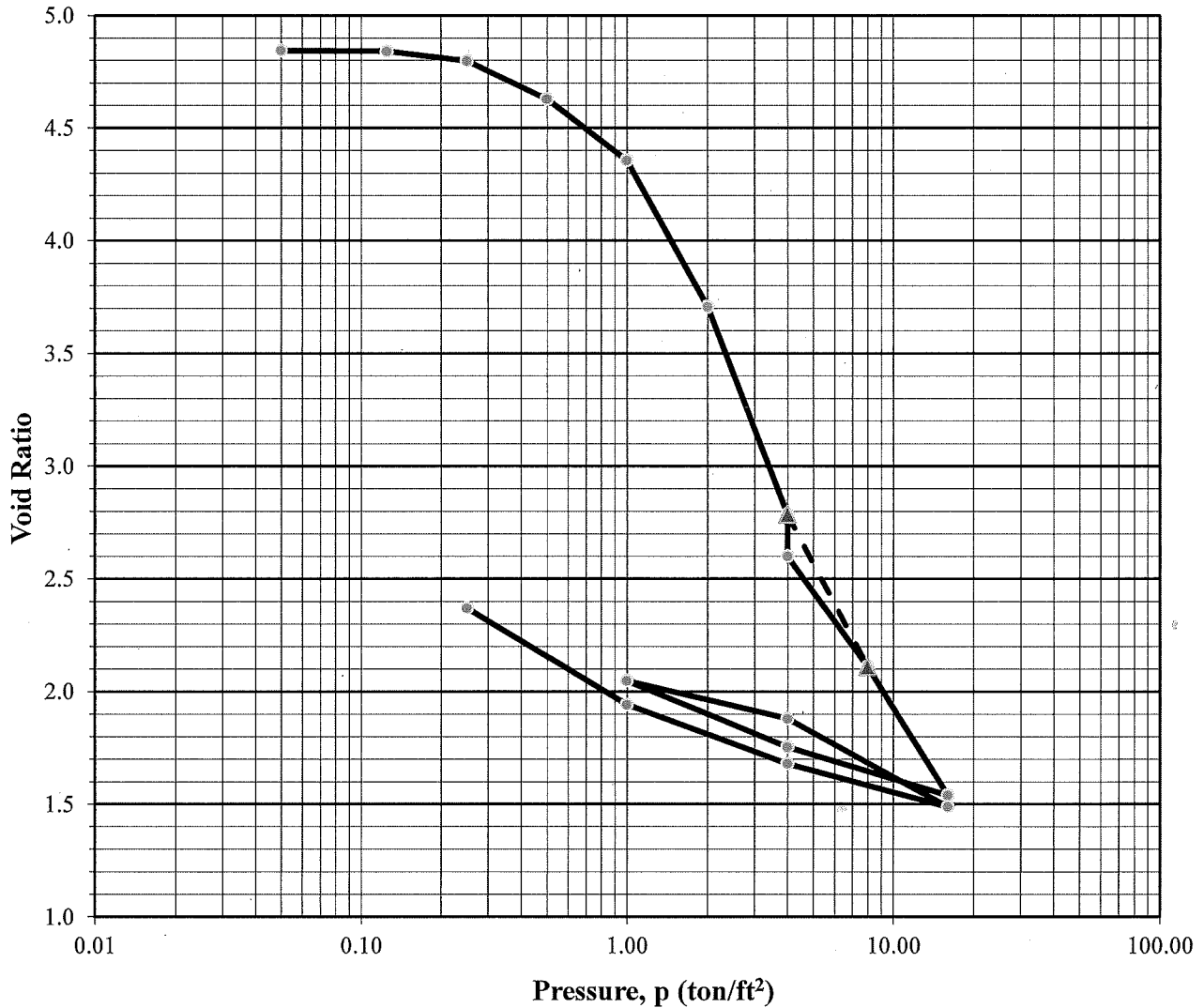
**AMERICAN  
ENGINEERING  
TESTING, INC.**

**Consolidation Test Results: Void Ratio vs. Pressure**

**Project:**  
Southwest Light Rail Transit  
Minneapolis to Hopkins, MN

**AET No.:** 01-05697

**Date:** 8/29/2013



	<b>Before</b>	<b>After</b>	<b>Liquid Limit (%):</b>		<b>Test Date:</b> 7/24/2013
<b>Water Content (%):</b>	249.21	130.61	<b>Plastic Limit (%):</b>		
<b>Dry Density (pcf):</b>	19.79	34.80	<b>Plasticity Index (%):</b>		
<b>Saturation (%):</b>	95.29	104.07	<b>Specific Gravity:</b>	1.856	Measured
<b>Void Ratio:</b>	4.8616	2.3802			
<b>Sample Description:</b>	Sapric Peat (PT)				
<b>Boring Number:</b>	B-1036		<b>Depth:</b>	22-24	
<b>Remarks:</b>	Test conducted in general accordance with ASTM D2435			<b>Soil Parameters:</b> Preconsolidation Pressure (Pc): 0.9 tsf Compression Index (Cc): 2.658 Recompression Index (Cr): 0.438	
<b>Tested By:</b>	Benjamin Pomroy		<b>Reviewed By:</b>	Jeff Voyer	



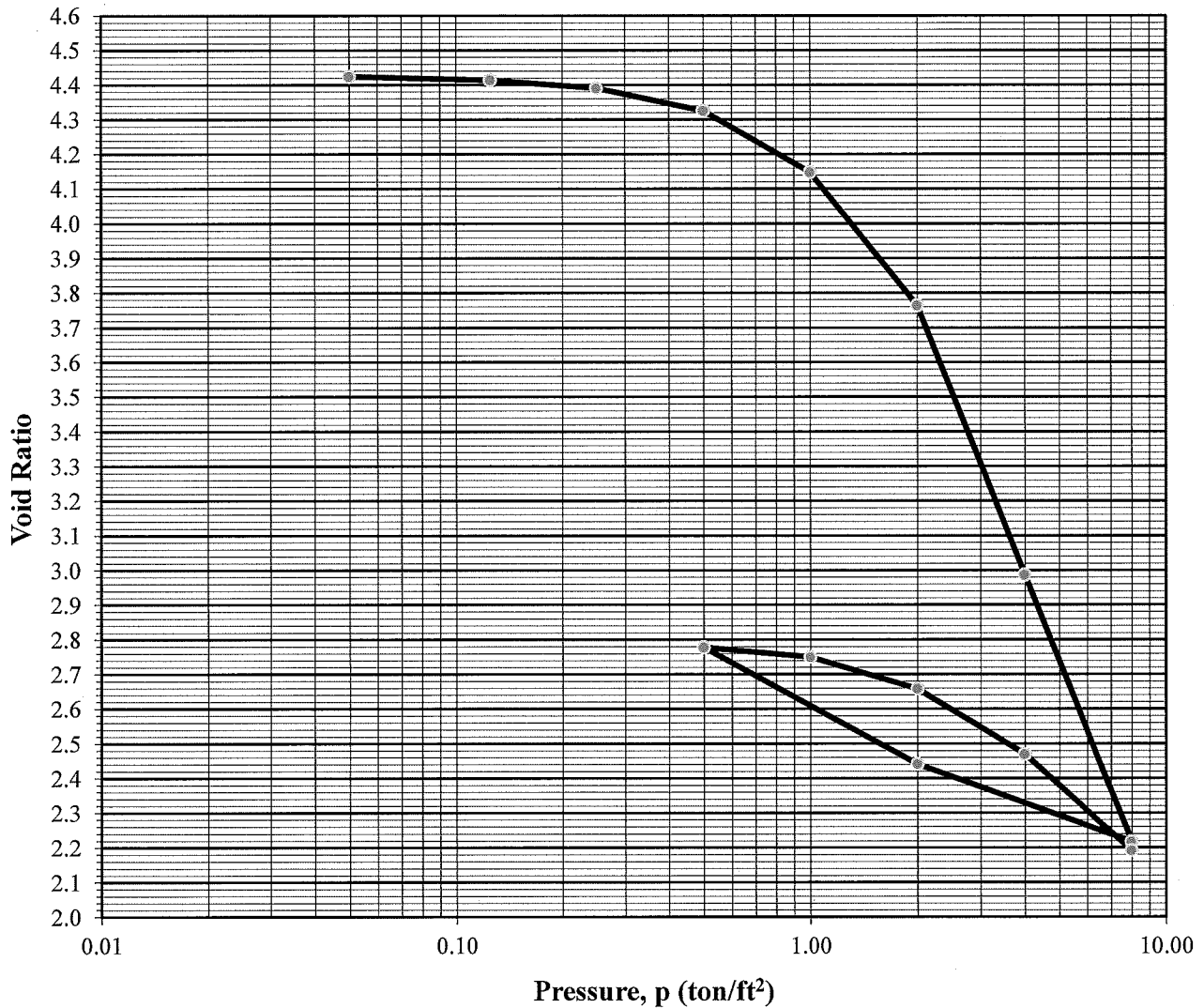
**AMERICAN  
ENGINEERING  
TESTING, INC.**

**Consolidation Test Results: Void Ratio vs. Pressure**

**Project:**  
Southwest LRT  
Minneapolis to Hopkins, MN

**AET No.:** 01-05697

**Date:** 1/2/2014



	<b>Before</b>	<b>After</b>	<b>Liquid Limit (%):</b>		<b>Test Date:</b> 9/6/2013
<b>Water Content (%):</b>	214.49	134.53	<b>Plastic Limit (%):</b>		
<b>Dry Density (pcf):</b>	22.64	33.15	<b>Plasticity Index (%):</b>		
<b>Saturation (%):</b>	95.33	97.77	<b>Specific Gravity:</b>	1.972	Measured
<b>Void Ratio:</b>	4.4193	2.5926			
<b>Sample Description:</b>	Sapric Peat (PT)				
<b>Boring Number:</b>	1053 SS	<b>Depth:</b>	24.5-26.5	<b>Soil Parameters:</b>	
<b>Remarks:</b>	Test conducted in general accordance with ASTM D2435 Air compressor failed during 16tsf			Preconsolidation Pressure (Pc): 1.3 tsf Compression Index (Cc): 2.557 Recompression Index (Cr): 0.469	
<b>Tested By:</b>	Benjamin Pomroy		<b>Reviewed By:</b>	Jeff Voyer	



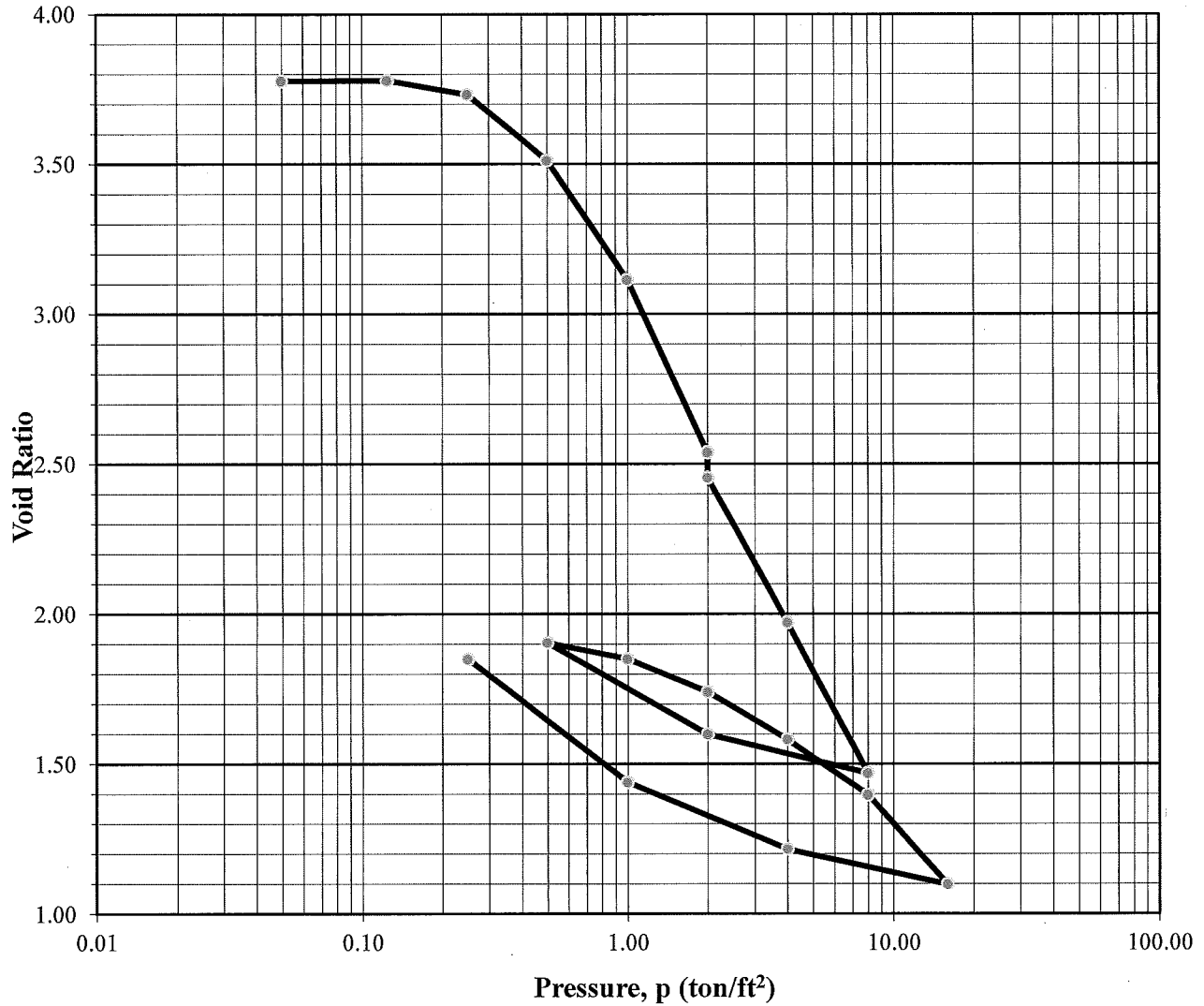


**Consolidation Test Results: Void Ratio vs. Pressure**

**Project:**  
Southwest LRT  
Hopkins to Minneapolis, MN

**AET No.:** 01-05697

**Date:** 6/19/2014



	<b>Before</b>	<b>After</b>	<b>Liquid Limit (%):</b>		<b>Test Date:</b>
<b>Water Content (%):</b>	189.45	111.01	<b>Plastic Limit (%):</b>		
<b>Dry Density (pcf):</b>	25.64	39.50	<b>Plasticity Index (%):</b>		
<b>Saturation (%):</b>	98.33	103.59	<b>Specific Gravity:</b>	1.967	Measured
<b>Void Ratio:</b>	3.7861	2.1058			
<b>Sample Description:</b> Peat					
<b>Boring Number:</b>	1213 SB		<b>Depth:</b>	9'-11'	
<b>Remarks:</b> Test conducted in general accordance with ASTM D2435			<b>Soil Parameters:</b> Preconsolidation Pressure (Pc): 0.5 tsf Compression Index (Cc): 1.860 Recompression Index (Cr): 0.383		
<b>Tested By:</b> Benjamin Pomroy			<b>Reviewed By:</b> Jeff Voyer		

# **Appendix C**

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Geotechnical Report Limitations and Guidelines for Use

**Appendix C**  
**Geotechnical Report Limitations and Guidelines for Use**  
**Report No. 01-05697.01**

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**B.1 REFERENCE**

This appendix provides information to help you manage your risks relating to subsurface problems which are caused by construction delays, cost overruns, claims, and disputes. This information was developed and provided by ASFE<sup>1</sup>, of which, we are a member firm.

**B.2 RISK MANAGEMENT INFORMATION**

**B.2.1 Geotechnical Services are Performed for Specific Purposes, Persons, and Projects**

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared solely for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. And no one, not even you, should apply the report for any purpose or project except the one originally contemplated.

**B.2.2 Read the Full Report**

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

**B.2.3 A Geotechnical Engineering Report is Based on A Unique Set of Project-Specific Factors**

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typically factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, always inform your geotechnical engineer of project changes, even minor ones, and request an assessment of their impact. Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.

**B.2.4 Subsurface Conditions Can Change**

A geotechnical engineering report is based on conditions that existed at the time the study was performed. Do not rely on a geotechnical engineering report whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. Always contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

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<sup>1</sup> ASFE, 8811 Colesville Road/Suite G106, Silver Spring, MD 20910  
Telephone: 301/565-2733 : [www.asfe.org](http://www.asfe.org)

**Appendix C**  
**Geotechnical Report Limitations and Guidelines for Use**  
**Report No. 01-05697.01**

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**B.2.5 Most Geotechnical Findings Are Professional Opinions**

Site exploration identified subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ, sometimes significantly, from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

**B.2.6 A Report's Recommendations Are Not Final**

Do not overrely on the construction recommendations included in your report. Those recommendations are not final, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual subsurface conditions revealed during construction. The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.

**B.2.7 A Geotechnical Engineering Report Is Subject to Misinterpretation**

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

**B.2.8 Do Not Redraw the Engineer's Logs**

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should never be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, but recognize that separating logs from the report can elevate risk.

**B.2.9 Give Contractors a Complete Report and Guidance**

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, but preface it with a clearly written letter of transmittal. In the letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need to prefer. A prebid conference can also be valuable. Be sure contractors have sufficient time to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

**B.2.10 Read Responsibility Provisions Closely**

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their report. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. Read these provisions closely. Ask questions. Your geotechnical engineer should respond fully and frankly.

**B.2.11 Geoenvironmental Concerns Are Not Covered**

The equipment, techniques, and personnel used to perform a geoenvironmental study differ significantly from those used to perform a geotechnical study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Unanticipated environmental problems have led to numerous project failures. If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. Do not rely on an environmental report prepared for someone else.