

APPENDIX A
MONITORING WELL LOCATION MAPS AND LOGS

LOCATION MAPS AND DRILLING LOGS
Load line 1 and Load Line 2 Monitoring Wells

Monitoring Wells:

LL1-mw-063

LL1-mw-064

LL1-mw-065

LL1-mw-066

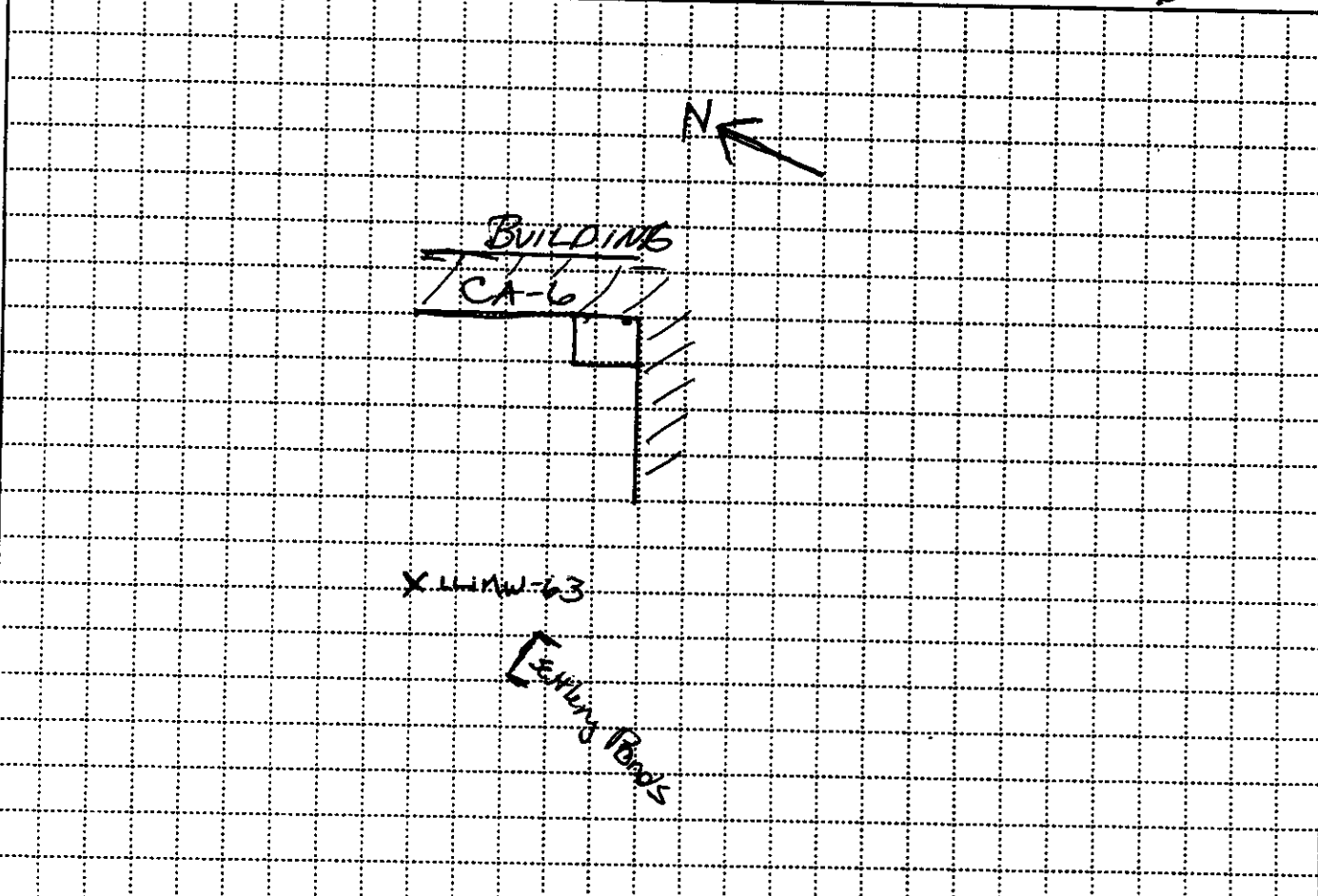
LL1-mw-067

LL2-mw-059

LL2-mw-060

HTRW DRILLING LOG		DISTRICT Nashville		HOLE NUMBER LL1MW-63	
1. COMPANY NAME SAIC		2. DRILL SUBCONTRACTOR Allience Environmental		SHEET 1 SHEETS 4	
3. PROJECT RVAAP		4. LOCATION Load Lim 1 - RVAAP			
5. NAME OF DRILLER Dave Newman		6. MANUFACTURERS DESIGNATION OF DRILL CME-55			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT CME 55 AAV 6 7/8 in ID Hollow stem auger's w/ 2 1/2 log 1 1/2 in diameter split spoon 6 1/4 in diameter tricone bit for air rotary using an Ingersoll Rand 375 air compressor		8. HOLE LOCATION SEE SKETCH BELOW			
12. OVERBURDEN THICKNESS 4. 3.1 ft BGS		9. SURFACE ELEVATION			
13. DEPTH DRILLED INTO ROCK 27.4 ft BGS		10. DATE STARTED 7/27/96		11. DATE COMPLETED 7/30/96	
14. TOTAL DEPTH OF HOLE 27.4 ft BGS		15. DEPTH GROUNDWATER ENCOUNTERED 19 ft			
18. GEOTECHNICAL SAMPLES NA		DISTURBED NA		UNDISTURBED NA	
20. SAMPLES FOR CHEMICAL ANALYSIS NA		VOC NA		OTHER (SPECIFY) NA	
22. DISPOSITION OF HOLE Monitoring well		BACKFILLED NO		MONITORING WELL LL1MW-63	
		METALS NA		OTHER (SPECIFY) NA	
		OTHER (SPECIFY) NA		OTHER (SPECIFY) NA	
		OTHER (SPECIFY) NO		21. TOTAL CORE RECOVERY 70%	
		23. SIGNATURE OF INSPECTOR <i>[Signature]</i>			

LOCATION SKETCH/COMMENTS SCALE: 1" = 100'



PROJECT RVAAP 00 # 0022	HOLE NO. LL1MW-63
-----------------------------------	-----------------------------

HTRW DRILLING LOG

HOLE NUMBER **LLIMW-63**
SHEET **2 of 4**

PROJECT **RVAAP DO# 022** INSPECTOR **S.L. Abston**

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	TEST SAMPLE OR CORE BOX NO (E)	ANALYTICAL SAMPLE NO (F)	REMARKS (G)
	0.3	CL, sandy silty clay, med plastic, soft, dry, 2.5YR 4/1 dark grayish brown	QUM	3	3	Recovery @ 1633
	0.5	CL, sandy silty clay, med plastic, soft, dry, 2.5YR 4/1 dark grayish brown	QUM	3	3	1.0 ft / 2.0 ft
		SW, sand w/ rock frags + gravel, loose, dry, 7.5YR 3/1 very dark gray. Rocks consist of sandstone and slag frags.	Q.Ø	14	14	
			Q.Ø	13	13	
			Q.Ø	7	7	
		CL, silty (30%) clay med. plastic, very stiff 10YR 6/1, gray mottled with 10YR 6/4 dark yellowish brown, dry weathered fine to med grain sandstone, SW 7.5YR 6/2 pinkish gray to 10YR 6/4 light yellowish brown	Q.Ø ppm	5	5	Split Spoon Refusal at 3.1 ft BGS
			Q.Ø ppm	11	11	Recovery @ 17.5 ft
				5 1/2	5 1/2	1.1 ft / 1.1 ft
						Augering w/ center stem, no split spoon
				NA	NA	Augering through weathered sandstone
						Auger refusal at 4.5 ft BGS. Adding 6/4 in tricone bit to air rotary sandstone
		Fine grain, well graded sand SW, dry, softer than above				
		Fine grain sand dry, 10YR 6/4 light yellowish brown mottled w/ 10YR 6/4 brownish yellow, Not uniform sizes - may be weathered or fractured	Q.Ø ppm			Add another rod

PROJECT **RVAAP**

HOLE NO. **LLIMW-63**

HTRW DRILLING LOG

PROJECT		INSPECTOR				HOLE NUMBER
RVAAP		S. Labsten.				LLIMW-63
ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO (E)	ANALYTICAL SAMPLE NO (F)	REMARKS (G)
			D.P pm	NA	NA	
			D.P pm			Add another rod
	15	SW, fine grain, sand slightly damp, 10YR/5/6 yellowish brown with some larger rock fragments Prob weathered fractured zone				Ratty drilling
	14	Returned to a SP, fine grain sand, dry 10YR 6/4 light yellowish brown	D.P pm			
	7.2	SW, fine grain sand, slightly damp, 10YR 6/5 brown yellow with weathering, angular sandstone frag.				Adding another rod Resist layer
	17.9	SP, fine grain sand, 10YR 6/4 light yellowish brown				Less resistant drilling
				↓	↓	Water stabilizes at 19 ft BGS

PROJECT RVAAP

HOLE NO. LLIMW-63

HTRW DRILLING LOG

HOLE NUMBER LL1MW-63

SHEET 4 of 4

PROJECT RVAAD DO # 0022

INSPECTOR S. L. Adams

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO (E)	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
		same as above	0.0 ppm		NA	Adding rod at 22 ft BGS. * pulling up to let borcher set open to check for water (W41)
	22	Fine to med. grained sandstone, moist, 100R 7/4 very pale brown w/ increasing fragments of 2 7/1 light brown grey sand - weathered	0.0 ppm			At 0639 7/29/16 3:17 ft of water in borcher. Drilling on additional 5 ft Ratty drilling
	23.5	same as above w/ less larger fragment				
	26	Increase in larger fragments	0.0 ppm			Ratty drilling
	27.4					Stop drilling @ 27.4 ft BGS to set well Field Reading with Mini Roe # 000617 and MX 251 LEL/O2 meter #2336 (Hazen)

PROJECT RVAAD

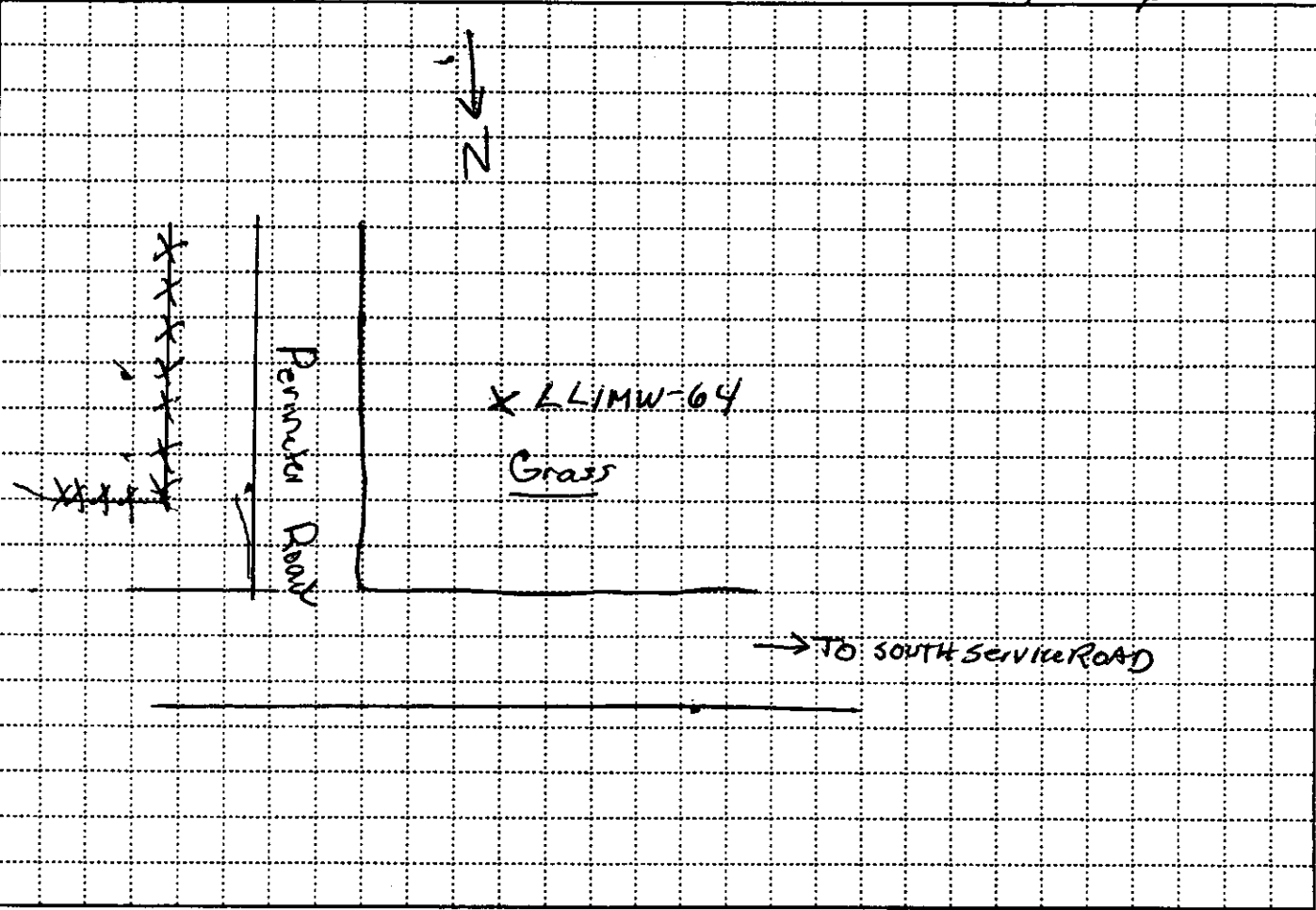
HOLE NO. LL1MW-63

HTRW DRILLING LOG		DISTRICT NASHVILLE		HOLE NUMBER LLIMW-64	
1. COMPANY NAME SAIC		2. DRILL SUBCONTRACTOR Alliance Environmental		SHEET SHEETS 1 OF 3	
3. PROJECT 51234 RAA RVAAP			4. LOCATION Load Line 1 Ravenna Army Arm. Plant		
5. NAME OF DRILLER James Bennett			6. MANUFACTURERS DESIGNATION OF DRILL CME-55		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT CME 55, 6 5/8" ID Hollow Stem Augers w/ 2 ft. 2 in diameter split spoons		8. HOLE LOCATION SEE SKETCH BELOW			
12. OVERBURDEN THICKNESS NA			15. DEPTH GROUNDWATER ENCOUNTERED 6.3 ft BGS		
13. DEPTH DRILLED INTO ROCK NA			16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED 3.03 BTDC 7/29/96 @ 1325		
14. TOTAL DEPTH OF HOLE 18 ft			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) 3.02 BTDC 7/30/96 @ 1321		
18. GEOTECHNICAL SAMPLES NA		DISTURBED NA	UNDISTURBED NA	19. TOTAL NUMBER OF CORE BOXES NA	
20. SAMPLES FOR CHEMICAL ANALYSIS NA		VOC NA	METALS NA	OTHER (SPECIFY) NA	OTHER (SPECIFY) NA
22. DISPOSITION OF HOLE M.W. Installed		BACKFILLED NA	MONITORING WELL 7/23/96	OTHER (SPECIFY) NA	21. TOTAL CORE RECOVERY % 79
				23. SIGNATURE OF INSPECTOR <i>[Signature]</i>	

LOCATION SKETCH/COMMENTS

SCALE:

1" = 20'



PROJECT RVAAP DO#00ZZ	HOLE NO. LLIMW-64
---------------------------------	-----------------------------

HTRW DRILLING LOG

HOLE NUMBER
LL1MW-064
SHEET
2 of 3

PROJECT
KVAAP

INSPECTOR
SA 712396 SLA bsten

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D) <i>DVA</i>	GEOCHEMICAL SAMPLE NO. OR CORE BOX NO. (E)	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
		SC, Silty sand, loose, topsoil 10YR 4/2 dark grayish brown, dry	ϕ . ϕ ppm	Blow Counts		Rec: 1.5 ft / 2.0 ft
		SM, Gravelly sand, med grain size medium dense, dry 2.5Y 7/4 pale yellow mottled with 10YR 7/4 very pale brown		3-13-11-7	NA	NO SAMPLES COLLECTED FROM BOREHOLE
		CL, sandy clay, medium plastic, soft, 10YR 4/1 dark gray mottled w/ 10YR 4/3 brown				Rec = 1.6 ft / 2.0 ft
		Clay-CL, high plastic, dry soft, 10YR 5/1 grey mottled with 10YR 4/3	ϕ . ϕ ppm	3-5-9-12 4-4-1-18	NA	
		CL, sandy clay, low plastic soft, damp, 10YR 5/2 grayish brown mottled with 10YR 5/4 yellowish brown with subrounded pebbles	ϕ . ϕ ppm	5-6-6-8	NA	Rec 1.3 ft / 2.0 ft WATER at \approx 6.3 ft BGS (0.7 ft of last recovery probably out of bottom of spoon)
		SM Gravelly sand with silt, coarse grain, loose, wet 10YR 5/2 grayish brown				
		CL, clay, high plastic very stiff, dry, 10YR 4/1 dark gray	ϕ . ϕ	4-7-11-18	NA	Rec 1.4 ft / 2.0 ft

PROJECT
KVAAP

HOLE NO.
LL1MW-064

HTRW DRILLING LOG

HOLE NO. **LLMW-064**
SHEET **3 of 3**

PROJECT **RVAAP**

INSPECTOR **S. J. Atkinson** **12/2/14**

ELEV (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR SOLE BOX NO (E)	ANALYTICAL SAMPLE NO (F)	REMARKS (G)
		SP, fine grain sand, loose saturated, 10% R5/1 grey	0.0	Blank	NA	Recovery: 1.8 ft / 2.0 ft
		Grades to a coarse grain sand, saturated	0.0 ppm	1-3-6-8	NA	
		CL, Clay, high plastic, very stiff, damp, 10% R5/1 grey	0.0	4-3-49	NA	Recovery: 1.4 ft / 2.0 ft
		SP, fine to med grained sand, loose, saturated 10% R5/1 grey	0.0	5-8-11-14	NA	Recovery 1.8 ft / 2.0 ft
		CL, Clay, high plastic, very stiff, 10% R5/1 grey, loose	0.0 ppm	3-5-7-12	NA	Recovery 2.0 ft / 2.0 ft Having trouble w/ sands coming up in the cages
						Stopped drilling at 18 ft BGS - setting well Field Readings with Mini Rae # 000617 and Mx 251 LGL/O2 meter # 2330 (H&Z)

PROJECT **RVAAP** D.O. # **0022**

HOLE NO. **LLMW-064**

HTRW DRILLING LOG		DISTRICT Nashville		HOLE NUMBER LL1 MW 065	
1. COMPANY NAME SAIG		2. DRILL SUBCONTRACTOR Alliance Environmental		SHEET SHEETS 1 of 3	
3. PROJECT RVAAP			4. LOCATION Load Line 1, RVAAP		
NAME OF DRILLER James Bennett			6. MANUFACTURERS DESIGNATION OF DRILL CME 55		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT CME 55, 6 5/8 in ID Hollow stem augers with 2 ft - 2 in diameter split spoons		8. HOLE LOCATION See Sketch Below			
		9. SURFACE ELEVATION			
		10. DATE STARTED 7/24/96		11. DATE COMPLETED 7/24-7/24/96	
12. OVERBURDEN THICKNESS NA		15. DEPTH GROUNDWATER ENCOUNTERED 14.2			
13. DEPTH DRILLED INTO ROCK NA		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED 10.28 (7/28/96) # BGS			
14. TOTAL DEPTH OF HOLE 20.5		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) 10.33 # BGS 7/30/96 01629			
18. GEOTECHNICAL SAMPLES		DISTURBED NA		UNDISTURBED NA	
19. TOTAL NUMBER OF CORE BOXES NA		20. SAMPLES FOR CHEMICAL ANALYSIS		21. TOTAL CORE RECOVERY % 95%	
NA		VOC NA		OTHER (SPECIFY) NA	
NA		METALS NA		OTHER (SPECIFY) NA	
22. DISPOSITION OF HOLE NA		BACKFILLED NA		MONITORING WELL NA	
NA		OTHER (SPECIFY) NA		23. SIGNATURE OF INSPECTOR Susan J. Clifton	
LOCATION SKETCH/COMMENTS			SCALE:		
PROJECT RVAAP			HOLE NO. LL1 MW-065		

HTRW DRILLING LOG

PROJECT		INSPECTOR			HOLE NUMBER	
RVAAP		S.L. Abston sur 7/24/86			LL1 MW-065	
ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH. SAMPLE OR CORE BOX NO. (E)	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0.3	30. Silty clay fine grained sand, med. dense, 10YR 4/2 pale yellow brown with red + grey (top soil) or 7.5YR 6/8	1.7 ppm	3	NA	Recovery 1.3 ft / 2.0 ft
		CL - silty clay, med. low plastic, firm, 10YR 6/3 pale brown mottled with 7.5YR 6/8 reddish yellow dn		11	NA	Field readings with Mini Raett #251 LEL/O ₂ meter #2330 (Hawco)
		prob. Ø.7 loss		8		Recovery 1.1 ft / 2.0 ft
		some as above but also mottled w/ 10YR 6/3 pale brown, dry	3.8 ppm	14	NA	At 2.0 BGS Borehole reading of 17.8 ppm Breathing zone of 2.7 ppm
				17		
		prob. Ø.9 loss		19		At 4.0 BGS Borehole reading of 0.7 ppm and Breathing zone of 0.8 ppm
		- gradation +		6		
		CL - silty clay, low plastic, hard 10YR 6/3 pale brown mottled with 10YR 6/3 pale brown with small small rock frag. dry	Ø.0 ppm	15	NA	At 2.0 BGS Borehole reading of 17.8. Breathing zone reading of 2.7 ppm Breathing zone Ø.8 ppm at 4.6 ft BGS
		prob Ø.8 loss		21		Recovery 1.2 ft / 2.0 ft
				24		
				9		Recovery 1.4 ft / 2.0 ft
			Ø.0 ppm	17	NA	Inside Auger OVA reading of 33 ppm Breathing zone Ø.8 ppm At 6.0 BGS
				26		
		Becoming mottled w/ 7.5YR 5/4 strong brown-iron		45		
		prob Ø.6 ft loss				
		- gradation -				
		CL, med to high plastic, hard, dry, 10YR 5/3 brown with < 10% small sub angular rock fragments	Ø.0 ppm	8	NA	Recovery 2.0 ft / 2.0 ft
				16		
				26		
				32		

PROJECT RVAAP

HOLE NO. LL1 MW-065

HTRW DRILLING LOG

HOLE NUMBER: **LL1 MW-65**
 SHEET: **Pg 3 of 3**

PROJECT: **RVAAP** INSPECTOR: **Blawie** S.L. DISTRICT: **11**

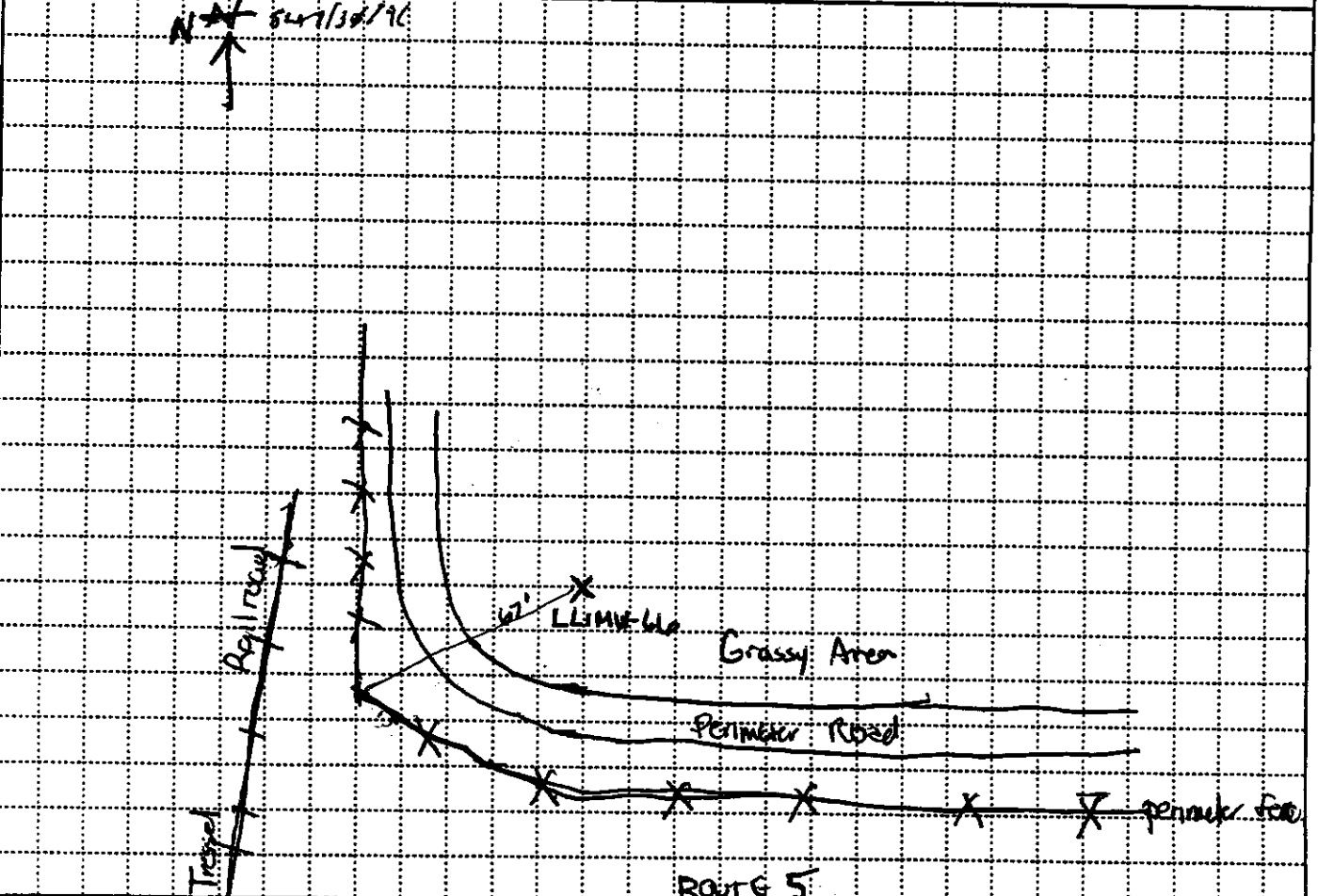
ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO. (E)	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
			ONA	17		Recovery 2.0' / 2.0'
			Φ.Φ ppm	14	NA	
				19		
	11.3	Cl, clay, high plastic, Firm, slightly damp 10YR 5/1 grey		19		
			Φ.Φ ppm	2	NA	Recovery 2.0' / 2.0'
				4		
				4		
				7		
		sf. Silty, fine grain, loose, wet sand, dense, silty yellow brown				
	14.2	sw, med. grain size, loose, saturated sand 10YR 5/3 brown	Φ.Φ ppm	4	NA	Recovery 2.0' ft / 2.0' ft
				2		Water at 14.2 ft BGS
				3		1.5 ft of sand came into the auger
				2		
			Φ.Φ ppm at bar hole	1	NA	> at 16.0 ft BGS
				2		Recovery 0.5' / 2.0'
				3		
				6		2.5 ft of sand in auger when preparing to drive the 18-20 ft section Pulling open auger to flush sand
			Φ.Φ	3		1.9 ft / 2.0' ft Recovery
				3		
				2		
		sw, fine to med grain size loose sand, saturated, 10YR 5/1, grey		3		Boring terminated at 20.0 ft to install manometry well
		pass. test @ 1.1 ft				Tagged at 20.5 ft BGS

PROJECT: **RVAAP**

HOLE NO.: **LL1 MW-65**

HTRW DRILLING LOG		DISTRICT NASHVILLE		HOLE NUMBER LLIMW-66	
1. COMPANY NAME JALC		2. DRILL SUBCONTRACTOR Alliance Environmental		SHEET SHEETS 1 OF 5	
3. PROJECT RVAAP		4. LOCATION Load Line Area Along perimeter fence			
5. NAME OF DRILLER		6. MANUFACTURERS DESIGNATION OF DRILL CME 55			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT CME 16 5/8 in ID Hollow Stem Augers with 2 ft - 2 in diameter split spacers		8. HOLE LOCATION SEE SKETCH BELOW.			
12. OVERBURDEN THICKNESS NA		15. DEPTH GROUNDWATER ENCOUNTERED NA			
13. DEPTH DRILLED INTO ROCK NA		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA			
14. TOTAL DEPTH OF HOLE 32 ft		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA			
18. GEOTECHNICAL SAMPLES NA		DISTURBED NA		UNDISTURBED NA	
19. TOTAL NUMBER OF CORE BOXES NA		20. SAMPLES FOR CHEMICAL ANALYSIS		21. TOTAL CORE RECOVERY %	
22. DISPOSITION OF HOLE ABANDONED		VOC NA		METALS NA	
BACKFILLED GROUT		MONITORING WELL NA		OTHER (SPECIFY) NA	
OTHER (SPECIFY) NA		OTHER (SPECIFY) NA		OTHER (SPECIFY) NA	
23. SIGNATURE OF INSPECTOR <i>Alan J. [Signature]</i>					

LOCATION SKETCH/COMMENTS SCALE: 1" = 50'



PROJECT RVAAP	HOLE NO. LLIMW-66
-------------------------	-----------------------------

HTRW DRILLING LOG

HOLE NUMBER: **LL1MW-66**
 SHEET: **2 of 5**

PROJECT: **RVAAP** INSPECTOR: **S.L. Abston / Matt Oby**

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO (E)	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0-0.2	topsoil w/ roots, etc	0.0 PPM	Blair County 6 3		1.2' of recovery
	0.5	2-20' Silt (ML): yellowish brn 10%R 5% Silt; moist; soft.		3	NA	
	1.0			4		
	1.5			6		
	2.0					
	2.0	28-4.0	0.0 PPM	6	NA	2.0' of Recov. 2-4' spoon collected
		20-40% clay; moist; stiff; low - no plant. Some gray mottling		7		
	3.0			10		
	4.0			14		
	4.0					
	4.0	4-6' ML cont'd to clayey silt (ML): yell brn 10%R 5% Silt w/ 35-50% clay; moist medium; low plasticity.	0.0 PPM	4		4'-6' spoon collected @ 1658 2.0' of Recov.
	5.0			4		
				7		
	6.0			8		
	6.0	6-6.2 as above 6.2 - Silt (AL): Dark gray 10%R (4%) Silt w/ 10% F-U.F sand saturated - soft.		3		6'-8' spoon collected @ 1700 1.2' of Recov.
				3		
				4		
	8			5		
	8	ML as above increase sand content to 20-25% F-U.F saturated		3		8-10' spoon collected @ 1717 1.3' of Recov.
				4		Stopped for day
	9			5		
				7		

PROJECT: **RVAAP**

HOLE NO: **LL1MW-66**

HTRW DRILLING LOG

HOLE NUMBER
LL1MW-66

SHEET
3 of 5

PROJECT
RVAAP

INSPECTOR
S.L. Boston

Blowcounts

ELEV (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO (E)	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)	
		same as above - wet ML, sandy silt (= 27%) soft, low plastic but friable in nature 10yr 5/1, grey } poss ϕ 7 loss	CVA	3		Recovery 1.3ft / 2.0ft 7/26/90 continued sampling. No water in borehole	
			ϕ ppm	4			NA
				6			
				7			
		same as above - wet } poss ϕ 3 loss		3		Recovery @ 1355 1.7ft / 2.0ft	
			ϕ ppm	5			NA
				5			
				6			
		Same as above. Increased water content	ϕ ppm	2		Recovery 1406 2.0ft / 2.0ft	
				3			NA
				3			
				3			
		Same as above } poss ϕ 3ft loss	ϕ ppm	1		Recovery 1547 2.0ft as 7/26/90 1.7ft / 2.0ft	
				2			NA
				3			
				3			
		Same as above	ϕ ppm	2		Recovery 1506 2.0ft / 2.0ft	
				3			NA
				2			
				3			

PROJECT
RVAAP

HOLE NO.
LL1MW-64

HTRW DRILLING LOG

HOLE NUMBER LL1 MW-64

SHEET 454 of 5

DATE 3/16/94

PROJECT RVAAP

INSPECTOR S.L. Andersen

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH. SAMPLE OR CORE BOX NO. (E)	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
		same as above	∅.∅ ppm	1 1 3 3	NA	Recovery @ 1524 1.8 ft / 2.0 ft
	22.2 22.4	pass ∅, 2 ft loss super saturated silt zone	∅.∅ ppm	1 1 2 3	NA	Recovery @ 1607 2.0 ft / 2.0 ft
		same as above	∅.∅ ppm	2 4 4 6	NA	1623 Recovery 2.0 ft / 2.0 ft
		same as above	∅.∅ ppm	1 4 4 4	NA	1700 Recovery 2.0 ft / 2.0 ft
		same as above	∅.∅ ppm	1 3 4 4	NA	1735 Recovery 2.0 ft / 2.0 ft
	29.4	CL, silty clay, high plasticity, grey, damp, dense	∅.∅ ppm	4		

PROJECT RVAAP

HOLE NO. LL1 MW-64

HTRW DRILLING LOG

HOLE NUMBER LLIMW-64

SHEET 5 of 5

PROJECT RVAAP

INSPECTOR S. Labston

ELEV (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO (E)	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
		Same as above	D.φ ppm	1	NA	1815 Recovery 2.0 ft / 1.0 ft
34.3	34.5	CLAY LENS (Same as last log)		2		
				5		Stopped drilling
						Field readings with Mini Rae # 000617 and MX 251 LEL/O2 meter #2330 (Harris) Due to groundwater being in the rock floor silt, DEPA, + USACE + SMC decide to grout borehole and not continue. Grout 27 July 96 6-94 lb sacks of Type I portland cement w/ 6% bentonite powder and = 42 gal of water Grout will not come above 7.5 ft BGS. Going to let it set up 7/28/96 - Add 1 bucket of bentonite pellets to borehole + hydrated w/ 5 gal of water (Bentonite to 6.5 ft BGS) Add 3-94 lb sacks of type I portland w/ 6% bentonite powder and 21 gal. of water 7/29/96. Grout at 3.2 ft BGS add 2-94 lbs of type I portland cement w/ 6% bentonite + 12 gal of water
						7/30/96 - Grout to surface

34

32

PROJECT RVAAP

HOLE NO. LLIMW-64

HTRW DRILLING LOG		DISTRICT NASHVILLE		HOLE NUMBER LL1MW67	
1. COMPANY NAME SAIC		2. DRILL SUBCONTRACTOR AEL		SHEET 1 OF 4	
PROJECT RVAAP		4. LOCATION LL1 AREA @ RVAAP RIVERINA, OH.			
NAME OF DRILLER DAVE NEWMAN		6. MANUFACTURERS DESIGNATION OF DRILL MOBILE B-61 HDX			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT MOBILE B61 HDX, 5 7/8" tri core roller bit, 6 3/8" in H.S. Augers.		5. HOLE LOCATION LL1 OUTSIDE OF FENCE.			
INGRESSAL RAINW 375 Air Compressor. 2" steel split spoons, & safety driving hammer.		9. SURFACE ELEVATION			
12. OVERBURDEN THICKNESS 5.7 FT BGS		10. DATE STARTED 12 AUG 96		11. DATE COMPLETED 13 AUG 96	
13. DEPTH DRILLED INTO ROCK 17.7 FT BGS		15. DEPTH GROUNDWATER ENCOUNTERED 18.4 FT BGS			
14. TOTAL DEPTH OF HOLE 23.4 FT BGS		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED			
18. GEOTECHNICAL SAMPLES NA		DISTURBED NA		UNDISTURBED NA	
20. SAMPLES FOR CHEMICAL ANALYSIS NA		19. TOTAL NUMBER OF CORE BOXES NA		21. TOTAL CORE RECOVERY NA	
22. DISPOSITION OF HOLE MW INSTALLED		VOC NA		METALS NA	
		OTHER (SPECIFY) NA		OTHER (SPECIFY) NA	
		MONITORING WELL INSTALLED		OTHER (SPECIFY) NA	
		23. SIGNATURE OF INSPECTOR Matthew B. Vest			
LOCATION SKETCH/COMMENTS				SCALE: NOT TO SCALE	
PROJECT RVAAP				HOLE NO. LL1MW67	

HTRW DRILLING LOG

LL1 MW67
SHEET 2 of 4

RVAAP

INSPECTOR: Matthew B. Vess

DEPTH (FT)	DESCRIPTION OF MATERIAL	HEAVY METALS (PPM)	CHLORIDES (PPM)	ANALYTICAL SAMPLE NO.	REMARKS
0.7	TOP SOIL w/ ROOTS	0.0 ppm	4 50/2	NA	0.7' REC out of 0.7' Borehole (B2) 0.0 ppm Begin B2 @ 0.7 ppm @ 0.7'
2.5	f. - m. grained SANDSTONE, damp clay, 10YR 6/8 brownish yellow, weathered & broken up. NO SAMPLE TAKEN, ONLY DRILL CUTTINGS.	NA	NA	NA	Spoon Refusal @ 0.7' B2 0.0 ppm Borehole @ 0.0 ppm Auger without sampling to 2.5ft BGS. Spoon Refusal @ 2.5'
3.2	Mk, SILT w/ CLAY, low plasticity, loose, damp, dry, 2.5 4 1/4 olive brown, mottled w/ 2.54 5/1 gray, w/ occasional black organic specs.	5.1 ppm not drilled NA	3 6 50/2	NA	0.7' REC out of 0.7' B2 0.0 ppm Borehole @ 0.0 ppm 3.2
4.0	NO SAMPLE TAKEN	NA	NA	NA	Spoon Refusal @ 3.2' Auger, no sampling. 4.0
5.7	wed. f. to med. grained SANDSTONE, interbedded w/ silty clayey SILT, low plasticity, loose, dry, 2.54 1/4 olive brown. Loss of 1.2 FT.	0.0 ppm	30 42 30 50/2	NA	0.5' REC out of 1.7' B2 @ 0.0 ppm Borehole @ 0.0 ppm 5.7
10.0	TOP OF ROCK @ 5.7 FT BGS f. - m. grained SANDSTONE 10YR 7/4 v. pale brown, sl. damp	0.0 ppm	NA	NA	Spoon Refusal @ 5.7' AUGER TO 5.5 FT BGS & BEGIN AIR ROTARY @ 5.5 FT BGS. CHECKING B2 & BOREHOLE w/ Mini Rot MODEL PGM-75 SERIAL # 000 167 & O2 LEL MX 252 SERIAL # 02 06083-160 DRILLER FEELS THAT @ COMPACT ROCK @ 5.7 FT BGS. HAD 150 lbs. TRYING TO DRILL DEEPER. B2 Borehole @ 0.0 ppm.

PROJECT RVAAP

HOLE NO LL1 MW67

HTRW DRILLING LOG

LL MWG7

RVAAP

INSPECTOR: MATHEW B. VEST

SHEET 3 of 4

DEPTH	DESCRIPTION OF MATERIALS	FILL-SURVEYING RESULTS	CHEMISTRY OF FILL (OR OTHER ANALYSES)	ANALYTICAL SAMPLE NO.	REMARKS
10.0	SANDSTONE	0.2 ppm	NA	NA	5Z @ 0.0 ppm
12.0					10.0
	SANDSTONE, f.-m. grained, 10YR 7/4 v. pale brown, damp.	0.9 ppm			BZ @ 0.9 ppm
18.4					BZ @ 0.9 ppm
	SANDSTONE, f.-m. grained, 10YR 7/4 v. pale brown, wet.	0.9 ppm			Hit first water @ 18.4 FT BGS BZ @ 0.9 ppm
20.0					20.0

PROJECT RVAAP

HOLE NO. LL MWG7

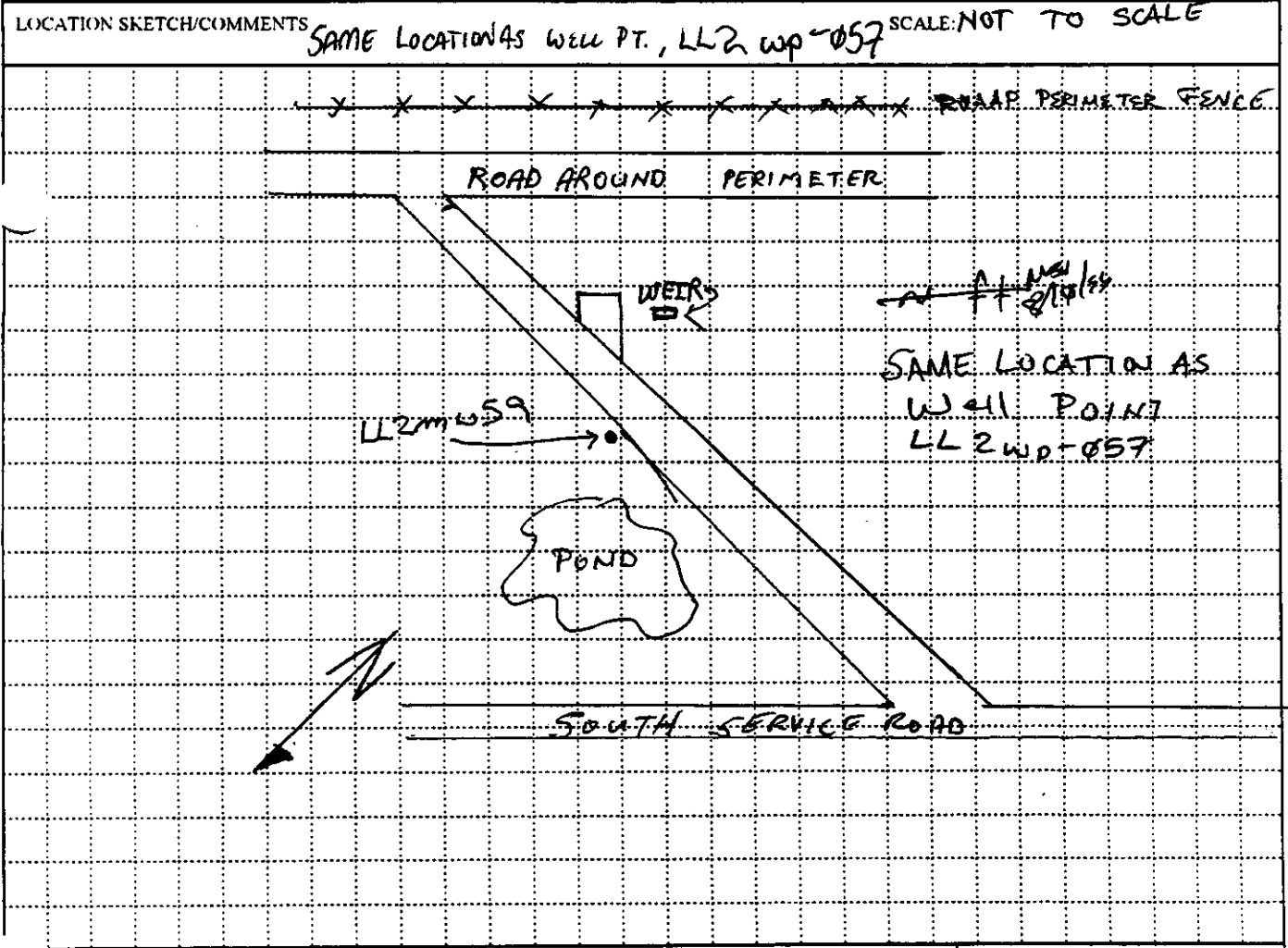
HTRW DRILLING LOG

PROJECT: RVAAP		INSPECTOR: MATHEN B. VEST			HOLE NO.: LLIMW67	
DEPTH (FT)		DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	CONTAMINANT TYPE AND CONC. (PPM)	ANALYTICAL SAMPLE NO.	REMARKS
22.7	22.7	SAME AS ABOVE	0.4 ppm	NA	NA	22.7
23.4	23.4	END OF DRILLING @ 23.4 FT BGS				STOP DRILLING @ 23.4 FT BGS TO SEE IF BOREHOLE MAKES SMOOTH WATER.

PROJECT **RVAAP**

HOLE NO. **LLIMW67**

HTRW DRILLING LOG		DISTRICT NASHVILLE		HOLE NUMBER LL2mw59	
1 COMPANY NAME SAIC		2 DRILL SUBCONTRACTOR ALLIANCE ENVIRONMENTAL, INC		SHEET 1 OF 4	
PROJECT RVAAP		4 LOCATION LL2 Area @ RVAAP, Ravenna, OH.			
3 NAME OF DRILLER ED MITCHELL DAVE NEWMAN		6 MANUFACTURERS DESIGNATION OF DRILL MOBILE B-61 HDX			
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 6 5/8 in HSA, Mobile B-61 HDX, 5 7/8 in Tri-cone roller bit, air compressor; 2" steel split spoons, & safety driving hammer.		8 HOLE LOCATION S. of KELLY'S POND along rd. @ Well Pt. location LL2wp-057			
		9 SURFACE ELEVATION			
		10 DATE STARTED 10 AUG 96		11 DATE COMPLETED 11 AUG 96	
12 OVERBURDEN THICKNESS 7.7 FT BGS		15 DEPTH GROUNDWATER ENCOUNTERED 14.5 FT BGS.			
13 DEPTH DRILLED INTO ROCK 15.2 FT BGS.		16 DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED 1 hr 30 min later w.l. @ 10.2 FT BGS			
14 TOTAL DEPTH OF HOLE 22.9 FT BGS		17 OTHER WATER LEVEL MEASUREMENTS (SPECIFY)			
18 GEOTECHNICAL SAMPLES NA		DISTURBED NA		UNDISTURBED NA	
19 TOTAL NUMBER OF CORE BOXES NA		20 SAMPLES FOR CHEMICAL ANALYSIS		21 TOTAL CORE RECOVERY	
VOC NA		METALS NA		OTHER (SPECIFY) NA	
OTHER (SPECIFY) NA		OTHER (SPECIFY) NA		OTHER (SPECIFY) NA	
22 DISPOSITION OF HOLE M.W. Installed.		BACKFILLED NA		MONITORING WELL INSTALLED	
		OTHER (SPECIFY) NA		23 SIGNATURE OF INSPECTOR Matthew B. Vest	



PROJECT RVAAP	HOLE NO. LL2mw59
------------------	---------------------

HTRW DRILLING LOG

LL2MWS9

SHEET 2 of 4

RVAAP

INSPECTOR Matthew B Vest

DEPTH	DESCRIPTION OF MATERIALS	FIELD RECORDING RESULTS	GEOTECHNICAL TESTS	ANALYTICAL SAMPLE NO.	REMARKS
	TOPSOIL w/ ROOTS				
2.0	ML SANDY SILT, low plasticity, loose, sl. damp, 10YR 5/4 yellowish brown.	φ ppm	4	NA	REC 1.4' out of 2.0' Breathing zone (bz) φ ppm Borehole φ ppm USING MINIME MODEL PGM-75 SERIAL # 000167 & O2 LEL 111X251 Serial # 9206083-160.
	probable loss of 0.6'		6		
			9		
			4		2.0
4.0	SM, SILTY SAND, low plas., loose, moist, 10YR 5/4 yellowish brown, w/ small root fragments & sand grains up to 1/16 in. dia.	φ ppm	2	NA	REC 1.5' out of 2.0' Breathing zone (bz) φ ppm Borehole φ ppm.
	PROBABLE LOSS of 0.5'		3		
			4		
			11		4.0
4.9		φ ppm	4	NA	REC 1.5' out of 2.0' BZ φ ppm Borehole φ ppm
			11		
6.0	ML CLAYEY SILT w/ SAND, low plas., medium density, sl. damp, 10YR 5/2 grayish brown, w/ specs of black organic material throughout.		20		
			23		6.0
6.5	SAME AS ABOVE, BUT NO BLACK ORGANIC SPECS.	φ ppm	6	NA	REC 1.7' out of 1.7' BZ φ ppm BOREHOLE φ ppm
			12		
7.2			30		SPLITSPoon REFUSAL @ 7.7 FT BGS.
7.7	fine to med. grained SANDSTONE, 10YR 6/2 lt. brownish gray, sl. damp, fractured.		42		
8.0	NO RECOVERY / Spoon Refusal @ 7.7 FT BGS.		42 1/2'		8.0
10.0	TOP OF ROCK @ 7.7 FT BGS. fine to med. gr. SANDSTONE, 10YR 6/4 brownish yellow, sl. damp. END AUGERING @ 10.0 FT SWITCHING TO ROLLER BIT BGS.	NA	NA	NA	TRIED ANOTHER SPOON 8-10 FT BGS BUT REFUSAL @ 8 FT BGS. Mini Roc φ ABOUT BACKING AUGER WITHOUT SPOONS TO 10.0 FT BGS. VERY HARD & SLOW DRILLING. DRILLER THINKS WE ARE ON BEDROCK.

PROJECT RVAAP

SOLE NO. LL2MWS9

HTRW DRILLING LOG

LL2 mw 59

RVAAP

INSTRUMENT: MATHIEU 3-VEST

SHEET: 3 of 4

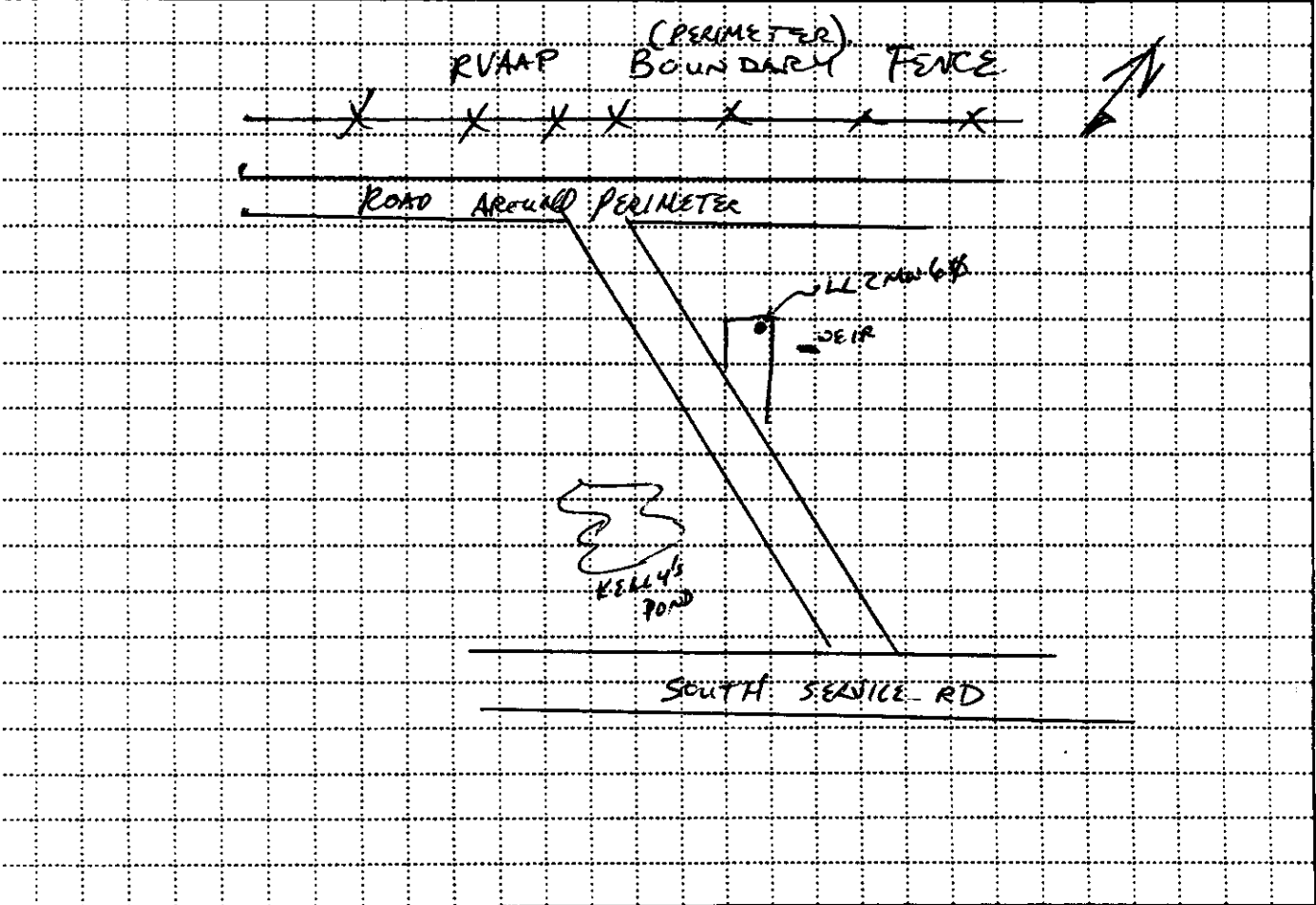
DEPTH (FEET)	DESCRIPTION OF MATERIAL	FILLING REFINES (PPM)	GEOTECHNICAL TESTS (COUNTS)	ANALYTICAL SAMPLE NO.	REMARKS
10.0	fine to med. gr. SANDSTONE, 10VR 1/6 brownish yellow, sl. damp.	0.0 ppm	NA	NA	BEGIN DRILLING W/ TRI-CONE ROLLER BIT & AIR COMPRESSOR (AIR ROTARY) @ 10.0 FT BGS. BZ & HOLE @ 0.0 ppm
14.5	fine to med. gr. SANDSTONE 10VR 1/6 brownish yellow, wet.	0.0 ppm	NA	NA	HIT SOME WATER @ 14.5 FT BGS. Not large amount of water. BZ & HOLE @ 0.0 ppm
19.3					Below 19.3 ft BGS DRILLING IS SLOWER, POSSIBLY HARDER ROCK BZ & HOLE @ 0.0 ppm
20.0					Water not more prevalent @ 19.3 FT BGS. Good water @ this depth. 20.0

PROJECT RVAAP

HOLE NO. LL2.mw 59

HTRW DRILLING LOG		DISTRICT NASHVILLE	HOLE NUMBER LL2mw66
COMPANY NAME SAC		DRILL SUBCONTRACTOR ALLIANCE ENVIRONMENTAL, INC.	SHEET NUMBER 1 OF 3
PROJECT RVAAP		LOCATION LL2 Area @ RVAAP, Ravenna, OH	
NAME OF DRILLER DAVE NEWMAN		MANUFACTURER'S DESIGNATION OF DRILL MOBILE B-6! HDX	
SIZE AND TYPE OF DRILLING AND SAMPLING EQUIPMENT 1 1/2" (5/8" in HSA, 2" split spoons, tri-cone roller bit (578))		HOLE LOCATION Beside of weir, along rd., S. of Kelly's Pond.	
Mobile B-6! HDX, air compressor, 2" steel split spoons, & safety driving hammer.		SURFACE ELEVATION	
DATE STARTED 11 AUG. 96		DATE COMPLETED 12 AUG. 94	
OVERBURDEN THICKNESS 7.9 FT BGS		DEPTH GROUNDWATER ENCOUNTERED 13.2 FT BGS	
DEPTH DRILLED INTO ROCK 11.3 FT BGS		DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED THR. 15 MIN @ 7.5 FT BGS.	
TOTAL DEPTH OF HOLE 19.2 FT BGS		OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
GEOTECHNICAL SAMPLES		TOTAL NUMBER OF CORE BOXES	
DISTURBED: NA		UNDISTURBED: NA	
TOTAL CORE RECOVERY: NA		SIGNATURE OF INSPECTOR Matthew B. Vest	
DISPOSITION OF HOLE MW. INSTALLED		BACKFILLED: NA	
MONITORING WELL: INSTALLED		OTHER (SPECIFY): NA	

LOCATION SKETCH/COMMENTS SCALE: NOT TO SCALE



PROJECT RVAAP	HOLE NO. LL2mw66
-------------------------	----------------------------

HTRW DRILLING LOG

HOLE NO. LL2mw6φ

PROJECT **RVAAP**

INSPECTOR **Matthew B. Vest**

SHEET **2 of 3**

DEPTH (ft.)	DESCRIPTION OF MATERIALS (ft.)	FIELD SCREENING RESULTS (ft.)	GEOTECHNICAL TESTS (ft.)	ANALYTICAL SAMPLE NO. (ft.)	REMARKS (ft.)
	TOPSOIL w/ roots. 0.4	0.4 ppm	4	NA	REC 1.4 out of 2.0 Breathing Zone (BZ) @ 0.4 ppm Borehole @ 0.4 ppm
2.0	ML SILT w/ sand, low plasticity, medium density, sl. damp, 10YR 8/3 brown mottled w/ 6W gray & 5YR 7/6 yellowish red, w/ occasional sand grains up to 0.1 in. dia. & chert frags, conchoidally fractured, up to 0.3 in. roots common & wood fragments occur occasionally. Probable loss of 0.6 ft.	0.0 ppm	12 12 16	NA	REC 1.4 out of 2.0 BZ 0.0 ppm Borehole 0.0 ppm
4.0	Probable loss of 0.6 ft.		9 10 12 15	NA	REC 1.4 out of 2.0 BZ 0.0 ppm Borehole 0.0 ppm
6.0	ML CLAYEY SILT, low plasticity, loose, sl. damp, 10YR 4/1 dark gray mottled w/ 5YR 7/3 dark reddish brown, w/ occasional frags of f-m grained sandstone. Probable loss of 0.7 ft.	0.0 ppm	5 8 10 11	NA	REC 1.3 out of 2.0 BZ 0.0 ppm Borehole 0.0 ppm
6.5	ML SILT w/ SAND, low plas, med. density, damp, 7.5Y 4/6 strong brown w/ black flakes of organic matter. 7.0	0.0 ppm	3 9 28 50/5	NA	REC 1.9 out of 2.0 BZ 0.0 ppm Borehole ppm 0.0
7.0	SM SILTY SAND, low plasticity, med. density, moist, 7.5YR 4/6 strong brown w/ black flakes of organic matter. 2.5Y 5/3 lt. olive brown. 7.7				
7.9	weathered f-m grained SANDSTONE FRAGMENTS 7.9				
7.9 FT	BGS TOP OF COMPETENT ROCK.	NA	NA	NA	BZ 0.0 ppm BOREHOLE 0.0 ppm AUGERED WITHOUT SAMPLING SPOONS TO 10.0 FT BGS IN ORDER TO hook UP AIR ROTARY SYSTEM DIVERTEE. TOP OF ROCK @ 7.9 FT (COMPETENT)
10.0					

PROJECT **RVAAP**

HOLE NO. **LL2mw6φ**

HTRW DRILLING LOG

HOLE NUMBER
LL 2mw 60
SHEET
3 of 3

PROJECT **RVAAP**

INSPECTOR **Matthew B. Vest**

FLY IN	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GRAVIMETRIC ANALYSIS (E)	ANALYTICAL SAMPLE NO. (F)	REMARKS (G)
	0.0	fine to med grained SANDSTONE, 10-14% brownish yellow, sl. damp	0.0 ppm	NA	NA	BZ 0.0 ppm USING AIR ROTARY, DRILLING w/ TRI-CONE ROLLER BIT.
	13.2	fine to med gr. SANDSTONE, 10-14% brownish yellow, wet	0.0 ppm	NA	NA	BZ 0.0 ppm Hit water @ 13.2 ft BGS.
	19.2	STOP AIR ROTARY @ 19.2 FT BGS.				STOP DRILLING @ 19.2 FT BGS.

PROJECT **RVAAP**

HOLE NO **LL 2mw 60**

