7647

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LEXINGTON-BLUEGRASS ARMY DEPOT GROUNDWATER INVESTIGATION REPORT PHASE I - FINAL

Volume III

Lexington-Bluegrass Army Depot
Lexington, Kentucky

Submitted to:

Commander
Department of the Army
United States Army Environmental Center
Aberdeen Proving Ground, Maryland

Submitted by:

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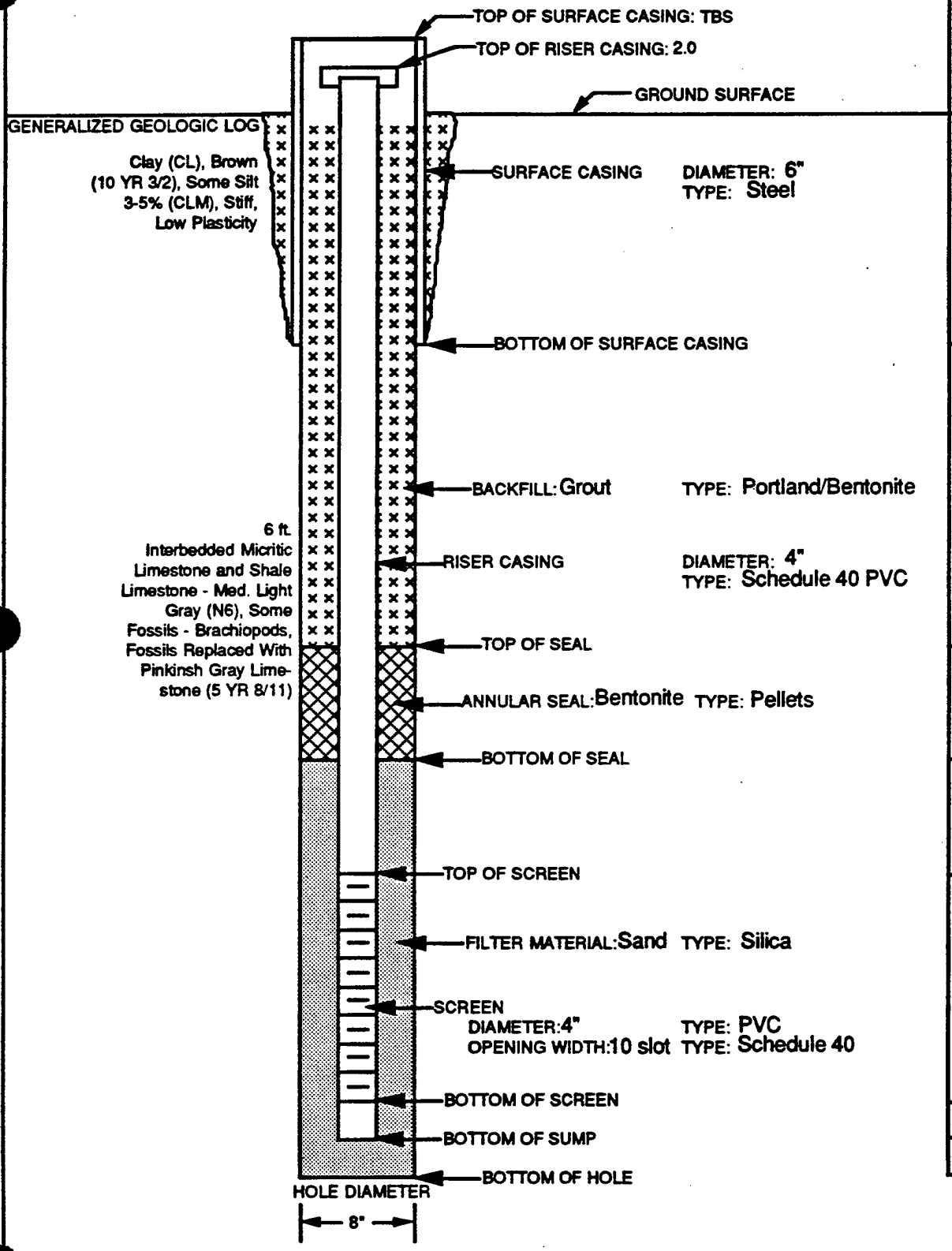
APPENDIX D
WELL CONSTRUCTION DIAGRAMS

GROUND WATER INSTALLATION

PROJECT: LBAD	JOB NO. 007248	WELL NO. MW-02
DRILLING CONTRACTOR: Faulkner	COORDINATES: N – 13838527.928,	E – 24089012.313

BEGUN: 11/21/91	SUPERVISOR: S. Hullett	WELL SITE: Old Landfill	WATER LEVEL: 34.0'	DEPTH/ELEV. 931.0'
FINISHED:	DRILLER: B. Gibson			

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
	0.0	965.0
	2.9	962.1
	25.6	939.4
	30.1	934.9
	32.3	932.7
	42.3	922.7
	42.9	922.1
	42.9	922.1

METHOD DRILLED: HSA/8" Tricone Air

METHOD DEVELOPED:

TIME DEVELOPED:

COMMENTS:

Metcalf & Eddy

GROUND WATER INSTALLATION | PROJECT: LBAD | JOB NO. 007248 | WELL NO. MW-02

DRILLING CONTRACTOR: Faulkner | COORDINATES: To be Surveyed

BEGUN: 11/21/91 | SUPERVISOR: Hulett | WELL SITE: Old Landfill | WATER LEVEL: DEPTH/ELEV.

F 4ED: | DRILLER: Bennet Gibson

REFERENCE POINT & ELEVATION:

DEPTH IN	ELEV. IN

TOP OF SURFACE CASING: TBS

TOP OF RISER CASING: 2.0

GROUND SURFACE

GENERALIZED GEOLOGIC LOG

Clay (CL) Brown (10YR 3/2) Some Silt 5-30% (CLm) Stiff, Low Plasticity

SURFACE CASING: DIA.: 6" TYPE: Steel

BOTTOM OF SURFACE CASING

← 6 ft →

Interbedded Micritic Limestone and Shale. Limestone-Med Light Gray (N6) Some fossils Brachiopods, Fossils replaced with Pinkish Gray Limestone (5YR 8/1)

BACKFILL: Grout TYPE: Portland/Bentonite

RISER CASING: DIA.: 4" TYPE: PVC sch 40

TOP OF SEAL — 25' 7"

ANNULAR SEAL: Bentonite TYPE: Pellets

BOTTOM OF SEAL — 30' 1"

TOP OF SCREEN — 32' 3"

FILTER MATERIAL: Sand TYPE: Silica

SCREEN: DIA.: 4" TYPE: PVC Sch 40

OPENING WIDTH: 10slot

BOTTOM OF SCREEN — 42' 3"

BOTTOM OF SUMP — 42' 9"

BOTTOM OF HOLE — 42' 9"

N OD DRILLED: 8" Tricone Air

METHOD DEVELOPED:

HOLE DIAMETER 8"

COMMENTS:

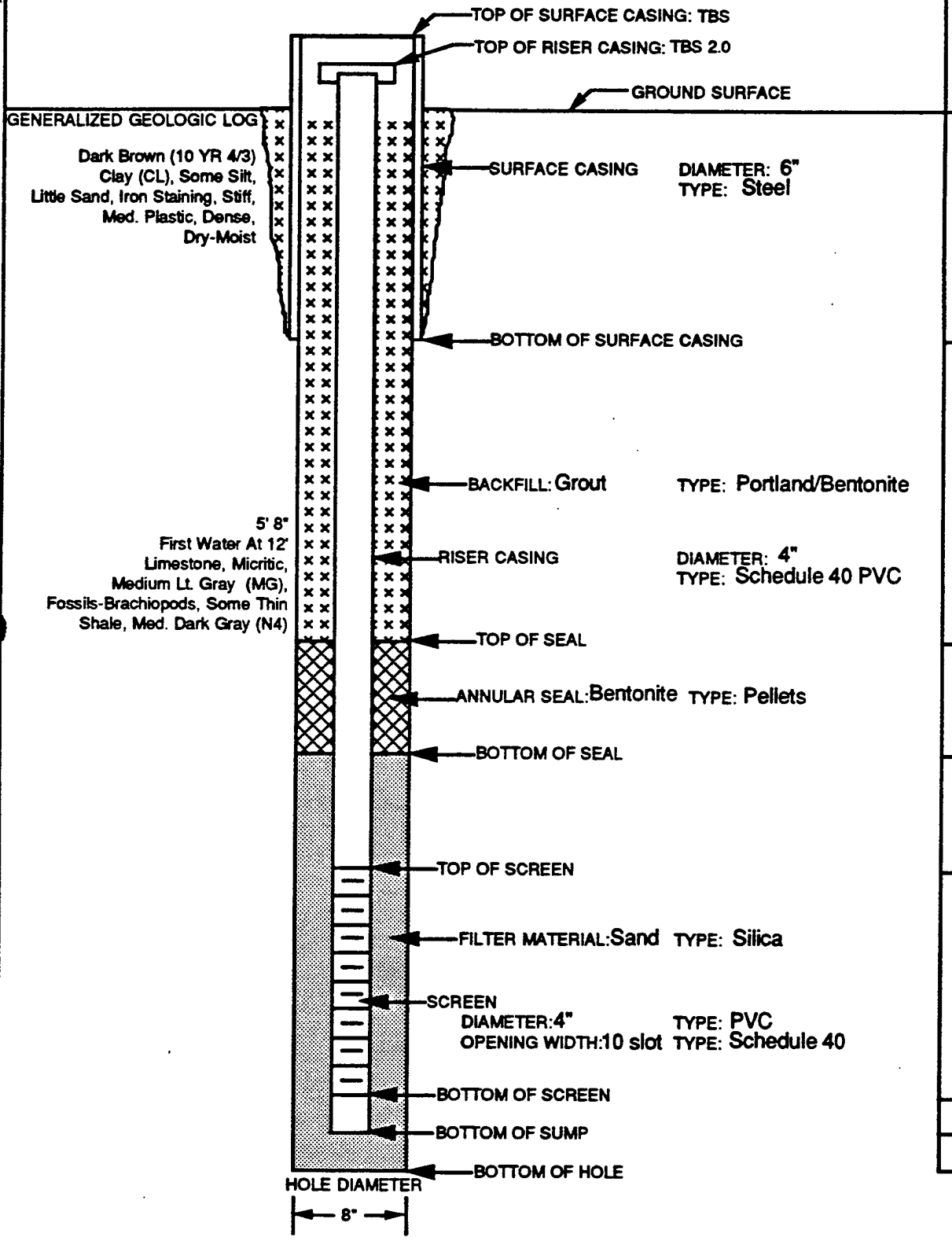
TIME DEVELOPED:

M&E

GROUND WATER INSTALLATION

PROJECT: LBAD	JOB NO. 007248	WELL NO. MW-03
DRILLING CONTRACTOR: Faulkner	COORDINATES: N – 13838354.269, E – 2408494.428	
BEGUN: 11/22/91	SUPERVISOR: S. Hullett	WELL SITE: Old Landfill
FINISHED: 11/22/91	DRILLER: B. Gibson	WATER LEVEL: 12.0' DEPTH/ELEV. 929.3'

REFERENCE POINT & ELEVATION:



DEPTH IN FEET	ELEV. IN FEET
0.0	941.3
2.6	938.7
5.5	935.8
10.5	930.8
12.5	928.8
22.5	918.8
23	918.3
23	918.3

METHOD DRILLED: HSA/8" Tricone Air

METHOD DEVELOPED:

TIME DEVELOPED:

COMMENTS:

Metcalf & Eddy

GROUND WATER INSTALLATION

PROJECT: LBAD JOB NO. 007248 WELL NO. MW-03

DRILLING CONTRACTOR: Faulkner

COORDINATES: To be Surveyed

BEGUN: 11/22/91 SUPERVISOR: Hukt

ED: 11/24/91 DRILLER: B. Gibson

WELL SITE: Old Landfill

WATER LEVEL: DEPTH/ELEV.

ERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING: TBS		
TOP OF RISER CASING: TBS 2.0		
GROUND SURFACE		
SURFACE CASING: DIA.: 6" TYPE: Steel		
BOTTOM OF SURFACE CASING		
BACKFILL: Grout TYPE: Portland/Bentonite		
RISER CASING: DIA.: 4" TYPE: PVC SCH. 40		
TOP OF SEAL	5.5 ft	
ANNULAR SEAL: Bentonite TYPE: Pellets		
BOTTOM OF SEAL	10.5 ft	
TOP OF SCREEN	12.5 ft	
FILTER MATERIAL: Sand TYPE: Silica		
SCREEN: DIA.: 4" TYPE: PVC OPENING WIDTH: 10 slot TYPE: Sch 40		
BOTTOM OF SCREEN	22.5 ft	
BOTTOM OF SUMP	23 ft	
BOTTOM OF HOLE	23 ft	

GENERALIZED GEOLOGIC LOG

DK. Brown (10YR 4/3) CLAY (CL) Some Silt Little sand, FeO_2 staining, Stiff Med. Plastic, Dense, Dry - Moist.

5'8" 1st Water at 12 ft

Limestone, Micritic, Medium Lt. Gray (N6), Fossils - Brachiopods, some thin shale, Med. DK. Gray (N4)

OD DRILLED: 8" Tricone Air

ETHOD DEVELOPED

ME DEVELOPED

HOLE DIAMETER 8"

COMMENTS:

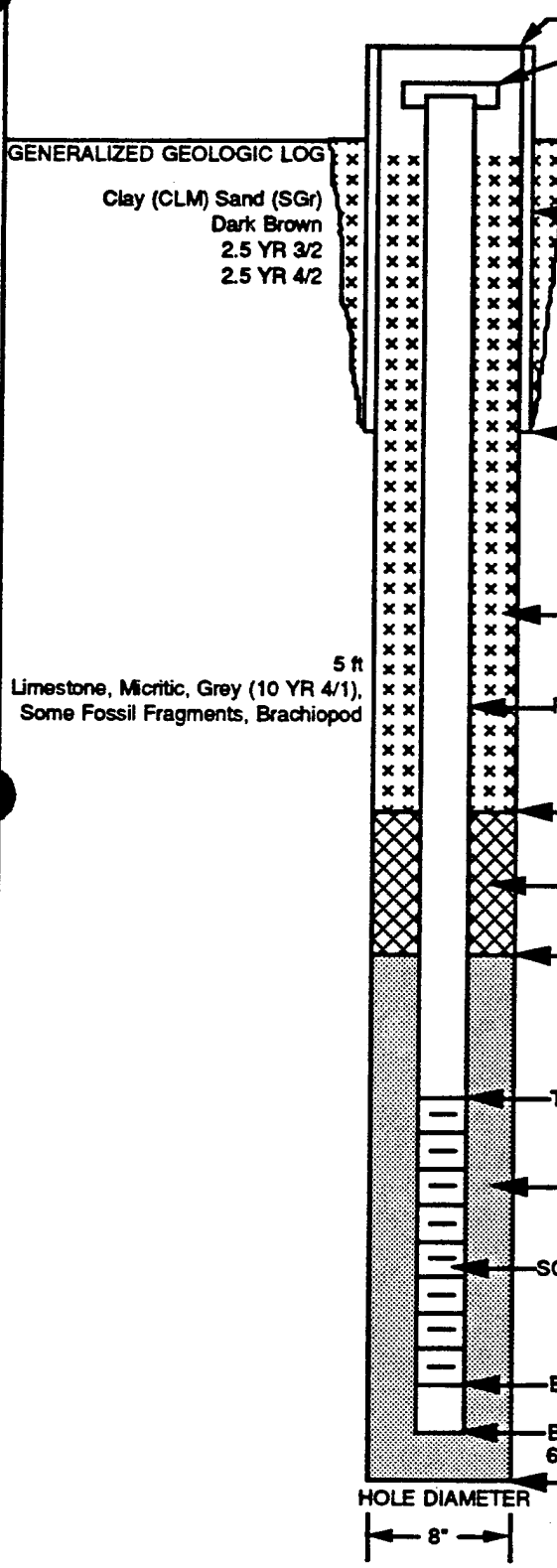
M&E

GROUND WATER INSTALLATION

PROJECT: LBAD	JOB NO. 007248	WELL NO. MW-04
DRILLING CONTRACTOR: LAW Engineering	COORDINATES: N – 13838515.938,	E – 2408382.364

BEGUN	SUPERVISOR	WELL SITE	WATER LEVEL:	DEPTH/ELEV.
11/8/91	S. Hullett/J. Strayton	North Side Old Landfill	17.0'	915.9'
FINISHED: 11/8/91	DRILLER: B. Gibson			

REFERENCE POINT & ELEVATION:



DEPTH IN FEET	ELEV. IN FEET
0.0	932.9
2.8	930.1
11	921.9
16	916.9
18.5	914.4
22.5	910.4
28.5	904.4
29	903.9

METHOD DRILLED: Auger/8" Tricone Air

METHOD DEVELOPED: 2" pump

TIME DEVELOPED: 5 hours

COMMENTS:

Metcalf & Eddy

GROUND WATER INSTALLATION

PROJECT: LBAD AH | JOB NO. 007248 | WELL NO. MW-004

DRILLING CONTRACTOR: HAW Eng | COORDINATES: M&E / To be surveyed

BEGUN: 11/8/91 | SUPERVISOR: Hulett / Strayton | WELL SITE: N. side Old landfill | WATER LEVEL: DEPTH/ELEV. 2 ft. B.G.

ENDED: 11/8/91 | DRILLER: Chris B. Gibson

REFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING: 28"		
TOP OF RISER CASING: 26.5"		
GROUND SURFACE		
SURFACE CASING: DIA.: 6" TYPE: Steel		
BOTTOM OF SURFACE CASING 32"		
BACKFILL: Grout TYPE: Portland / Bentonite		
RISER CASING: DIA.: 4" TYPE: PVC sch: 40		
TOP OF SEAL	11 ft	
ANNULAR SEAL: Pellets / Slurry TYPE: Bent. Slurry 11 ft / Bentonite Pellets 14.5	16 ft	
BOTTOM OF SEAL	17.4	
TOP OF SCREEN	18.5	
FILTER MATERIAL: Sand TYPE: Silica		
SCREEN: DIA.: 4" TYPE: PVC Sch 40		
OPENING WIDTH: 10 slot TYPE: PVC sch. 40		
BOTTOM OF SCREEN	22.5	
6" Sump		
BOTTOM OF SUMP	28.5	
BOTTOM OF HOLE	29 ft	

GENERALIZED GEOLOGIC LOG

Clay (CLM) SAND(SG)
Dark Brown 2.5YR 3/2
2.5 YR 4/2

← 5 ft

Limestone, Micrite
Gray (10YR 4/1)
Some fossil fragments
Brachiopod

METHOD DRILLED: Auger / 8" Tricone - Air

METHOD DEVELOPED: 2" pump

HOLE DIAMETER: 8"

COMMENTS:

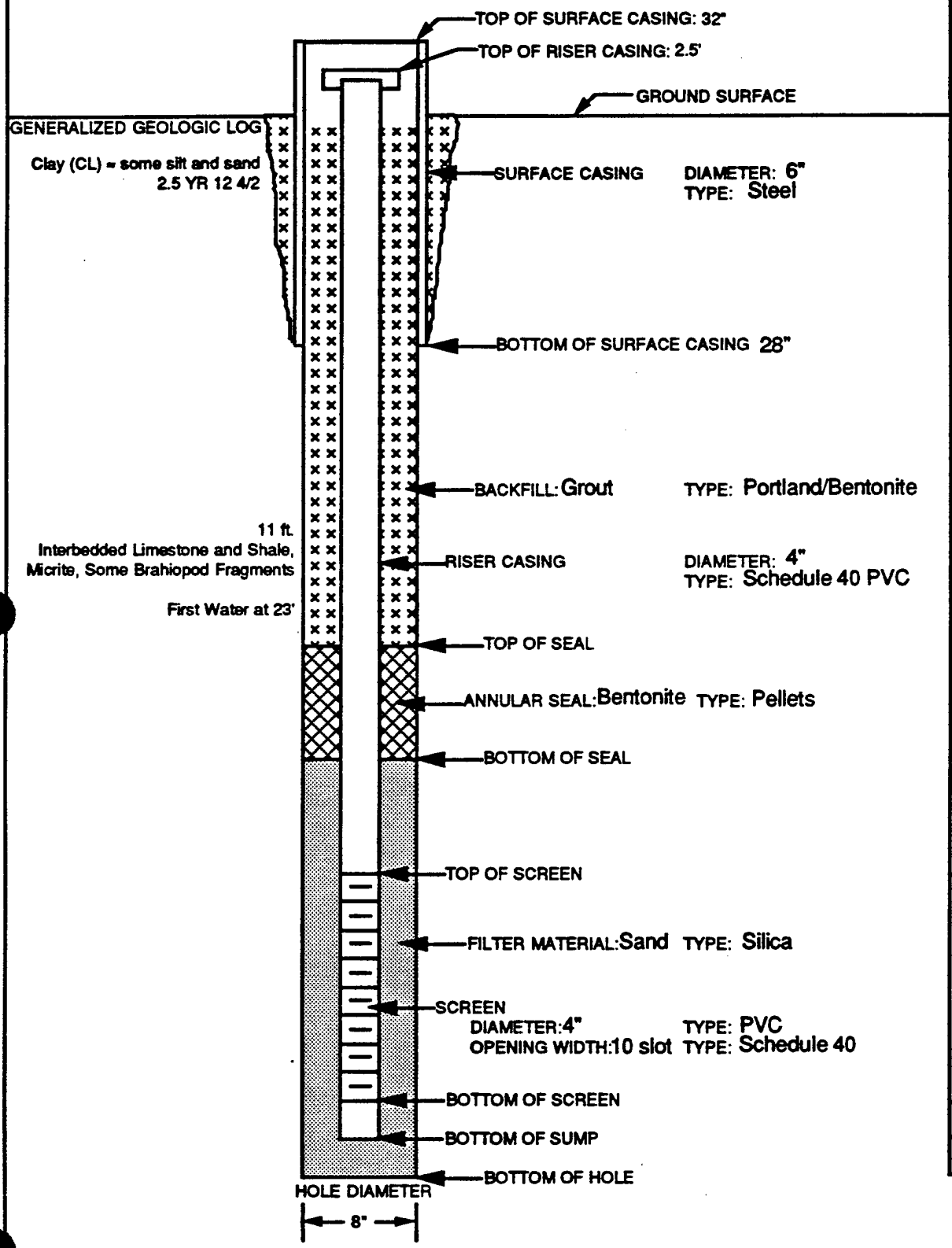
TIME DEVELOPED: 5 hrs.

M&E

GROUND WATER INSTALLATION	PROJECT: LBAD	JOB NO. 007248	WELL NO. S001 MW-05
DRILLING CONTRACTOR: LAW Engineering	COORDINATES: N – 13838745.011,	E – 2408597.466	

BEGUN: 11/7/91	SUPERVISOR: S. Hullett/J. Strayton	WELL SITE: North Side Old Landfill	WATER LEVEL: 25.0'	DEPTH/ELEV. 913.8'
FINISHED: 11/7/91	DRILLER: E. Fleming			

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
TOP OF SURFACE CASING: 32" / TOP OF RISER CASING: 2.5' / GROUND SURFACE	0.0	938.8
BOTTOM OF SURFACE CASING 28"	2.6	936.2
TOP OF SEAL	13.75	925.05
BOTTOM OF SEAL	18.75	920.05
TOP OF SCREEN	20.9	917.9
BOTTOM OF SCREEN	30.9	907.9
BOTTOM OF SUMP	31.4	907.4
BOTTOM OF HOLE	33.0	905.8

METHOD DRILLED: HSA/8" Tricone Air

METHOD DEVELOPED:

TIME DEVELOPED:

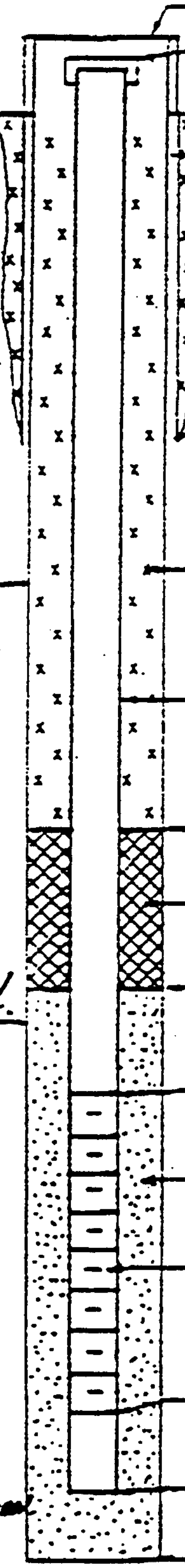
COMMENTS:

Metcalf & Eddy

GROUND WATER INSTALLATION

GROUND WATER INSTALLATION	PROJECT: LBAD	JOB NO. 00 72 48	WELL NO. 5801-MW-05
DRILLING CONTRACTOR: LAW Engin.	COORDINATES: Metcalf & Eddy		
BEGUN: 11/7/91	SUPERVISOR: Hulett / Strayton	WELL SITE: Old Landfill North side	WATER LEVEL: DEPTH/ELEV.
FINISHED: 11/7/91	DRILLER: Eric Fleming		

REFERENCE POINT & ELEVATION:



GENERALIZED GEOLOGIC LOG

Clay (CL) ~ Some silt and Sand, 2.5 YR12 4/2

11 ft

Interbedded limestone and Shale, Micrite, Some Brachiopod fragments.

1st Water at 23 ft.

Item	Value	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:	32"		
TOP OF RISER CASING:	~~30~~ 2.5 ft		
GROUND SURFACE			
SURFACE CASING:	DIA.: 6" TYPE: Steel		
BOTTOM OF SURFACE CASING	28'		
BACKFILL:	Grout TYPE: Portland/Bentonite		
RISER CASING:	DIA.: 4" TYPE: PVC sched. 40		
TOP OF SEAL		13.75	
ANNULAR SEAL:	Bentonite TYPE: Pellets		
BOTTOM OF SEAL		18.75	
TOP OF SCREEN		20.9	
FILTER MATERIAL:	Sand TYPE: Silica		
SCREEN:	DIA.: 4" TYPE: PVC sch 40; OPENING WIDTH: 10 slot TYPE: PVC		
BOTTOM OF SCREEN		30.9	
BOTTOM OF SUMP		31.4	
BOTTOM OF HOLE	33.0 ft	~~31.4~~	

METHOD DRILLED: HSA/8" Tricone /Air

METHOD DEVELOPED:

HOLE DIAMETER 8"

COMMENTS:

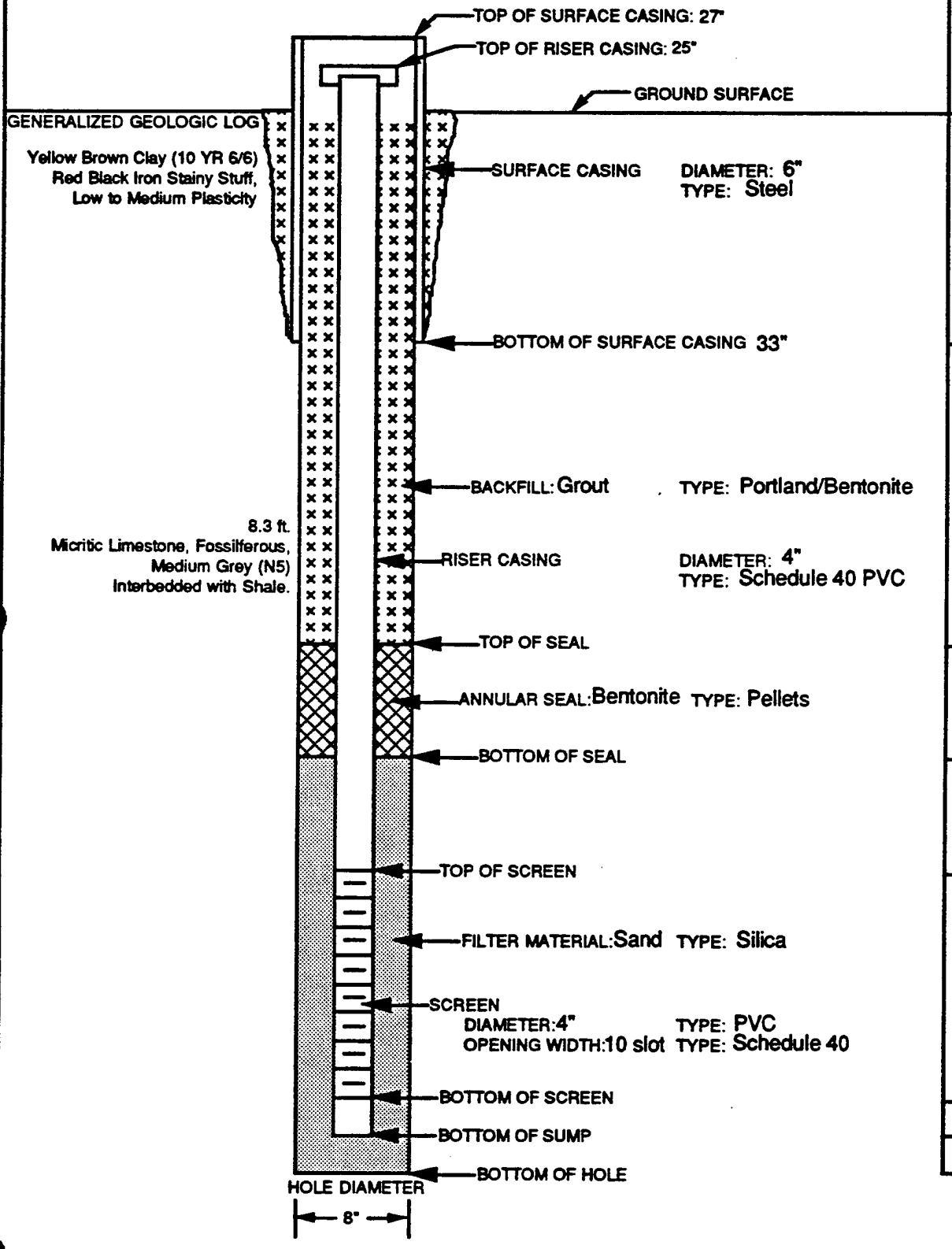
TIME DEVELOPED:

M&E

GROUND WATER INSTALLATION	PROJECT: LBAD	JOB NO. 007248	WELL NO. MW-06
DRILLING CONTRACTOR: Faulkner	COORDINATES: N – 13837674.483,	E – 2408863.114	

BEGUN: 11/20/91	SUPERVISOR: S. Hullett	WELL SITE: Waste Lagoons	WATER LEVEL: 25.0'	DEPTH/ELEV. 932.3'
FINISHED:	DRILLER: B. Gibson			

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
	0.0	957.3
	2.8	954.5
	17.7	939.6
	23.0	934.3
	25.0	932.3
	35	922.3
	35.5	921.8
	35.5	921.8

METHOD DRILLED: HSA/8" Tricone Air

METHOD DEVELOPED:

TIME DEVELOPED:

COMMENTS:

Metcalf & Eddy

GROUND WATER INSTALLATION | PROJECT: LBAD | JOB NO. 007248 | WELL NO. MW-06

DRILLING CONTRACTOR: Faulkner | COORDINATES: To be Surveyed

BEGUN: 11/20/91 | SUPERVISOR: Hulett | WELL SITE: Waste Lagoons | WATER LEVEL: DEPTH/ELEV.

FINISHED: | DRILLER: B. Watson and Gibson

REFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING: 27"		
TOP OF RISER CASING: 25"		
GROUND SURFACE		
SURFACE CASING: DIA.: 6" TYPE: Steel		
BOTTOM OF SURFACE CASING 33"		
BACKFILL: Grout TYPE: Portland/Bentonite		
RISER CASING: DIA.: 4" TYPE: PVC sch 40		
TOP OF SEAL	17.7 ft	
ANNULAR SEAL: Bentonite PE: Pellets		
BOTTOM OF SEAL	23'	
TOP OF SCREEN	25'	
FILTER MATERIAL: Sand TYPE: Silica		
SCREEN: DIA.: 4" TYPE: PVC sch. OPENING WIDTH: .010 slot TYPE: 40		
BOTTOM OF SCREEN	35'	
BOTTOM OF SUMP	35.5'	
BOTTOM OF HOLE	35.5'	

GENERALIZED GEOLOGIC LOG

Yellow Brown Clay (10YR6/6) red black Fe_2O_3 staining stiff low to Med. plasticity

8.3'

Micritic Limestone, Fossiliferous, Med. Gray (N5) interbedded with shale.

METHOD DRILLED: HSA/8" Tricone Air

METHOD DEVELOPED:

HOLE DIAMETER 8"

COMMENTS:

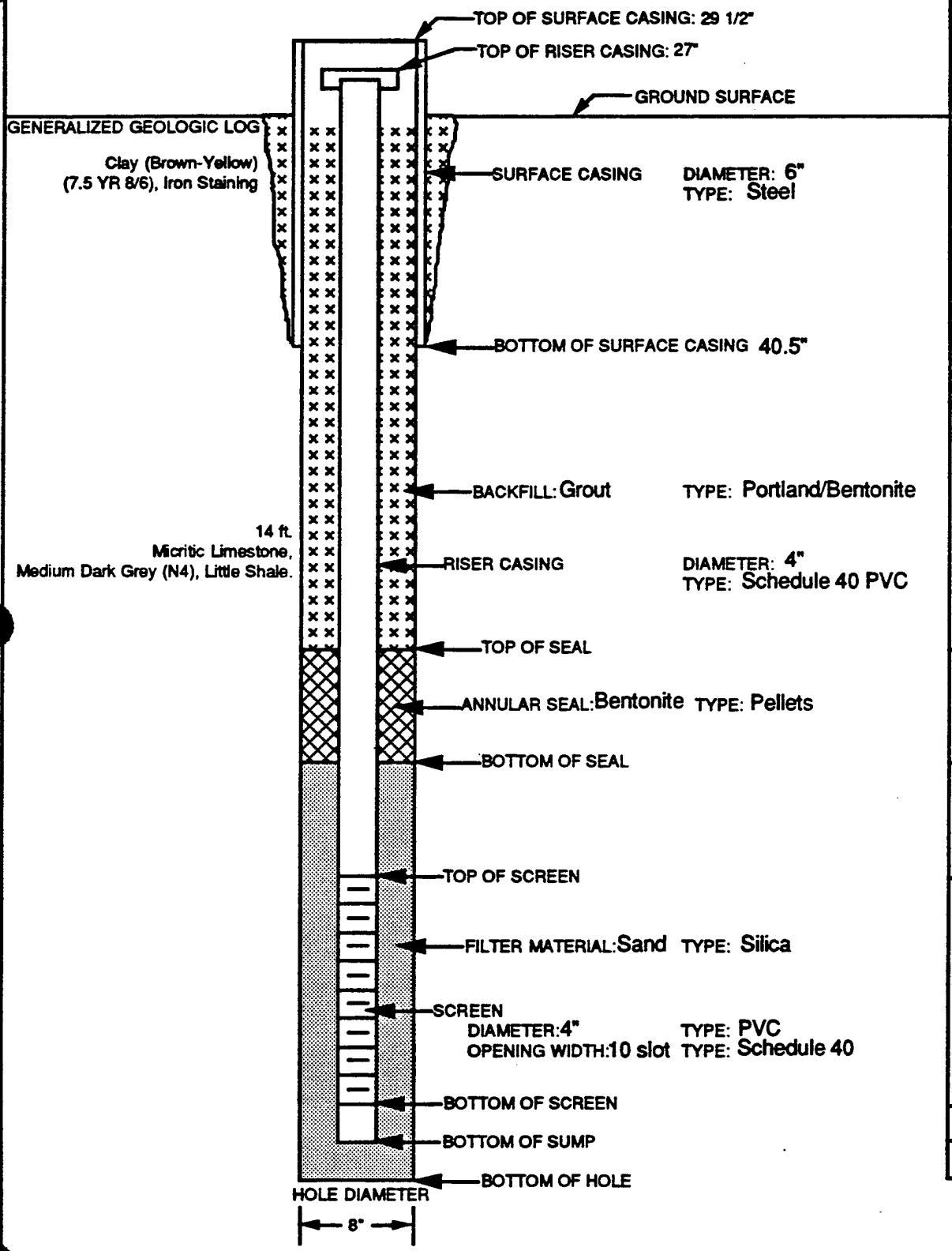
TIME DEVELOPED:

M&E

GROUND WATER INSTALLATION

PROJECT: LBAD	JOB NO. 007248	WELL NO. MW-07
DRILLING CONTRACTOR: Faulkner	COORDINATES: N – 13838548.447, E – 2410862.983	
BEGUN: 11/19/91	SUPERVISOR: S. Hullett	WELL SITE: Next to Decon Pad
FINISHED: 11/19/91	DRILLER: B. Gibson	WATER LEVEL: 69.0' DEPTH/ELEV. 920.3'

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
TOP OF SURFACE CASING: 29 1/2"		
TOP OF RISER CASING: 27"		
GROUND SURFACE	0.0	989.3
SURFACE CASING DIAMETER: 6" TYPE: Steel		
BOTTOM OF SURFACE CASING 40.5"	2.9	986.4
BACKFILL: Grout TYPE: Portland/Bentonite		
RISER CASING DIAMETER: 4" TYPE: Schedule 40 PVC	63.0	926.3
TOP OF SEAL		
ANNULAR SEAL: Bentonite TYPE: Pellets	68.4	920.9
BOTTOM OF SEAL		
TOP OF SCREEN	70.5	918.8
FILTER MATERIAL: Sand TYPE: Silica		
SCREEN DIAMETER: 4" TYPE: PVC OPENING WIDTH: 10 slot TYPE: Schedule 40	80.5	908.8
BOTTOM OF SCREEN	81.0	908.3
BOTTOM OF SUMP	82.5	906.8
BOTTOM OF HOLE		

METHOD DRILLED: HSA/8" Tricone Air

METHOD DEVELOPED:

TIME DEVELOPED:

COMMENTS:

Metcalf & Eddy

GROUND WATER INSTALLATION

PROJECT: LBAD | JOB NO. 007248 | WELL NO. MW-07

DRILLING CONTRACTOR: Faulkner | COORDINATES: To be Surveyed

BEGUN: 11/19/91 | SUPERVISOR: Hulett AH | WELL SITE: MW-07 (EXT) Next to Decon. PAD. NLF | WATER LEVEL: DEPTH/ELEV.

ED: 11/19/91 | DRILLER: R. Hallbert AH Gibson

REFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING: 29½"		
TOP OF RISER CASING: 27" 2.2		
GROUND SURFACE		
SURFACE CASING: DIA.: 6" TYPE: Steel		
BOTTOM OF SURFACE CASING 40.5		
BACKFILL: Grout TYPE: ~~Grout~~ AH Portland Bentonite		
RISER CASING: DIA.: 4" TYPE: PVC sch 40		
TOP OF SEAL	63 ft	
ANNULAR SEAL: Bentonite TYPE: Pellets		
BOTTOM OF SEAL	68.4	
TOP OF SCREEN	70.5'	
FILTER MATERIAL: Sand TYPE: Silica		
SCREEN: DIA.: 4" TYPE: PVC Sch 40 OPENING WIDTH: 10 slot TYPE:		
BOTTOM OF SCREEN	80.5'	
BOTTOM OF SUMP	81.0 AH ~~80.5~~	
BOTTOM OF HOLE	82.5	

GENERALIZED GEOLOGIC LOG

Clay (Brown-Yellow) (7.5YR 5/6), FeO_2 Staining

← 14 ft

Micritic Limestone Medium Dark Gray (N4) Little Chalk.

OD DRILLED: 8" Tricone Air

METHOD DEVELOPED:

TIME DEVELOPED:

HOLE DIAMETER 8"

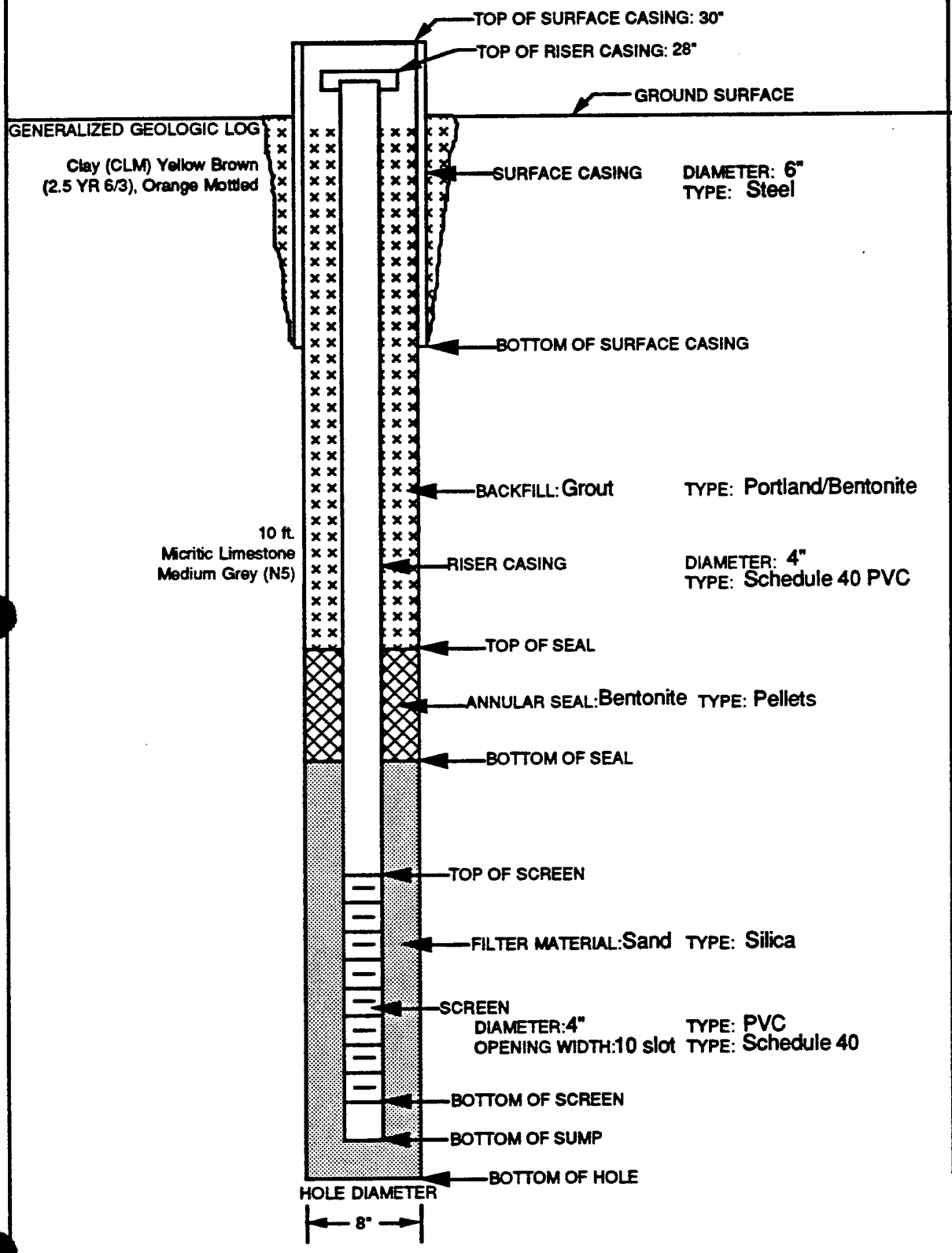
COMMENTS:

M&E

GROUND WATER INSTALLATION

PROJECT: LBAD	JOB NO. 007248	WELL NO. MW-08
DRILLING CONTRACTOR: Faulkner	COORDINATES: N – 13838891.474, E – 2410135.787	
BEGUN: 11/11/91	SUPERVISOR: S. Hullett	WELL SITE: Sanitary Landfill
FINISHED: 11/12/91	DRILLER: B. Gibson	WATER LEVEL: 19.5' DEPTH/ELEV. 934.1'

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
	0.0	953.6
	2.6	951.0
	11.0	942.6
	16.0	937.6
	18.0	935.6
	28.0	925.6
	28.5	925.1
	31.0	921.6

METHOD DRILLED: HSA/8" Tricone Air

METHOD DEVELOPED:

TIME DEVELOPED:

COMMENTS:

M&E Metcalf & Eddy

GROUND WATER INSTALLATION

PROJECT: LBAD | JOB NO. 007248 | WELL NO. MW-08

DRILLING CONTRACTOR: Faulkner | COORDINATES: M&E

BEGUN: 11/11/91 | SUPERVISOR: Hulett | WELL SITE: MW-08 Sanitary L.F. | WATER LEVEL: DEPTH/ELEV.

FINISHED: 11/12/91 | DRILLER: Bennet Gibson

REFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING: 2'		
GROUND SURFACE		
SURFACE CASING: DIA.: 6" TYPE: Steel		
BOTTOM OF SURFACE CASING		
BACKFILL: Grout TYPE: Portland/Bentonite		
RISER CASING: DIA.: 4" TYPE: PVC Sch 40		
TOP OF SEAL	11 ft	
ANNULAR SEAL: Pellets TYPE: Bentonite		
BOTTOM OF SEAL	16 ft	
TOP OF SCREEN	18 ft	
FILTER MATERIAL: Sand TYPE: Silica		
SCREEN: DIA.: 4" TYPE: PVC OPENING WIDTH: 10 slot TYPE: Sch 40		
BOTTOM OF SCREEN	28 ft	
BOTTOM OF SUMP	28.5	
BOTTOM OF HOLE	31 ft	

GENERALIZED GEOLOGIC LOG

CLAY (CLM)
Yellow Brown
(2.5YR 6/3)
Orange Mottled

10 ft

Micritic Limestone
Medium Gray
(N5)

METHOD DRILLED: ASA 8 1/4 Hollow Stem Auger

METHOD DEVELOPED:

HOLE DIAMETER
8"

COMMENTS:

TIME DEVELOPED:

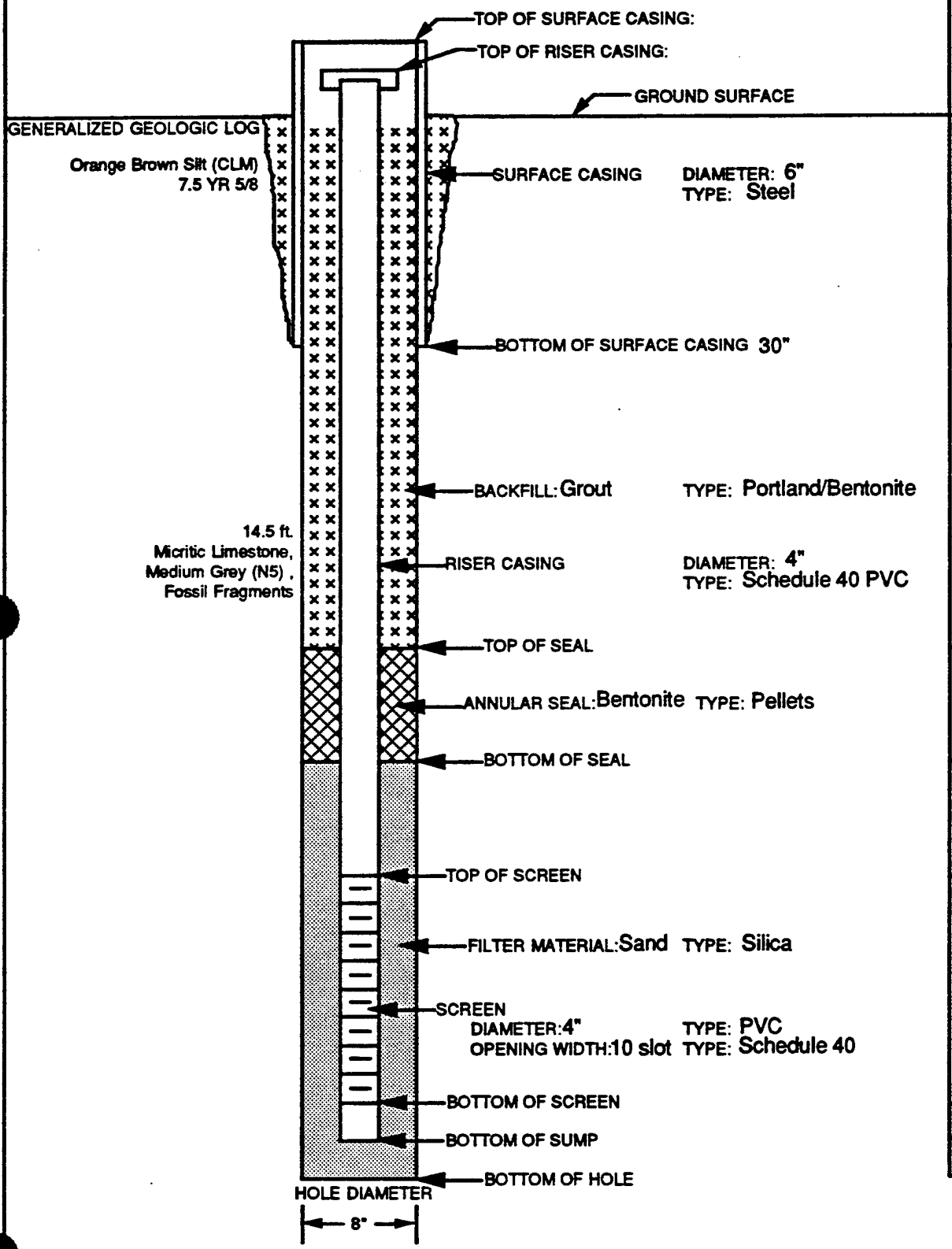
M&E

GROUND WATER INSTALLATION

PROJECT: LBAD	JOB NO. 007248	WELL NO. MW-09
DRILLING CONTRACTOR: Faulkner	COORDINATES: N – 13838669.815,	E – 2410008.522

BEGUN: 11/12/91	SUPERVISOR: S. Hullett	WELL SITE: Sanitary Landfill	WATER LEVEL: 58.0'	DEPTH/ELEV. 917.6'
FINISHED: 11/12/91	DRILLER: B. Gibson			

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
	0.0	975.6
	2.75	972.85
	50.5	925.1
	65.3	919.3
	58.5	917.1
	68.5	907.1
	69.0	906.6
	69.0	906.6

METHOD DRILLED: HSA/8" Tricone Air

METHOD DEVELOPED:

TIME DEVELOPED:

COMMENTS:

Metcalf & Eddy

GROUND WATER INSTALLATION

PROJECT: LBAD JOB NO. 007248 WELL NO. MW-09

DRILLING CONTRACTOR: Faulkner COORDINATES: To be surveyed

BEGUN: 11/12/91 SUPERVISOR: Hulett WELL SITE: Santa Fe landfill WATER LEVEL: DEPTH/ELEV.

ED: 11/12/91 DRILLER: B. Wallace & Gibson

REFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING:		
GROUND SURFACE		
SURFACE CASING: DIA.: 6" TYPE: Steel		
BOTTOM OF SURFACE CASING		
BACKFILL: Grout TYPE: Portland/Bentonite		
RISER CASING: DIA.: 4" TYPE: PVC		
TOP OF SEAL	50.5	
ANNULAR SEAL: Bentonite TYPE: pellets		
BOTTOM OF SEAL	56.3	
TOP OF SCREEN	58.5	
FILTER MATERIAL: Sand TYPE: Silica		
SCREEN: DIA.: 4" TYPE: PVC OPENING WIDTH: 10 slot TYPE:		
BOTTOM OF SCREEN	68.5	
BOTTOM OF SUMP	69ft	
BOTTOM OF HOLE	69ft	

GENERALIZED GEOLOGIC LOG

Orange Brown Silt (CLM) (7.5YR 5/8)

14.5ft

Micritic Limestone Medium Gray (N5) fossil fragments

OD DRILLED: HSA/Air 8" Tricone

METHOD DEVELOPED:

TIME DEVELOPED:

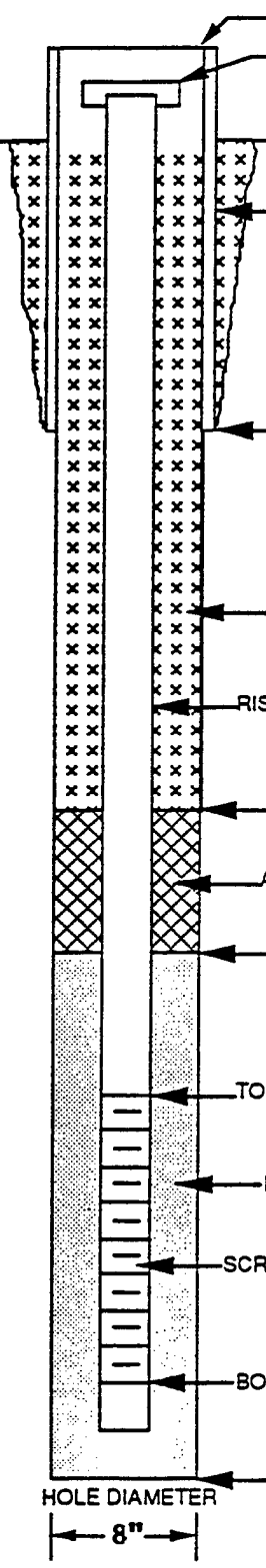
HOLE DIAMETER 8"

COMMENTS:

M&E

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO MW-16
DRILLING CONTRACTOR: Faulkner	COORDINATES: Y-13837938.62 X-2408423.81 (In Feet)		
BEGUN: 11/22/91	SUPERVISOR: S. Hullett	WELL SITE: Between Old Landfill And Waste Lagoons	WATER LEVEL: 12'/930.77' DEPTH/ELEV.
FINISHED: 11/22/91	DRILLER: B. Gibson		

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
GROUND SURFACE	0.0'	942.77'
BOTTOM OF SURFACE CASING	3.0'	939.77'
TOP OF SEAL	5.5'	937.27'
ANNULAR SEAL:	10.2'	932.27'
BOTTOM OF SEAL	12.5'	930.27'
TOP OF SCREEN	22.5'	920.27'
BOTTOM OF SCREEN	23.0'	919.77'

SURFACE CASING — DIAMETER: 6" TYPE: Steel

BACKFILL: Grout — TYPE: Portland/Bentonite

RISER CASING — DIAMETER: 4" TYPE: Schedule 40 PVC

ANNULAR SEAL: — TYPE: Bentonite Pellets

FILTER MATERIAL: Sand — TYPE: Silica

SCREEN — DIAMETER: 4" — OPENING WIDTH: 10 Slot — TYPE: PVC — TYPE: Schedule 40

HOLE DIAMETER: 8"

METHOD DRILLED: HSA/8" Tricone Air

COMMENTS:

METHOD DEVELOPED:

Metcalf & Eddy

GROUND WATER INSTALLATION

PROJECT: LBAD JOB NO. 002248 WELL NO. MW-16

DRILLING CONTRACTOR: Faulkner

COORDINATES: To be surveyed - TBS

BEGUN: 11/22/91 SUPERVISOR: Holeft

ENDED: 11/22/91 DRILLER: Bennet Gibson

WELL SITE: Between Old Landfill and Waste Lagoons

WATER LEVEL: DEPTH/ELEV.

REFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING: TBS		
TOP OF RISER CASING: TBS 2'		
GROUND SURFACE		
SURFACE CASING: DIA.: 6" TYPE: Steel		
BOTTOM OF SURFACE CASING		
BACKFILL: Grout TYPE: Portland/Bentonite		
RISER CASING: DIA.: 4" TYPE: PVC sch 40		
TOP OF SEAL	5.5'	
ANNULAR SEAL: Bentonite TYPE: Pellet	10.2'	
BOTTOM OF SEAL	10.5'	
TOP OF SCREEN	12.5'	
FILTER MATERIAL: Sand TYPE: Silica		
SCREEN: DIA.: 4" TYPE: PVC Sch 40 OPENING WIDTH: 10 slot TYPE:		
BOTTOM OF SCREEN	22.5'	
BOTTOM OF SUMP	23'	
BOTTOM OF HOLE	23'	

GENERALIZED GEOLOGIC LOG

Dark Yellow Brown Clay (10YR3/4) Moist, Limonite Pebbles.

5.2 ft

Med. Gray Micritic Limestone. Fossils, Brachiopods, Some shale interbedded

HOLE DIAMETER 8"

METHOD DRILLED: 8" Tricone/Air

METHOD DEVELOPED:

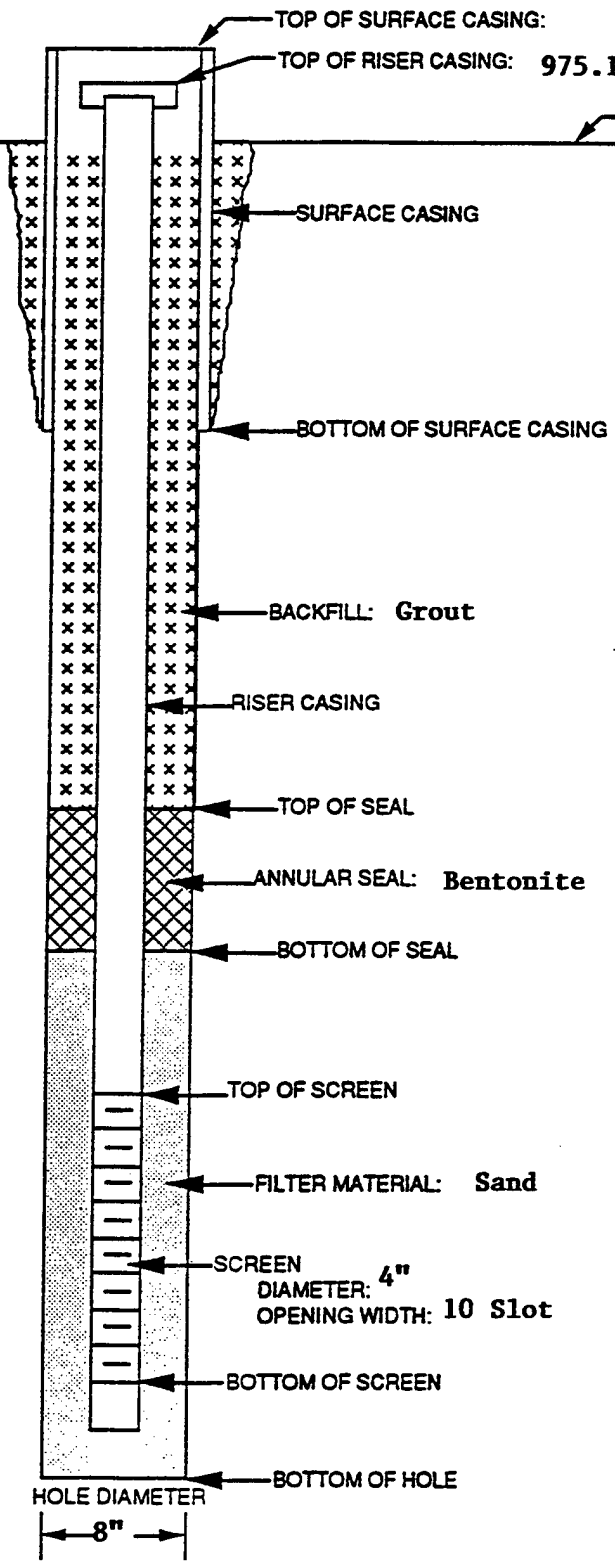
TIME DEVELOPED:

COMMENTS:

M&E

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO. MW-18
DRILLING CONTRACTOR: Faulkner	COORDINATES: Y-13838271.77 X-2410560.58 (In Feet)		
BEGUN: 11/25/91	SUPERVISOR: S. Hullett	WELL SITE: Industrial And Sanitary Landfill	WATER LEVEL: 49.0'/924.1' DEPTH/ELEV.
FINISHED: 11/26/91	DRILLER: B. Gibson		

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
	0.0'	973.1'
	2.7'	970.4'
	51.4'	921.7'
	56.2'	916.9'
	58.3'	914.8'
	68.3'	904.8'
	68.8'	904.2'

METHOD DRILLED: HSA/8" Tricone Air

COMMENTS:

METHOD DEVELOPED:

Metcalf & Eddy

GROUND WATER INSTALLATION

PROJECT: LBAD | JOB NO. 007248 | WELL NO. MW-18

DRILLING CONTRACTOR: Faulkner | COORDINATES: To be Surveyed

BEGUN: 11/25/91 | SUPERVISOR: Hulett

FINISHED: 11/26/91 | DRILLER: Bennet Gibson

WELL SITE: Industrial / Sanitary Landfill

WATER LEVEL: DEPTH/ELEV.

REFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING: TBS aft.		
TOP OF RISER CASING: TBS		
GROUND SURFACE		
SURFACE CASING: DIA.: 6" TYPE: Steel		
BOTTOM OF SURFACE CASING		
BACKFILL: Grout TYPE: Portland/Bentonite		
RISER CASING: DIA.: 4" TYPE: PVC SCH 40		
TOP OF SEAL	51.4 ft	
ANNULAR SEAL: Bentonite TYPE: Pellets		
BOTTOM OF SEAL	56.2'	
TOP OF SCREEN	58.44"	
FILTER MATERIAL: Sand TYPE: Silica		
SCREEN: DIA.: 4" TYPE: PVC Sch 40 OPENING WIDTH: 10 slot TYPE: PVC, Sched 40		
BOTTOM OF SCREEN	68.44"	
BOTTOM OF SUMP	68.10"	
BOTTOM OF HOLE	68.10"	

GENERALIZED GEOLOGIC LOG

CLAY (CL) Lt. Brown 10YR 4/3, Moist, Fe Oz Staining,

~ 7 ft Gray 2.5YR 6/0 Clay, Thin Laminated

~ 8 ft Micritic fossiliferous Limestone, Med Dark Gray (N4) stone interbedded shale. Brachiopods & some Pyrite X-tals throughout few.

METHOD DRILLED: 8" Trecone Air

METHOD DEVELOPED:

TIME DEVELOPED:

HOLE DIAMETER 8"

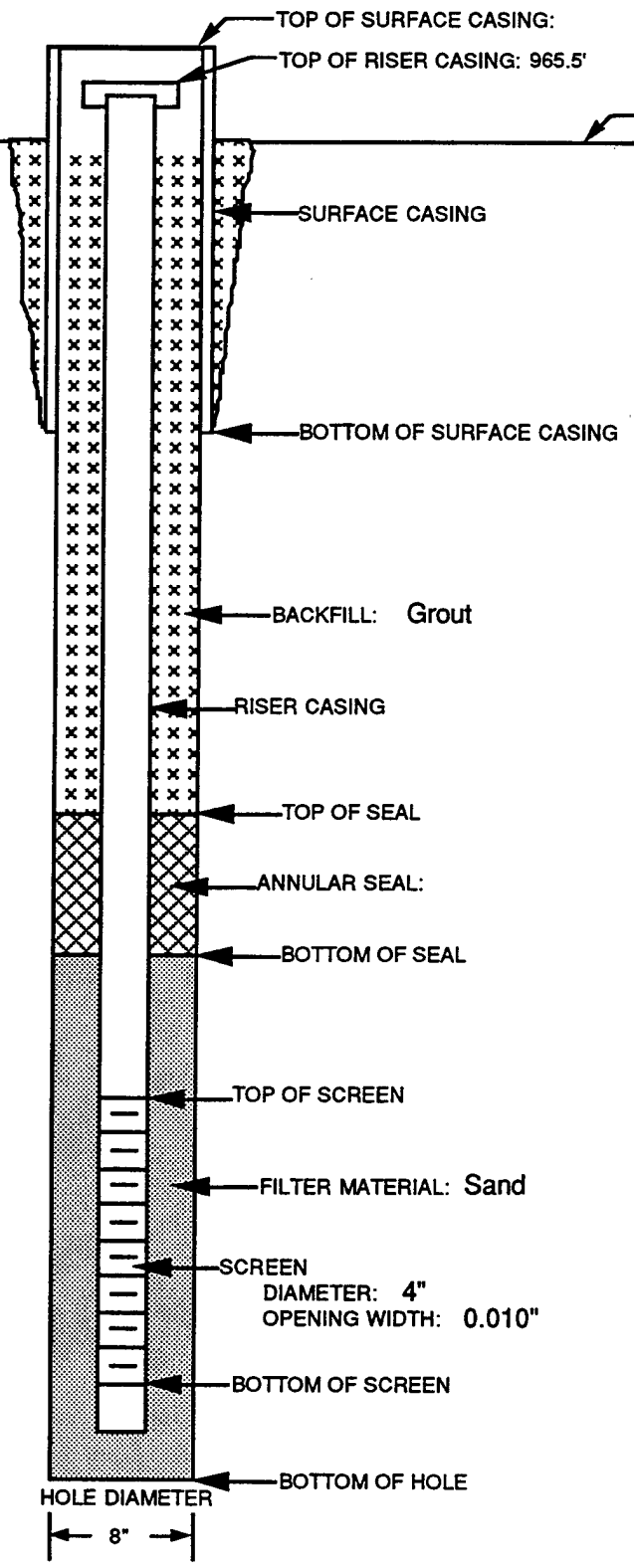
COMMENTS:

M&E

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO. MW-2D
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13838546.60, X-2409001.05 (in feet)		

BEGUN: 7/21/92	SUPERVISOR: Wurm/Jordan	WELL SITE: Old landfill Deep Well to MW-2.	WATER LEVEL: 72.0'	DEPTH/ELEV. 81.0'
FINISHED: 7/21/92	DRILLER: Bennett/Danny/Charlie			

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
	0.0	963.0
DIAMETER: 8" TYPE: Steel	2.5	960.5
TYPE: 95% Portland Cement 5% Volclay		
DIAMETER: 4" TYPE: Schedule 40 PVC	50.0	913.0
TYPE: 3/8" Bentonite Pellets	55.0	908.0
	60.0	903.0
TYPE: #2		
TYPE: PVC TYPE: Slotted	80.5	883.0
	80.5	882.5

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

COMMENTS: Hit Bedrock at 7.5 feet.
Hit water at 72 feet.

Metcalf & Eddy

1-021-12

GROUND WATER INSTALLATION

PROJECT: LBAD | JOB NO. 7848-3 | WELL NO. MW-20

DRILLING CONTRACTOR: Faulkner Drilling Co.

COORDINATES: Y-138385.46.60 X-240900.105 (In Feet)

GUN: 1542 / 1936 | SUPERVISOR: Wurm / Jordan | DRILLER: Bennett, Danny, Charlie

WELL SITE:

WATER LEVEL: 72' | DEPTH/ELEV: 80' -

EFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING: 965.49'		
GROUND SURFACE		
GENERALIZED GEOLOGIC LOG		
SURFACE CASING: DIA.: TYPE:		
Hit bedrock at 7.5'		
BOTTOM OF SURFACE CASING		
Hit water at 72'.		
BACKFILL: Grout TYPE: 95% Portland cement 5% volclay	50.0'	
RISER CASING: DIA.: 4" TYPE: PVC		
TOP OF SEAL		
ANNULAR SEAL: 3/8" TYPE: Bentonite Pellets	5.0'	
BOTTOM OF SEAL	55.0'	
	5.0'	
TOP OF SCREEN	60.0'	
FILTER MATERIAL: Sand TYPE:	20.0'	
SCREEN: DIA.: 4" TYPE: PVC		
OPENING WIDTH: .010 in TYPE: slotted sch. 40		
BOTTOM OF SCREEN	80.0'	
	0.5'	
BOTTOM OF SUMP	80.5'	
BOTTOM OF HOLE	80.5'	

HOLE DIAMETER: 9 3/4"

METHOD DRILLED: air rotary

METHOD DEVELOPED:

TIME DEVELOPED:

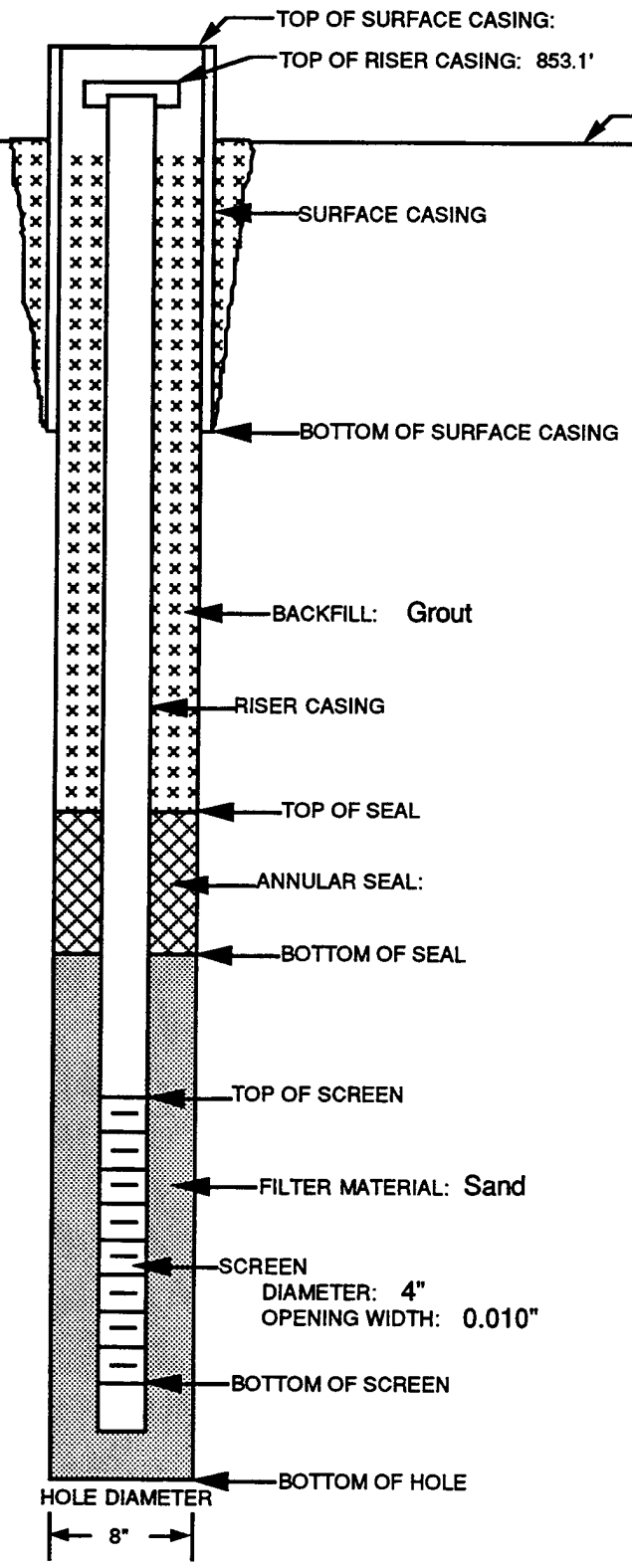
COMMENTS:

M&E

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO. MW-6D
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13837679.51, X-2408841.41 (in feet)		

BEGUN: 7/29/92	SUPERVISOR: T. Smith	WELL SITE:	WATER LEVEL:	DEPTH/ELEV.
FINISHED: 7/29/92	DRILLER: D. Logan	Waste Lagoon deep well to MW-6.	40.0'	53.0'

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
	0.0	850.6
DIAMETER: 8" TYPE: Steel	2.5	848.1
TYPE: 95% Portland Cement 5% Volclay DIAMETER: 4" TYPE: Schedule 40 PVC	42.0	808.6
TYPE: 3/8" Bentonite Pellets	47.0	803.6
	52.0	798.6
TYPE: #2 TYPE: PVC TYPE: Machine Cut	72.0	778.6
	72.5	778.1

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

COMMENTS:

Metcalf & Eddy

GROUND WATER INSTALLATION

PROJECT: LBAD JOB NO. 7248.3 WELL NO. MW-6D

ILLING CONTRACTOR: Faulkner

COORDINATES: Y-1383767 9.51 X-2408841.41 (In Feet)

UN: 7/29/92 SUPERVISOR: T. SMITH

7/29/92 DRILLER: D. Logan

WELL SITE: Waste Lagoon Deep Well TO MW-6

WATER LEVEL: DEPTH/ELEV. 40'453'

FERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING:		
GROUND SURFACE		
GENERALIZED GEOLOGIC LOG		
SURFACE CASING: DIA.: 8" TYPE: Steel		
BOTTOM OF SURFACE CASING		
BACKFILL: TYPE:		
RISER CASING: DIA.: 4" TYPE: Schedule 40 PVC		
TOP OF SEAL	42.0'	
ANNULAR SEAL: 3/8" TYPE: Bentonite Pellets		
BOTTOM OF SEAL	47.0'	
TOP OF SCREEN	52.0'	
FILTER MATERIAL: TYPE:		
SCREEN: DIA.: 4" TYPE: PVC OPENING WIDTH: 10 Slot TYPE: Machine Cut		
BOTTOM OF SCREEN	72.0'	
BOTTOM OF SUMP	72.5'	
BOTTOM OF HOLE	72.5'	

HOLE DIAMETER 8"

LLED: Air ROTARY

HOD DEVELOPED:

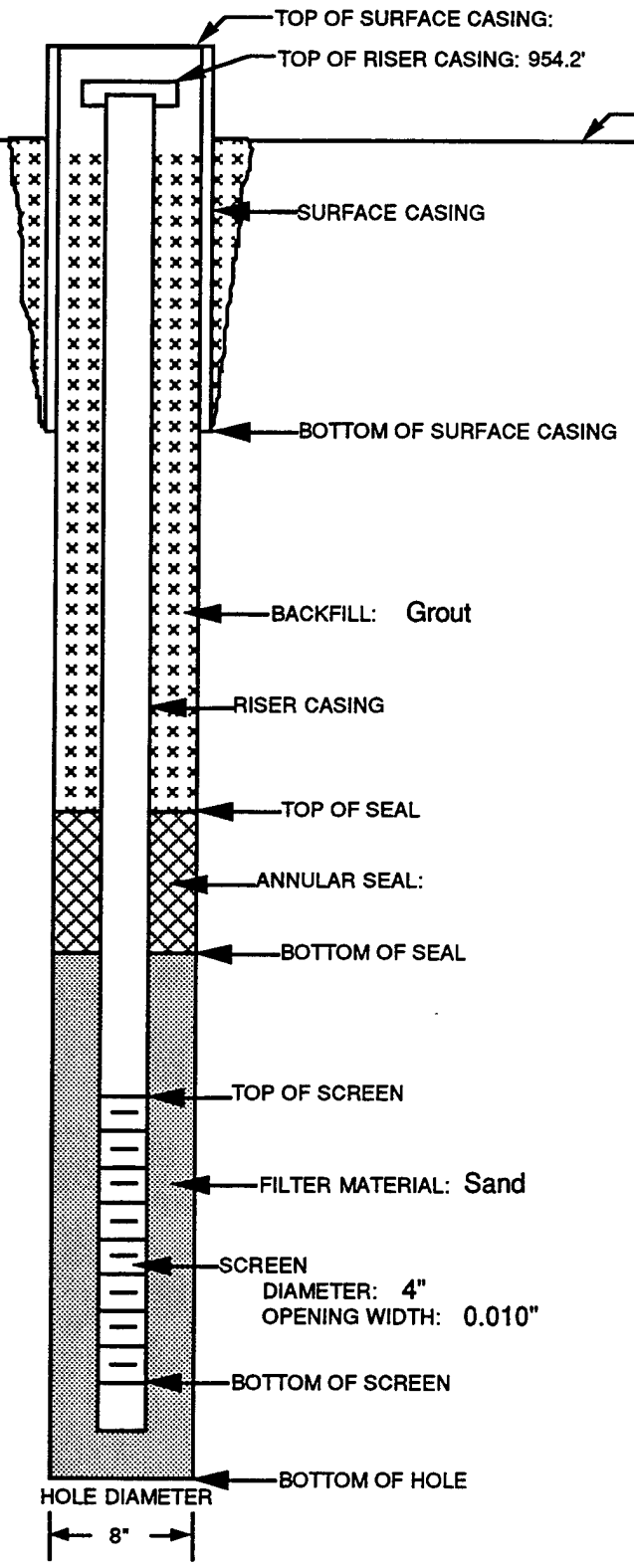
E DEVELOPED:

COMMENTS:

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO. MW-8D
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13838912.08, X-2410112.91 (in feet)		

BEGUN: 7/31/92	SUPERVISOR: T. Smith	WELL SITE:	WATER LEVEL:	DEPTH/ELEV.
FINISHED: 8/3/92	DRILLER: D. Logan	Industrial Sanitary Landfill Deep well to MW-8.	37.0'	

REFERENCE POINT & ELEVATION:



		DEPTH IN FEET	ELEV. IN FEET
TOP OF SURFACE CASING: TOP OF RISER CASING: 954.2'			
GROUND SURFACE		0.0	951.7
SURFACE CASING	DIAMETER: 8" TYPE: Steel		
BOTTOM OF SURFACE CASING		2.5	949.2
BACKFILL: Grout	TYPE: 95% Portland Cement 5% Volclay		
RISER CASING	DIAMETER: 4" TYPE: Schedule 40 PVC		
TOP OF SEAL		33.5	918.2
ANNULAR SEAL:	TYPE: 3/8" Bentonite Pellets		
BOTTOM OF SEAL		38.5	913.2
		43.5	908.2
TOP OF SCREEN			
FILTER MATERIAL: Sand	TYPE: #2		
SCREEN	DIAMETER: 4" OPENING WIDTH: 0.010"	TYPE: PVC TYPE: Machine Cut	
BOTTOM OF SCREEN		63.5	888.2
BOTTOM OF HOLE		64.0	887.7

METHOD DRILLED: Air Rotary

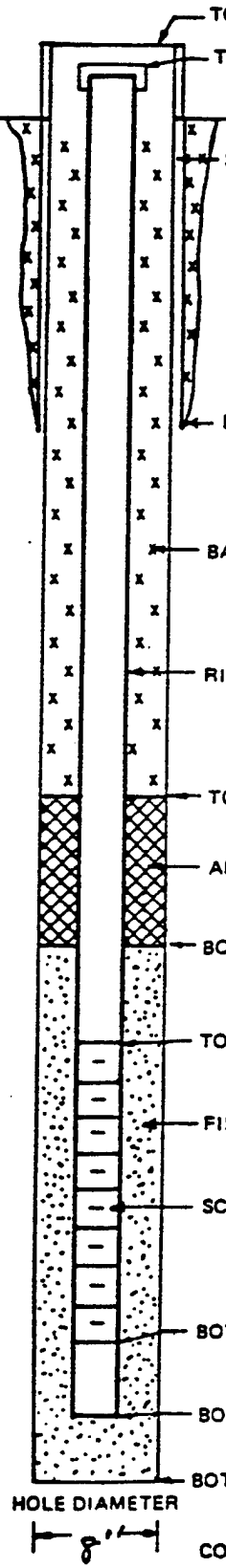
METHOD DEVELOPED:

COMMENTS:

Metcalf & Eddy

GROUND WATER INSTALLATION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO. MW-81
DRILLING CONTRACTOR: Faulkner	COORDINATES: Y-1383912.08 X-241011 2.91 (In Fee		
BEGUN: 7/31/92 FINISHED: 8/3/92	SUPERVISOR: T. Smith DRILLER: D. Logan	WELL SITE: Deep well to MW-8	WATER LEVEL: DEPTH/ELEV 97.0'

REFERENCE POINT & ELEVATION:



GENERALIZED GEOLOGIC LOG

	DEPTH IN	ELEV. IN
TOP OF SEAL	33.5'	
BOTTOM OF SEAL	38.5'	
TOP OF SCREEN	43.5'	
BOTTOM OF SCREEN	63.5'	
BOTTOM OF SUMP	64.0'	
BOTTOM OF HOLE	64.0'	

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

TIME DEVELOPED:

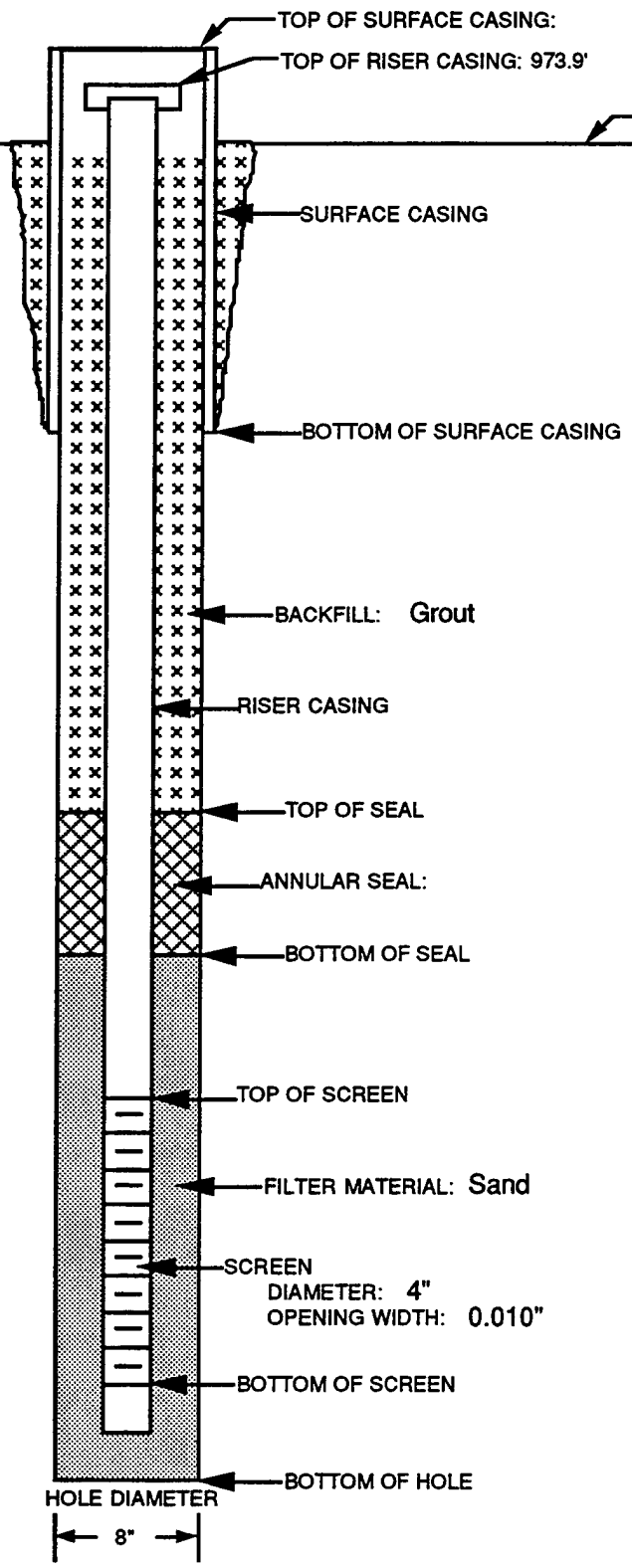
COMMENTS:

Metcalf & Eddy

MONITORING WELL CONSTRUCTION

PROJECT: LBAD	JOB NO. 007248-0003	WELL NO MW-18D	
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13838242.60, X-2410562.28 (in feet)		
BEGUN: 7/29/92	SUPERVISOR: Wurm/Jordan	WELL SITE: Industrial Sanitary Landfill Deep well to MW-18.	WATER LEVEL: 60.0'
FINISHED: 7/29/92	DRILLER: Clarence/Bennett/Charlie		DEPTH/ELEV. 105.0'

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
	0.0	971.4
	2.5	968.9
	72.5	898.9
	80.0	891.4
	84.5	886.9
	104.5	866.9
	105.0	866.4

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

COMMENTS: Hit bedrock at 9' 4".
Hit water at 60 feet.

M&E Metcalf & Eddy

7/29/92

GROUND WATER INSTALLATION

PROJECT: LBAD JOB NO. 9248-3 WELL NO. MW-18D

DRILLING CONTRACTOR: FAULKNER-DRILLING CO.

COORDINATES: Y-13838242.60 X-2410562.28 (In Feet)

BEGUN: 0710 SUPERVISOR: WURM / JORDAN

ENDED: 1510 DRILLER: CLARENCE / BENNETT / CHARLIE

WELL SITE:

WATER LEVEL: DEPTH/ELEV. 60' 105'

REFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING: ~~45'20'~~ 973.93'		
GROUND SURFACE		
GENERALIZED GEOLOGIC LOG		
SURFACE CASING: DIA.: TYPE:		
IT BEDROCK AT 9'4"		
BOTTOM OF SURFACE CASING		
BACKFILL: GROUT TYPE: 95% PORTLAND CEMENT 5% VOLCLAY		
IT WATER AT 60!		
RISER CASING: DIA.: 4" TYPE: PVC		
TOP OF SEAL	72.5'	725'
ANNULAR SEAL: 3/8" TYPE: BENTONITE PELLETS		~~4.5'~~
BOTTOM OF SEAL	80'	80.0'
TOP OF SCREEN	84.5'	~~4.5'~~ 84.5'
FILTER MATERIAL: SAND TYPE:		
		~~20'~~
SCREEN: DIA.: 4" TYPE: PVC OPENING WIDTH: .010 in. TYPE: Sch. 40 slotted		
BOTTOM OF SCREEN	104.5'	104.5'
		~~0.5'~~
RILLED: AIR ROTARY BOTTOM OF SUMP	105'	105.0'
BOTTOM OF HOLE	105'	105.0'

THOD DEVELOPED :

HOLE DIAMETER 8¾"

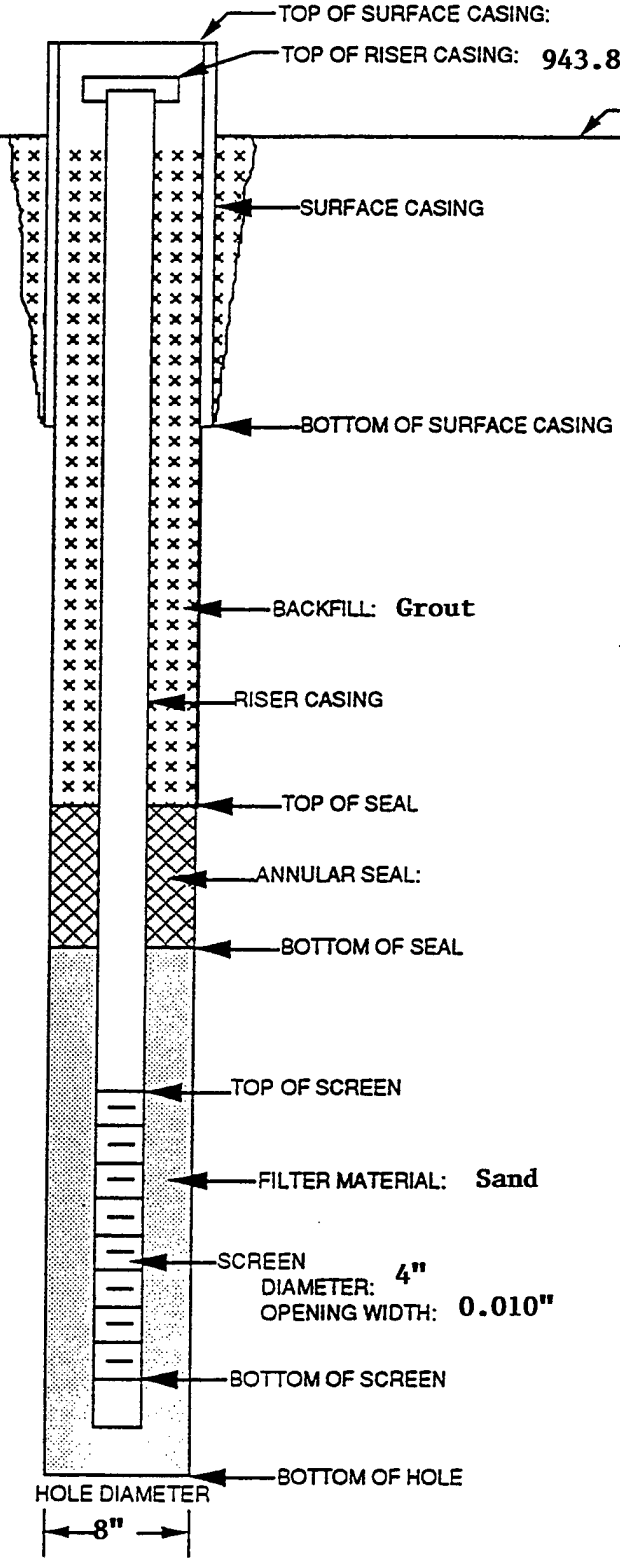
COMMENTS:

ME DEVELOPED :

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO. MW-19DD
DRILLING CONTRACTOR: Faulkner	COORDINATES: Y-13838790.58 X-2408528.89 (In Feet)		

BEGUN: 8/24/92	SUPERVISOR: S. Hulett	WELL SITE: Old Landfill Across Stream	WATER LEVEL: 24.0'/917.3'	DEPTH/ELEV.
FINISHED: 8/24/92	DRILLER: D. Logan			

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
GROUND SURFACE	0.0'	941.3'
DIAMETER: 8" TYPE: Steel		
BOTTOM OF SURFACE CASING	2.5'	938.3'
BACKFILL: Grout TYPE: 95% Portland Cement 5% Volclay		
RISER CASING DIAMETER: 4" TYPE: Schedule 40 PVC		
TOP OF SEAL	37.5'	903.8'
ANNULAR SEAL: TYPE: 3/8" Bentonite Pellets		
BOTTOM OF SEAL	42.5'	898.8'
TOP OF SCREEN	47.5'	893.8'
FILTER MATERIAL: Sand TYPE: #2		
SCREEN DIAMETER: 4" OPENING WIDTH: 0.010" TYPE: PVC TYPE: Machine Cut		
BOTTOM OF SCREEN	67.5'	873.8'
BOTTOM OF HOLE	68.0'	873.3'

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

COMMENTS:

Metcalf & Eddy

GROUND WATER INSTALLATION | PROJECT: LBAD | JOB NO. 7248.3 | WELL NO. MW-19DD

LLING CONTRACTOR: Faulkner

COORDINATES: Y-13838790.58 X-2408528.89 (In Feet)

UN: 8/5/92 | SUPERVISOR: T. Smith

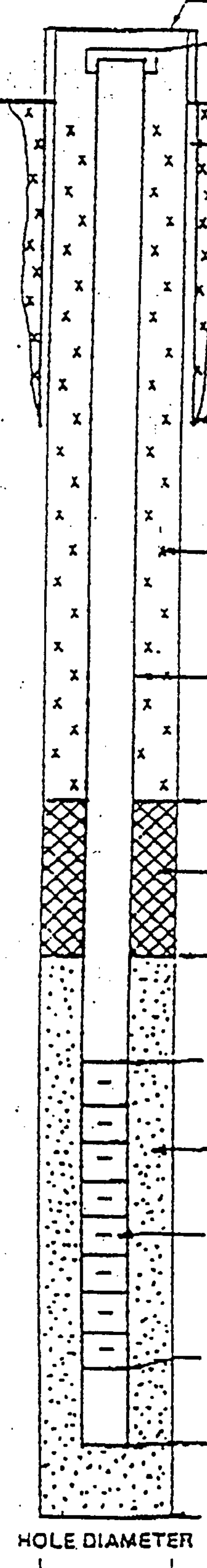
ED: 8/5/92 | DRILLER: D. Logan

WELL SITE: ~~Y-13838790.5~~

WATER LEVEL DEPTH/ELEV: 24.0'

FERENCE POINT & ELEVATION:

GENERALIZED GEOLOGIC LOG



Item	Value	DEPTH IN	ELEV IN
TOP OF SURFACE CASING:			
TOP OF RISER CASING:	943.82'		
GROUND SURFACE			
SURFACE CASING:	DIA.: TYPE:		
BOTTOM OF SURFACE CASING			
BACKFILL:	grout TYPE:		
RISER CASING:	DIA.: 4" TYPE: Schedule 40 PVC		
TOP OF SEAL		37.5'	
ANNULAR SEAL:	3/8" TYPE: Bent. Pellets		
BOTTOM OF SEAL		42.5'	
TOP OF SCREEN		47.5'	
FILTER MATERIAL:	#2 TYPE: Sand		
SCREEN:	DIA.: 4" TYPE: PVC; OPENING WIDTH: 10 slot; TYPE: Machine Cut		
BOTTOM OF SCREEN		67.5'	
BOTTOM OF SUMP		68.0'	
BOTTOM OF HOLE		68.0'	

HOLE DIAMETER 8"

OD DRILLED: ...OTARY

HOD DEVELOPED:

COMMENTS:

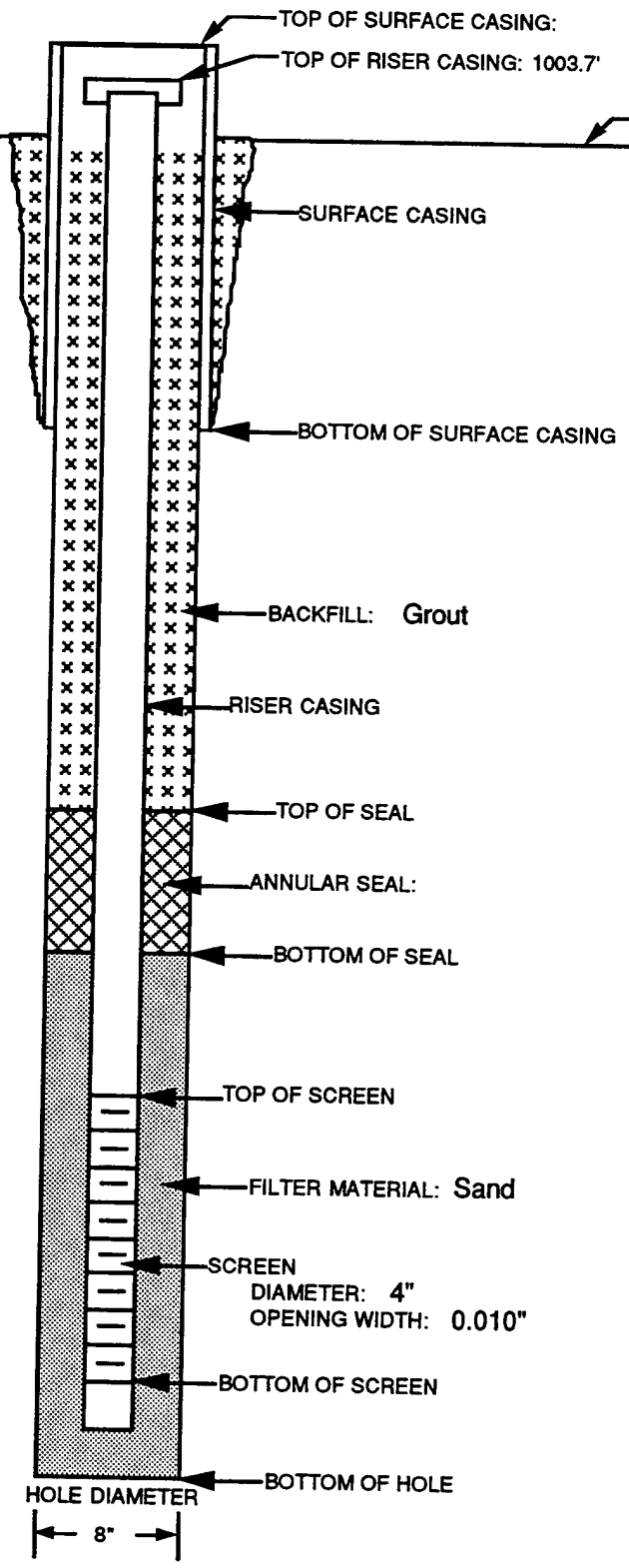
E DEVELOPED:

M&E

MONITORING WELL CONSTRUCTION

PROJECT: LBAD	JOB NO. 007248-0003	WELL NO. MW-22	
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13839437.03, X-2414263.70 (in feet)		
BEGUN: 7/21/92	SUPERVISOR: Schreve/Jordan	WELL SITE:	WATER LEVEL: 22.5 DEPTH/ELEV. 32.5'
FINISHED: 7/21/92	DRILLER: Bennett/Charles Joseph		

REFERENCE POINT & ELEVATION:



DEPTH IN FEET	ELEV. IN FEET
0.0	1001.2
2.5	998.7
13.0	988.2
18.5	982.7
22.5	978.7
32.5	968.7
32.5	968.7

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

COMMENTS: Hit bedrock at 10.5 feet.
Hit groundwater at 22.5 feet.

Metcalf & Eddy

07/21/92

GROUND WATER INSTALLATION | PROJECT: LBAD | JOB NO. 7248-3 | WELL NO. MW-22

LING CONTRACTOR: AULKNER DRILLING CO. | COORDINATES: Y-1383937.03 X-2414263.70 (In Feet)

N: 1305 | SUPERVISOR: SCOTT SCHREVE/J. JORDAN | WELL SITE:

1620 | DRILLER: BENETT / CHARLES JOSEPH

WATER LEVEL: 22.5' | DEPTH/ELEV. 32.5'

ERENCE POINT & ELEVATION:

GENERALIZED GEOLOGIC LOG

DEPTH IN | ELEV IN

TOP OF SURFACE CASING:

TOP OF RISER CASING: 1003.67

GROUND SURFACE

SURFACE CASING: DIA.: TYPE:

BOTTOM OF SURFACE CASING

BEDROCK AT 10.5!

BACKFILL: GROUT TYPE: 95% PORTLAND CEMENT 5% VOLCLAY

RISER CASING: DIA.: 4" TYPE: PVC

TOP OF SEAL 13.0'

ANNULAR SEAL: 3/8" TYPE: BENTONITE PELLETS 5.5'

BOTTOM OF SEAL 18.5'

4.0'

GROUNDWATER AT 22.5!

TOP OF SCREEN 22.5'

FILTER MATERIAL: TYPE: SAND

SCREEN: DIA.: 4" TYPE: PVC 10.0'

OPENING WIDTH: .010 in TYPE: sch. 40 slotted

BOTTOM OF SCREEN

D D LED: AIR ROTARY

BOTTOM OF SUMP 32.5'

BOTTOM OF HOLE 32.5'

D DEVELOPED:

HOLE DIAMETER 8 3/4"

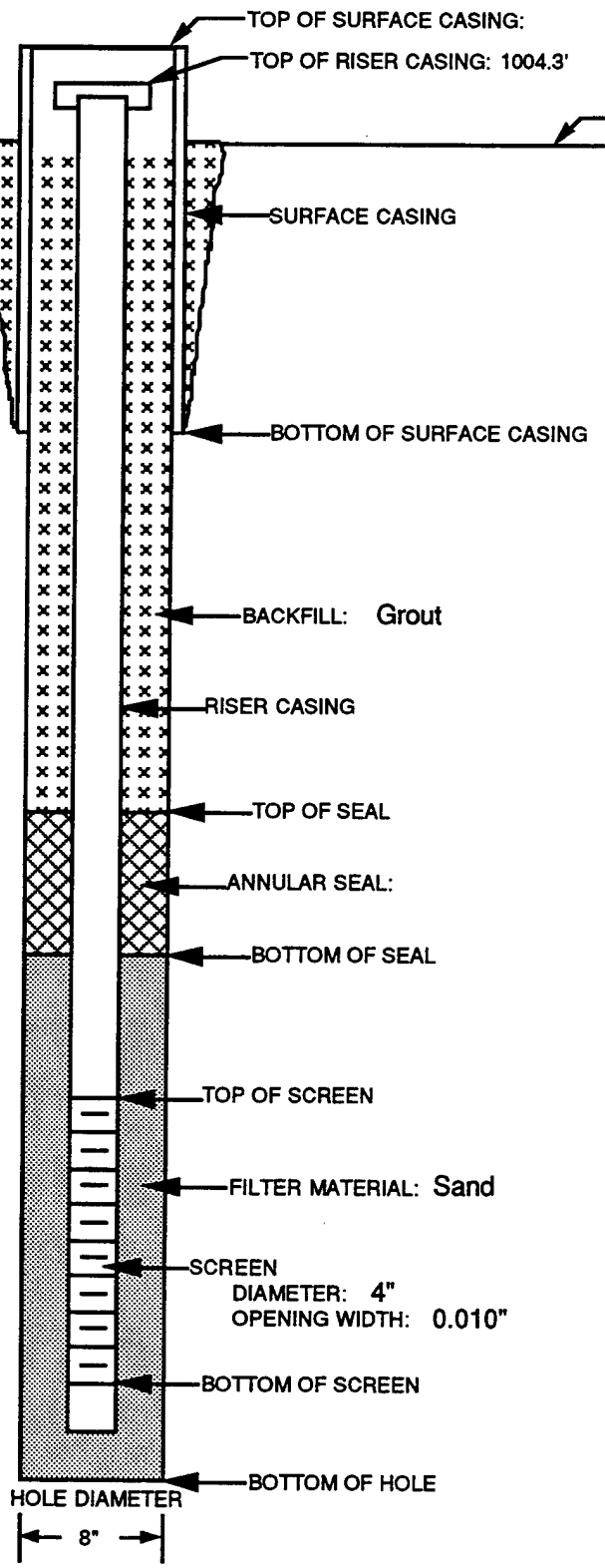
COMMENTS:

EVELOPED:

M&E

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO MW-22D
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13839440.35, X-2414246.28 (in feet)		
BEGUN: 7/21/92	SUPERVISOR: Wurm/Jordan	WELL SITE:	WATER LEVEL: DEPTH/ELEV.
FINISHED: 7/21/92	DRILLER: Charlie/Danny/Clarence		67.5'

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
	0.0	1001.8
DIAMETER: 8" TYPE: Steel	2.5	999.3
TYPE: 95% Portland Cement 5% Volclay		
DIAMETER: 4" TYPE: Schedule 40 PVC	34.6	967.2
TYPE: 3/8" Bentonite Pellets	42.3	959.5
	57.0	944.8
TYPE: #2		
TYPE: PVC TYPE: Machine Cut	67.0	934.8
	67.5	934.3

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

COMMENTS: Hit bedrock at 15' 4".
Hit a damp spot at 18 feet.
Hit a damp spot from 47 to 49 feet.

M&E Metcalf & Eddy

GROUND WATER INSTALLATION

PROJECT: LBAD | JOB NO. 7348-3 | WELL NO. MW-22-D

DRILLING CONTRACTOR: FAULKNER DRILLING CO.

COORDINATES: Y-138394.40.35 X-2414246.28 (In Feet)

GUN: 6750 | SUPERVISOR: WURM/JORDAN | WELL SITE:

HER: 1200 | DRILLER: CHARLIE/DANNY/CLARENCE | WATER LEVEL: DEPTH/ELEV. 67.5'

EFERENCE POINT & ELEVATION:

	DEPTH IN'	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING: 1004.25'		
GROUND SURFACE		
SURFACE CASING: DIA.: TYPE:		
BOTTOM OF SURFACE CASING		
IT BEDROCK AT 15'4"		
T A DAMP SPOT AT 18'.		
BACKFILL: GROUT TYPE: 95% PORTLAND CEMENT 5% WOLCLAY		
RISER CASING: DIA.: 4" TYPE: PVC, schedule 40		
TOP OF SEAL	34.6'	34.6'
ANNULAR SEAL: 3/8" TYPE: BENTONITE PELLETS		7.7'
BOTTOM OF SEAL	42.3'	42.3'
T A DAMP SPOT FROM 47'-49'		14.7'
TOP OF SCREEN	57'	57.0'
FILTER MATERIAL: SAND TYPE:		
SCREEN: DIA.: 4" TYPE: PVC		10'
OPENING WIDTH: .010 in. TYPE: sch. 40 slotted		
BOTTOM OF SCREEN	67'	67.0'
		0.5'
BOTTOM OF SUMP	67.5'	67.5'
BOTTOM OF HOLE	67.5'	67.5'

GENERALIZED GEOLOGIC LOG

DRILLED: AIR ROTARY

ETHOD DEVELOPED:

IME DEVELOPED:

HOLE DIAMETER
8¾"

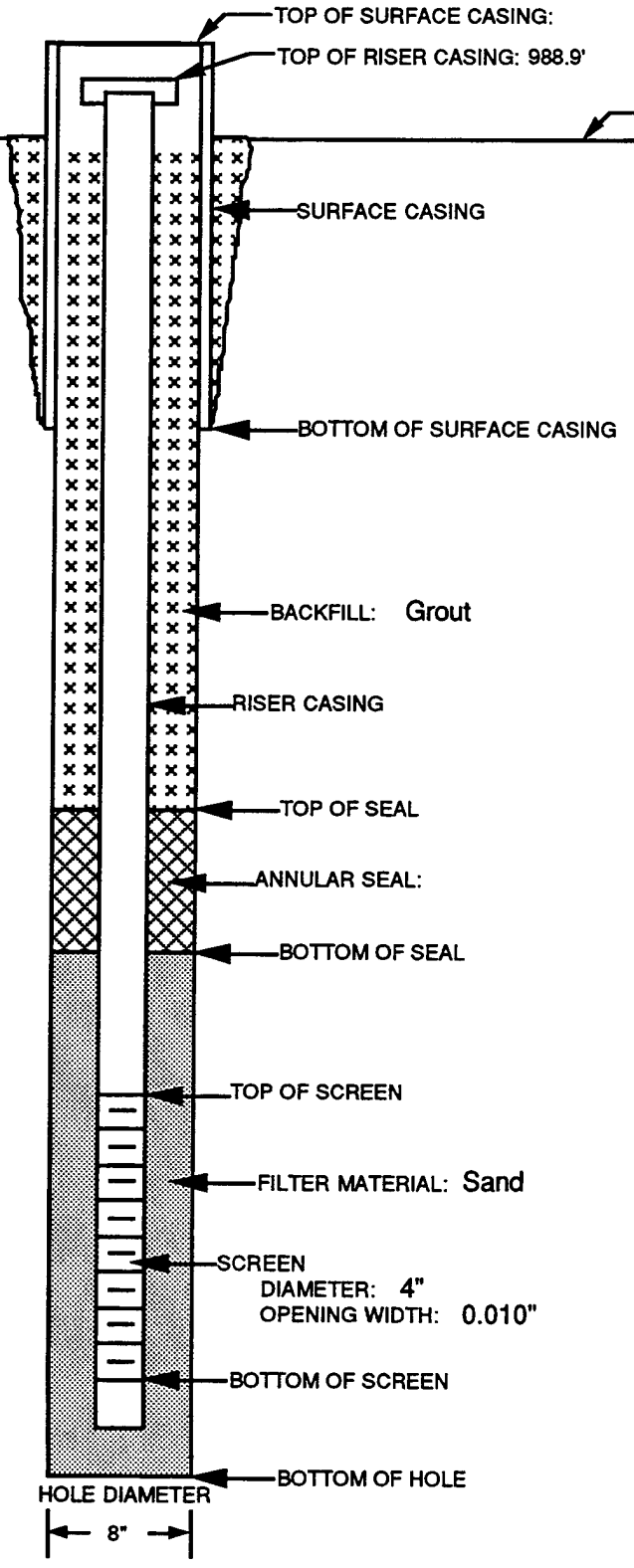
COMMENTS:

M&E

MONITORING WELL CONSTRUCTION

PROJECT: LBAD	JOB NO. 007248-0003	WELL NO. MW-23
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13838601.78, X-2415962.35 (in feet)	
BEGUN: 7/21/92	SUPERVISOR: Rogers	WELL SITE: New landfill.	WATER LEVEL: 43.0'	DEPTH/ELEV. 53.0'
FINISHED: 7/21/92	DRILLER: Faulkner/Delbert			

REFERENCE POINT & ELEVATION:



DEPTH IN FEET	ELEV. IN FEET	
0.0	986.4	GROUND SURFACE
		DIAMETER: 8" TYPE: Steel
2.5	983.9	BOTTOM OF SURFACE CASING
		TYPE: 95% Portland Cement 5% Volclay
		DIAMETER: 4" TYPE: Schedule 40 PVC
33.0	953.4	TOP OF SEAL
		TYPE: 3/8" Bentonite Pellets
38.0	948.4	BOTTOM OF SEAL
42.5	943.9	TOP OF SCREEN
		TYPE: #2
		TYPE: PVC TYPE: Machine Slotted
52.5	933.9	BOTTOM OF SCREEN
53.0	933.4	BOTTOM OF HOLE

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

COMMENTS:

Metcalf & Eddy

GROUND WATER INSTALLATION

PROJECT: LBAD JOB NO. 7248.3 WELL NO. MW-23

DRILLING CONTRACTOR: FAULKNER

COORDINATES: Y-1383860178 X-2415962.35 (In Feet)

DRILLING: 7/21/92 SUPERVISOR: Rogers

DEVELOPED: 7/ 1992 DRILLER: Faulkner / Delbert

WELL SITE: New Landfill

WATER LEVEL: DEPTH/ELEV. 23'

REFERENCE POINT & ELEVATION:

	DEPTH IN:	ELEV. IN
	Feet	
TOP OF SURFACE CASING:		
TOP OF RISER CASING: 988.87'		
GROUND SURFACE		
GENERALIZED GEOLOGIC LOG		
SURFACE CASING: DIA.: 8 inch TYPE: Steel		
BOTTOM OF SURFACE CASING		
BACKFILL: TYPE:		
RISER CASING: DIA.: 4 inch TYPE: PVC Sch 40		
TOP OF SEAL	33	
ANNULAR SEAL: TYPE: bentonite (3/8")		
BOTTOM OF SEAL	38	
TOP OF SCREEN	42.5	
FILTER MATERIAL: SAND TYPE:		
SCREEN: DIA.: 4" TYPE: PVC 40 OPENING WIDTH: 10 slot TYPE: Machine Slotted	52.5	
BOTTOM OF SCREEN	53	
BOTTOM OF SUMP	53	
BOTTOM OF HOLE		

HOLE DIAMETER 8"

COMMENTS:

DRILLED: Air Rotary

METHOD DEVELOPED:

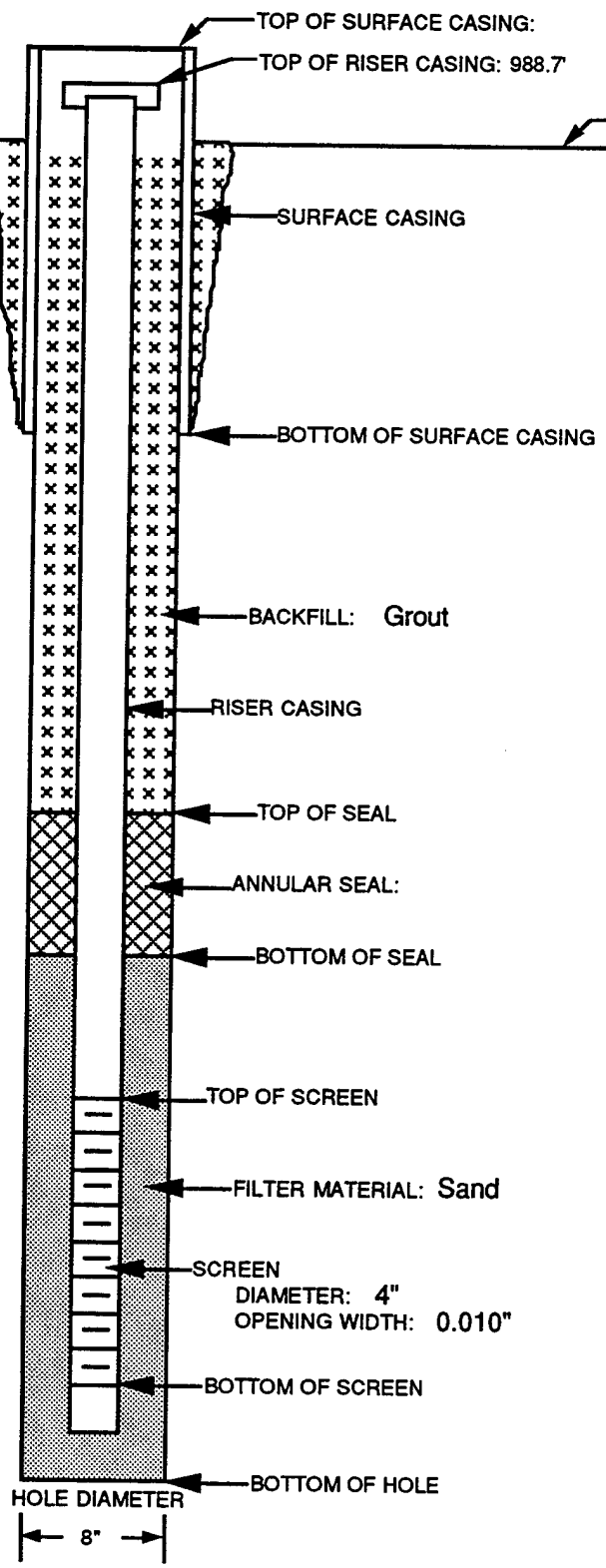
DATE DEVELOPED:

M&E

MONITORING WELL CONSTRUCTION

PROJECT: LBAD	JOB NO. 007248-0003	WELL NO MW-23D	
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13838592.82, X-2415957.43 (in feet)		
BEGUN: 7/28/92	SUPERVISOR: T. Smith	WELL SITE: New Landfill.	WATER LEVEL: 41.0' DEPTH/ELEV. 47.0'
FINISHED: 7/28/92	DRILLER: D. Logan		

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
	0.0	986.2
DIAMETER: 8" TYPE: Steel	2.5	983.7
TYPE: 95% Portland Cement 5% Volclay	56.5	929.7
DIAMETER: 4" TYPE: Schedule 40 PVC	62.5	923.7
TYPE: 3/8" Bentonite Pellets	67.5	918.7
TYPE: #2	87.5	898.7
TYPE: PVC TYPE: Machine Cut	88.0	898.2

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

COMMENTS:

Metcalf & Eddy

~~GROUND~~ WATER INSTALLATION

PROJECT: CBAD JOB NO. 7248.3 WELL NO. MW-23D

LING CONTRACTOR: Wilcox

COORDINATES: Y-1383892.82 X-2415957.93 (In Feet)

N: 7/28/92 SUPERVISOR: T. Smith

E 7/28/92 DRILLER: Delbert Logan

WELL SITE:

WATER LEVEL: DEPTH/ELEV. 41'9.47'

ERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING: 988.68'		
GROUND SURFACE		
GENERALIZED GEOLOGIC LOG		
SURFACE CASING: DIA.: 8" TYPE: Steel		
BOTTOM OF SURFACE CASING		
BACKFILL: TYPE:		
RISER CASING: DIA.: 4" TYPE: Schedule 40 PVC		
TOP OF SEAL	56.5'	
ANNULAR SEAL: 3/8" TYPE: Bentonite Pellets		
BOTTOM OF SEAL	60.5'	
TOP OF SCREEN	67.5'	
FILTER MATERIAL: TYPE:		
SCREEN: DIA.: 4" TYPE: PVC		
OPENING WIDTH: 10 slot TYPE: Machine		
BOTTOM OF SCREEN	87.5'	
BOTTOM OF SUMP	88.0'	
BOTTOM OF HOLE	88.0'	

HOLE DIAMETER 8"

COMMENTS:

LLED: Air ROTARY

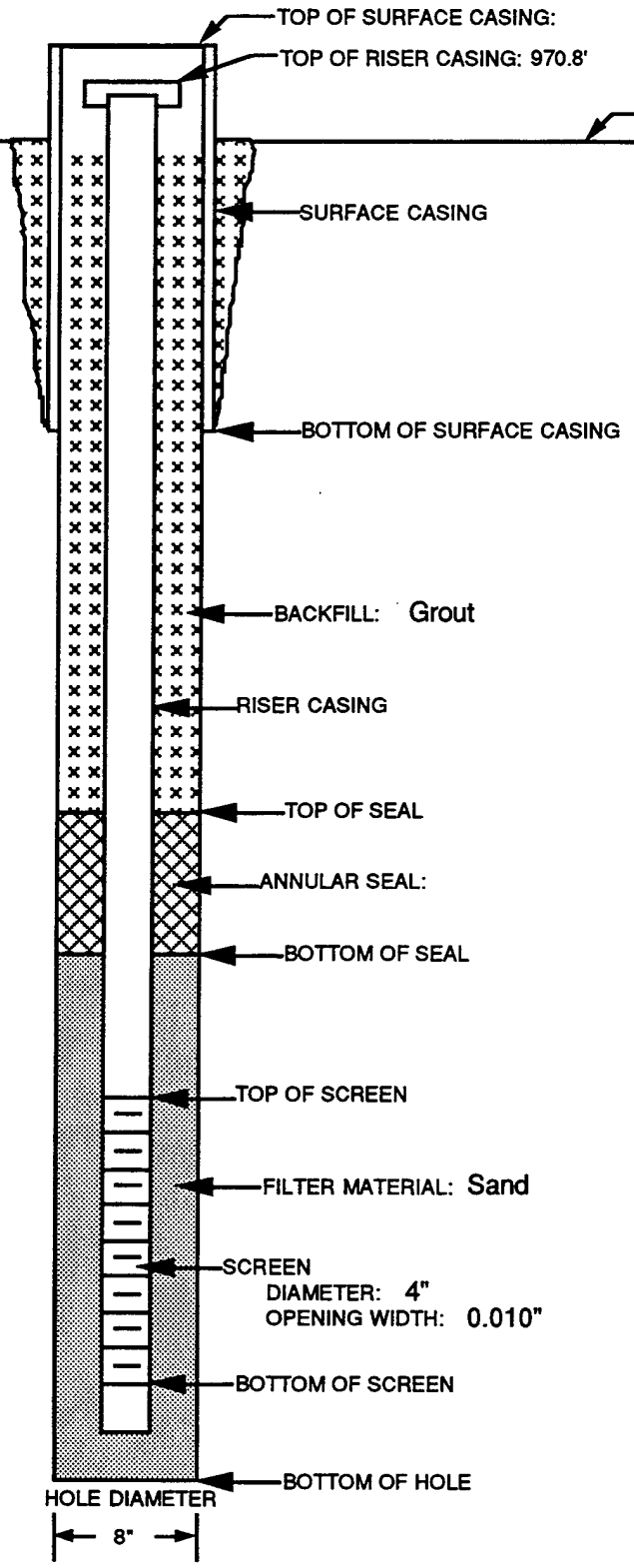
HOD DEVELOPED:

E DEVELOPED:

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO. MW-32
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13837906.36, X-2410418.56 (in feet)		

BEGUN: 7/23/92	SUPERVISOR: T. Smith	WELL SITE:	WATER LEVEL:	DEPTH/ELEV.
FINISHED: 7/23/92	DRILLER: D. Logan	Northeast corner of Building 147.	44.0'	

REFERENCE POINT & ELEVATION:



DEPTH IN FEET	ELEV. IN FEET
0.0	968.3
2.5	965.8
34.0	934.3
39.0	929.3
43.5	924.8
53.5	914.8
54.0	914.3

METHOD DRILLED: Air Rotary

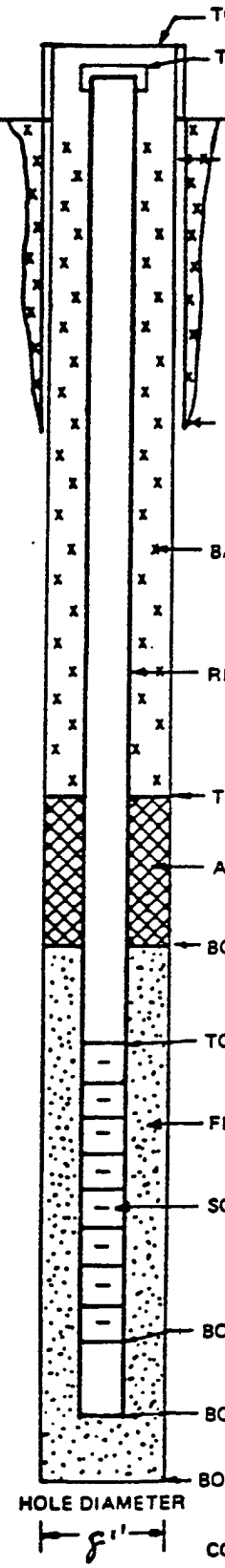
METHOD DEVELOPED:

COMMENTS:

Metcalf & Eddy

GROUND WATER INSTALLATION	PROJECT: (BHI)	JOB NO. 7248-3	WELL NO. MW-32
DRILLING CONTRACTOR: Faulkner	COORDINATES: Y-13837906.36 X-241048.56 (In Feet)		
BEGUN: 7/23/92 FINISHED: 7/23/92	SUPERVISOR: T. Smith DRILLER: D. Logan	WELL SITE: N.E. Corner Bldg. 147	WATER LEVEL: DEPTH/ELEV 44.0'

REFERENCE POINT & ELEVATION:



GENERALIZED GEOLOGIC LOG

DEPTH IN	ELEV. IN
34.0'	
39.0'	
49.5'	
53.5'	
54.0'	
54.0'	

METHOD DRILLED: Air Rotary Dr:11

METHOD DEVELOPED:

TIME DEVELOPED:

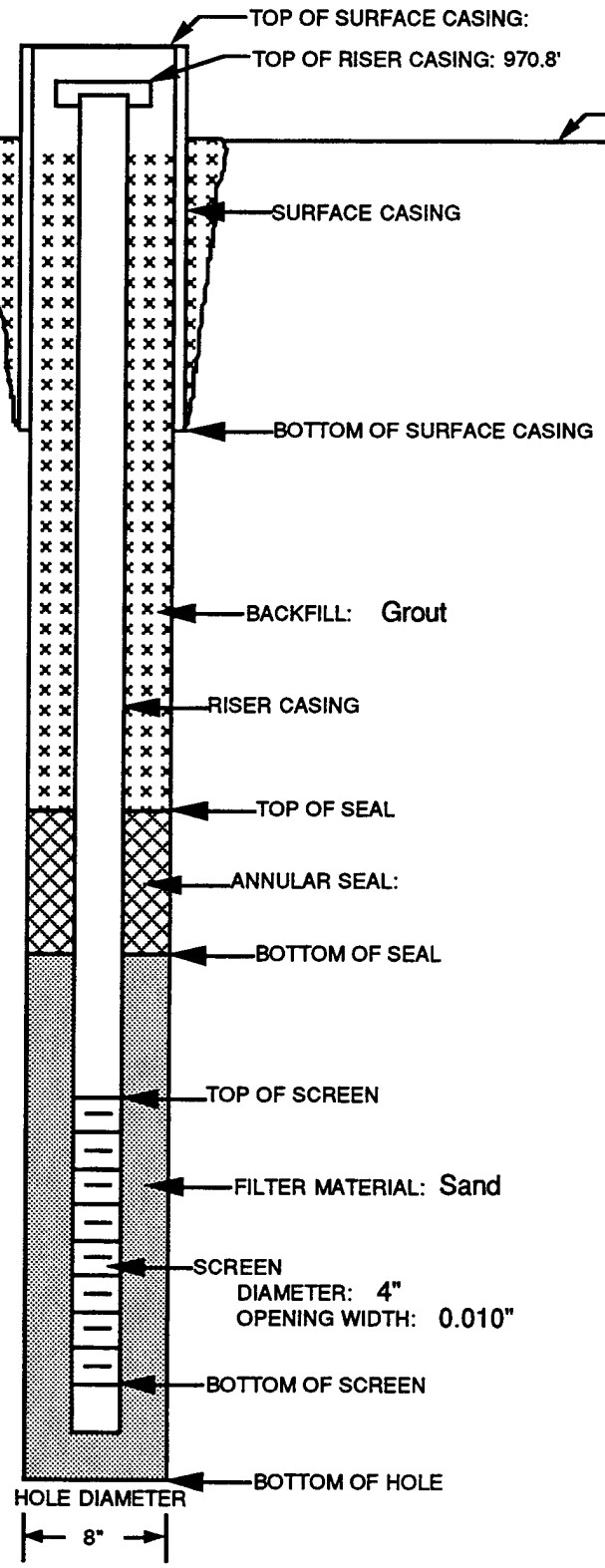
COMMENTS:

Metcalf & Eddy

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO MW-32D
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13837901.26, X-2410432.45 (in feet)		

BEGUN: 8/4/92	SUPERVISOR: T. Smith	WELL SITE:	WATER LEVEL:	DEPTH/ELEV.
FINISHED: 8/4/92	DRILLER: D. Logan	Northeast corner of Building 147.	45.0'	52.0'

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
	0.0	968.3
DIAMETER: 8" TYPE: Steel	2.5	965.8
TYPE: 95% Portland Cement 5% Volclay		
DIAMETER: 4" TYPE: Schedule 40 PVC	59.5	908.8
TYPE: 3/8" Bentonite Pellets	63.9	904.4
	69.0	899.3
TYPE: #2		
TYPE: PVC TYPE: Machine Cut	89.0	879.3
	89.5	878.8

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

COMMENTS: Hit bedrock at 8 feet. Grey micritic limestone of interbedded shale.

Metcalf & Eddy

GROUND WATER INSTALLATION

PROJECT: 7248.3 JOB NO. (BAD) WELL NO: MW-32A

DRILLING CONTRACTOR: Faulkner

COORDINATES: Y-1383790.26 X-2410432.45 (Fla. East)

BEGUN: 8/4/92 SUPERVISOR: T. Smith

FINISHED: 8/4/92 DRILLER: D. Logan

WELL SITE: N.E. Corner of Bldg. 147

WATER LEVEL - DEPTH/ELEV: 45'4.52"

REFERENCE POINT & ELEVATION:

	DEPTH IN'	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING: 970.84'		
GROUND SURFACE		
GENERALIZED GEOLOGIC LOG		
SURFACE CASING: DIA.: TYPE:		
Bedrock at 8'		
grey, micritic limestone w/ interbedded shale		
BOTTOM OF SURFACE CASING		
BACKFILL: grout TYPE:		
RISER CASING: DIA.: 4" TYPE: Sch. 40 PVC		
TOP OF SEAL	59.5'	
ANNULAR SEAL: 3/8" TYPE: Bentonite Pellets		
BOTTOM OF SEAL	63.9'	
TOP OF SCREEN	69.0'	
FILTER MATERIAL: # TYPE: Sand		
SCREEN: DIA.: 4" TYPE: PVC		
OPENING WIDTH: 10 Slot TYPE: machine cut		
BOTTOM OF SCREEN	89.0'	
BOTTOM OF SUMP	89.5'	
BOTTOM OF HOLE	89.5'	

DRILLED: 4" ROTARY

METHOD DEVELOPED:

TIME DEVELOPED:

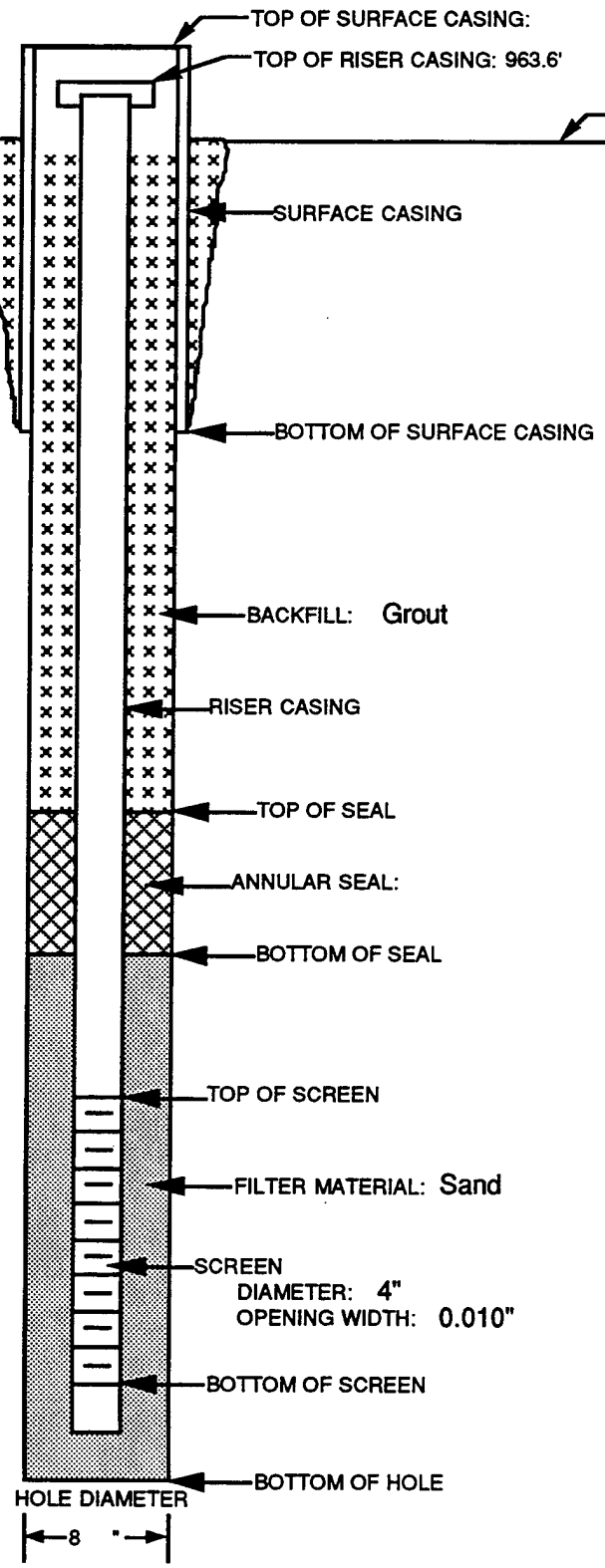
HOLE DIAMETER 8"

COMMENTS:

MONITORING WELL CONSTRUCTION

PROJECT: LBAD	JOB NO. 007248-0003		WELL NO. MW-33
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13838021.00, X-2410720.36 (in feet)		
BEGUN: 7/28/92	SUPERVISOR: Wurm/Jordan	WELL SITE:	WATER LEVEL: 52.0' DEPTH/ELEV. 62.0'
FINISHED: 7/28/92	DRILLER: Charlie/Danny/Clarence		

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
TOP OF SURFACE CASING: TOP OF RISER CASING: 963.6' / GROUND SURFACE	0.0	961.1
SURFACE CASING — DIAMETER: 8" TYPE: Steel		
BOTTOM OF SURFACE CASING	2.5	958.6
BACKFILL: Grout — TYPE: 95% Portland Cement 5% Volclay		
RISER CASING — DIAMETER: 4" TYPE: Schedule 40 PVC		
TOP OF SEAL	41.5	919.6
ANNULAR SEAL: — TYPE: 3/8" Bentonite Pellets		
BOTTOM OF SEAL	46.5	914.6
TOP OF SCREEN	52.0	909.1
FILTER MATERIAL: Sand — TYPE: #2		
SCREEN — DIAMETER: 4" OPENING WIDTH: 0.010" — TYPE: Schedule 40 PVC TYPE: Machine Cut		
BOTTOM OF SCREEN	62.0	899.1
BOTTOM OF HOLE	62.5	898.6

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

COMMENTS: Hit bedrock at 6.5 feet.
Hit water at 52 feet.

Metcalf & Eddy

7-28-92

GROUND WATER INSTALLATION

PROJECT: LBAD JOB NO. 7248-3 WELL NO. MW-33

DRILLING CONTRACTOR: FawKes Drilling Co.

COORDINATES: Y-1383802 1.00 X-2410720.36 (In Feet)

GUN: 1315 SUPERVISOR: Nurm/Jordan WELL SITE:

ED: 1757 DRILLER: Charlie, Clarence, Danny

WATER LEVEL: DEPTH/ELEV: 52' 10"

EFERENCE POINT & ELEVATION:

DEPTH IN: ELEV IN:

TOP OF SURFACE CASING:

TOP OF RISER CASING: 963.58'

GROUND SURFACE

GENERALIZED GEOLOGIC LOG

SURFACE CASING: DIA.: TYPE:

Hit bedrock at 6.5"

BOTTOM OF SURFACE CASING

BACKFILL: Grout TYPE: 95% Portland Cement 5% Volclay

lit water at 52'

RISER CASING: DIA.: 4" TYPE: PVC

TOP OF SEAL 41.5' 41.5'

ANNULAR SEAL: 3/4" TYPE: Bentonite Pellets 5.0'

BOTTOM OF SEAL 46.5' 46.5'

5.5'

TOP OF SCREEN 52' 52.0'

FILTER MATERIAL: Sand TYPE:

SCREEN: DIA.: 4" TYPE: PVC 10'

OPENING WIDTH: .010 in. sch. 40 TYPE: slotted

BOTTOM OF SCREEN 62' 62.0'

0.5' 62.5'

BOTTOM OF SUMP 62.5'

BOTTOM OF HOLE 62.5' 62.5'

OD DRILLED: air rotary

HOD DEVELOPED:

HOLE DIAMETER 7 3/4"

COMMENTS:

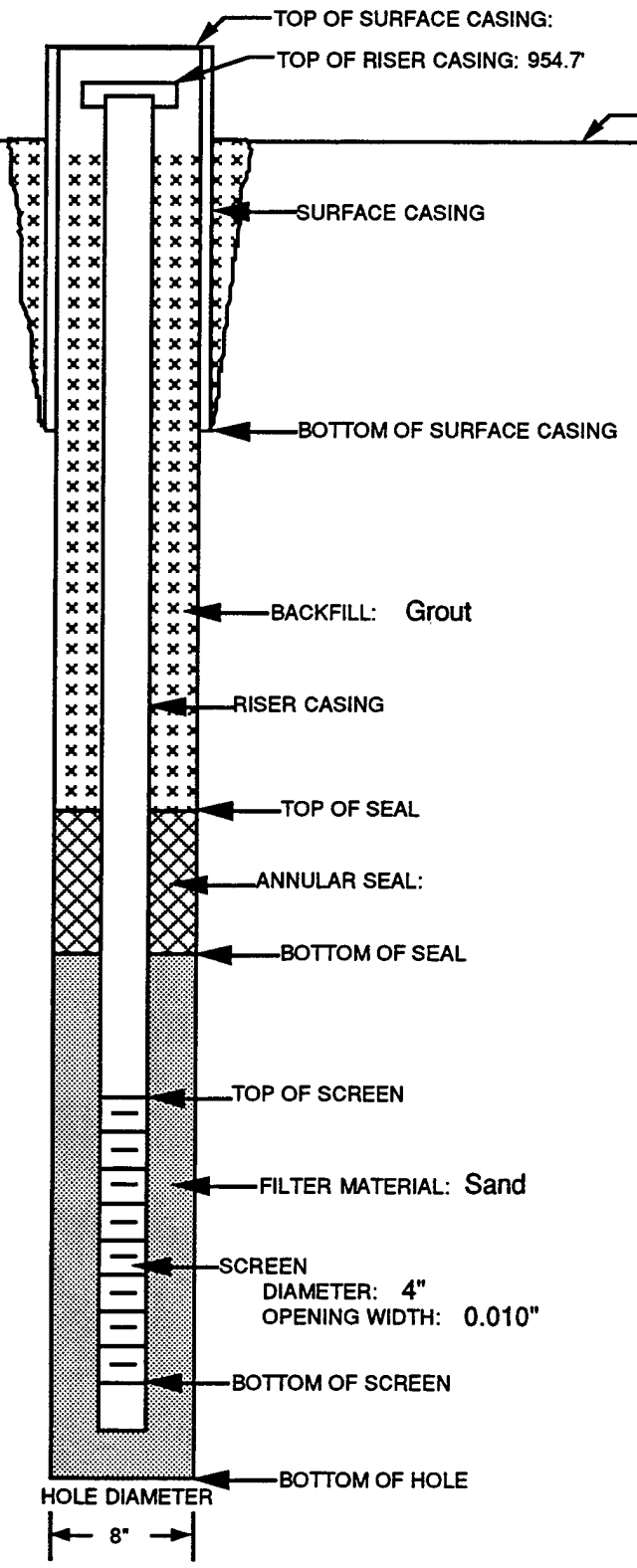
E DEVELOPED:

M&E

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO. MW-35
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13839524.62, X-2415149.72 (in feet)		

BEGUN: 7/22/92	SUPERVISOR: Rogers	WELL SITE:	WATER LEVEL: DEPTH/ELEV.
FINISHED: 7/23/92	DRILLER: Faulkner/D. Logan		14.0

REFERENCE POINT & ELEVATION:



DEPTH IN FEET	ELEV. IN FEET
0.0	952.2
2.5	949.7
8.0	944.2
10.5	941.7
14.0	938.2
24.0	928.2
24.5	927.7

METHOD DRILLED: Air Rotary with Roller Cone Bit

METHOD DEVELOPED: Bailed

COMMENTS: Hit bedrock at 11 feet. Water at about 2.5 feet below grade in well.

Metcalf & Eddy

GROUND WATER INSTALLATION

PROJECT: LBAD JOB NO. WELL NO. MW-35

DRILLING CONTRACTOR: Faulkner Drilling

COORDINATES: Y-1383956.62 X-2415149.72 ~~Along Fence, Next To Stream~~ Ft. Pond

BEGUN: 7/22/92 SUPERVISOR: Rogers

ENDED: 7/23/92 DRILLER: Faulkner / Delbert Logan

WELL SITE:

WATER LEVEL: DEPTH/ELEV.

REFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING: 954.65		
GROUND SURFACE		
GENERALIZED GEOLOGIC LOG		
SURFACE CASING: DIA.: TYPE:		
BOTTOM OF SURFACE CASING		
BACKFILL: TYPE:		
RISER CASING: DIA.: 4" TYPE: PVC, schedule 40		
TOP OF SEAL	8.0	
ANNULAR SEAL: 3/8" TYPE: Bentonite Pellets		
BOTTOM OF SEAL	10.5	
TOP OF SCREEN	14.0	
FILTER MATERIAL: TYPE:		
SCREEN: DIA.: 4 inch TYPE: PVC OPENING WIDTH: .010 sch. 40 TYPE: slotted		
BOTTOM OF SCREEN	24.0	
BOTTOM OF SUMP	24.5	
BOTTOM OF HOLE	24.5	

HOLE DIAMETER

DRILLED: Air Rotary w/ roller cone bit

METHOD DEVELOPED: Bailed

TIME DEVELOPED:

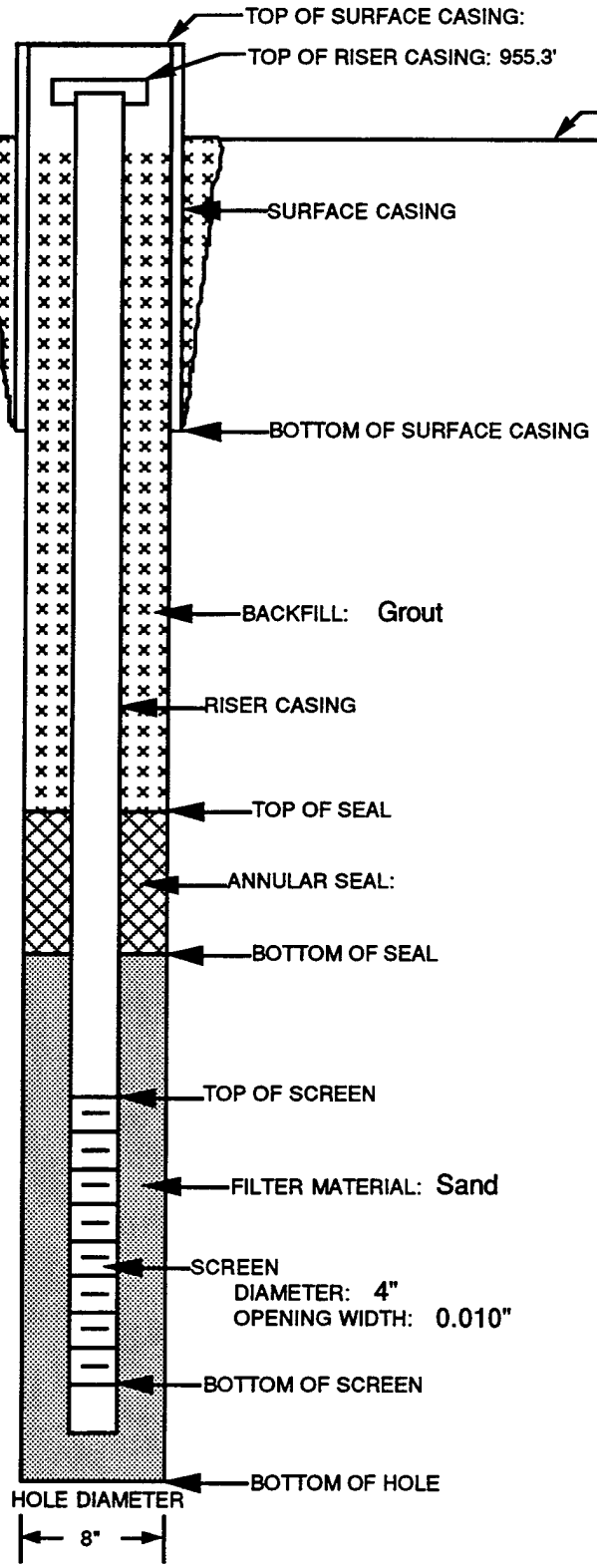
COMMENTS: Hit water @ 11 Ft. when drilling. Water about 2.5 Ft. below grade in well.

M&E

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO MW-39D
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13837480.27, X-2409139.77 (in feet)		

BEGUN: 7/29/92	SUPERVISOR: T. Smith	WELL SITE:	WATER LEVEL:	DEPTH/ELEV.
FINISHED: 7/29/92	DRILLER: D. Logan	Waste Lagoondeep well to MW-1852.	35.0'	

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
TOP OF SURFACE CASING: TOP OF RISER CASING: 955.3' / GROUND SURFACE	0.0	952.8
SURFACE CASING — DIAMETER: 8" TYPE: Steel		
BOTTOM OF SURFACE CASING	2.5	950.3
BACKFILL: Grout — TYPE: 95% Portland Cement 5% Volclay		
RISER CASING — DIAMETER: 4" TYPE: Schedule 40 PVC		
TOP OF SEAL	51.0	901.8
ANNULAR SEAL: — TYPE: 3/8" Bentonite Pellets		
BOTTOM OF SEAL	56.0	896.8
TOP OF SCREEN	61.0	891.8
FILTER MATERIAL: Sand — TYPE: #2		
SCREEN DIAMETER: 4" OPENING WIDTH: 0.010" — TYPE: PVC TYPE: Machine Cut		
BOTTOM OF SCREEN	81.0	871.8
BOTTOM OF HOLE	81.5	871.3

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

COMMENTS:

Metcalf & Eddy

GROUND WATER INSTALLATION

PROJECT: LBAD JOB NO. 7248-3 WELL NO. MW-391D

LLING CONTRACTOR: Faulkner

COORDINATES: Y-13837480.27 X-2409139.77 (In Feet)

UN: 7/29/92 SUPERVISOR: T. Smith

ED: 7/29/92 DRILLER: Delbert Logan

WELL SITE: Waste Lagoon Deep Well To MW-1852

WATER LEVEL: DEPTH/ELEV. 35'

FERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING: 955.28'		
GROUND SURFACE		
GENERALIZED GEOLOGIC LOG		
SURFACE CASING: DIA.: 8" TYPE: Steel		
BOTTOM OF SURFACE CASING		
BACKFILL: TYPE:		
RISER CASING: DIA.: 4" TYPE: 40 Schedule PVC		
TOP OF SEAL	51.0'	
ANNULAR SEAL: 3/8" TYPE: Bentonite Pellets		
BOTTOM OF SEAL	56.0'	
TOP OF SCREEN	61.0'	
FILTER MATERIAL: TYPE:		
SCREEN: DIA.: 4" TYPE: PVC OPENING WIDTH: 10 slot TYPE: Machine Cut		
BOTTOM OF SCREEN	81.0'	
BOTTOM OF SUMP	81.5'	
BOTTOM OF HOLE	81.5'	

HOLE DIAMETER

8"

D LLED: Rotary

HOD DEVELOPED:

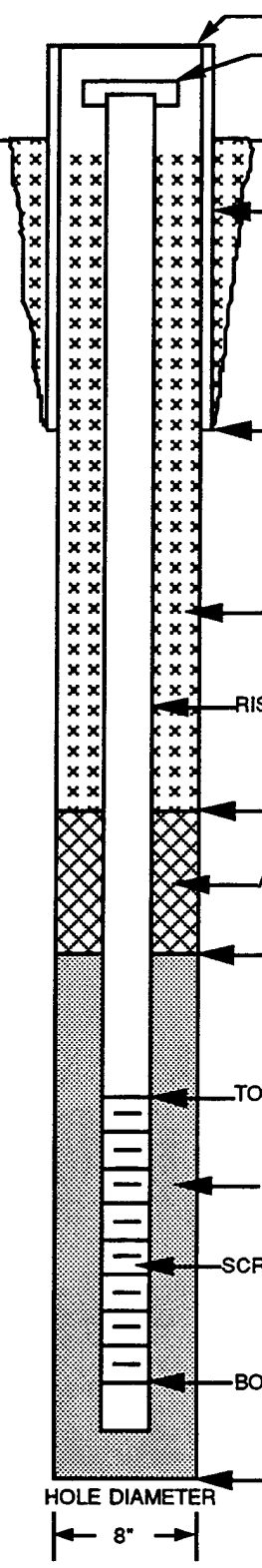
E DEVELOPED:

COMMENTS:

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO. MW-40
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13837134.88, X-2408732 (in feet)		

BEGUN: 7/23/92	SUPERVISOR: T. Smith	WELL SITE:	WATER LEVEL: DEPTH/ELEV.
FINISHED: 7/23/92	DRILLER: D. Logan		

REFERENCE POINT & ELEVATION:



		DEPTH IN FEET	ELEV. IN FEET
TOP OF SURFACE CASING:			
TOP OF RISER CASING: 943.6'			
GROUND SURFACE		0.0	941.1
SURFACE CASING	DIAMETER: 8" TYPE: Steel		
BOTTOM OF SURFACE CASING		2.5	938.6
BACKFILL: Grout	TYPE: 95% Portland Cement 5% Volclay		
RISER CASING	DIAMETER: 4" TYPE: Schedule 40 PVC		
TOP OF SEAL		13.5	927.6
ANNULAR SEAL:	TYPE: 3/8" Bentonite Pellets		
BOTTOM OF SEAL		18.5	922.6
		23.5	917.6
TOP OF SCREEN			
FILTER MATERIAL: Sand	TYPE: #2		
SCREEN			
DIAMETER: 4"	TYPE: PVC		
OPENING WIDTH: 0.010"	TYPE: Machine Slotted		
BOTTOM OF SCREEN		33.5	907.6
BOTTOM OF HOLE		34.0	907.1

HOLE DIAMETER: 8"

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

COMMENTS:

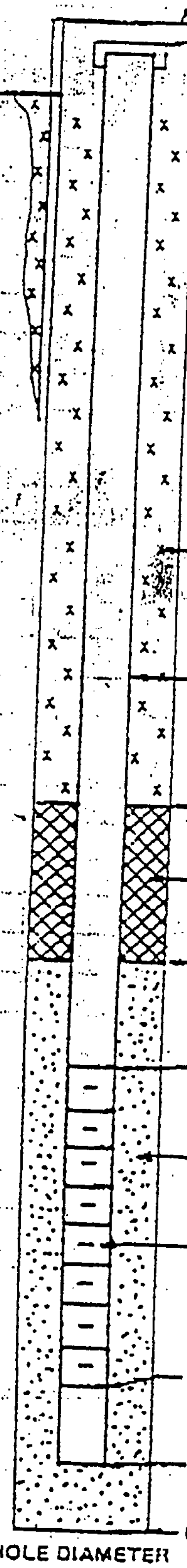
Metcalf & Eddy

GROUND WATER INSTALLATION

DRILLING CONTRACTOR: Faulkner	PROJECT: LBAD	JOB NO. 7248-3	WELL NO. MW-40
BEGUN: 7/23/97	COORDINATES: Y-1383734.88 X-2408732 (In Feet)		
SUPERVISOR: T. Smith			
COMPLETED: 7/23/97	DRILLER: Derbert	WELL SITE:	WATER LEVEL DEPTH/ELEV. 23 1/2'

REFERENCE POINT & ELEVATION:

GENERALIZED GEOLOGIC LOG



Item	Details	DEPTH IN feet	ELEV. IN
TOP OF SURFACE CASING:			
TOP OF RISER CASING:	943.61'		
GROUND SURFACE			
SURFACE CASING:	DIA.: TYPE:		
BOTTOM OF SURFACE CASING			
BACKFILL:	TYPE:		
RISER CASING:	DIA.: 4" TYPE: PVC Sch. 40		
TOP OF SEAL		13.5'	
ANNULAR SEAL:	TYPE: Bentonite 3/8"		
BOTTOM OF SEAL		18.5'	
TOP OF SCREEN		23 1/2'	
FILTER MATERIAL:	Sand TYPE:		
SCREEN:	DIA.: TYPE: OPENING WIDTH: 10 slot TYPE: Machine slot		
BOTTOM OF SCREEN		32.5'	
BOTTOM OF SUMP		33.0'	
BOTTOM OF HOLE		33.0'	

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

HOLE DIAMETER 8"

COMMENTS:

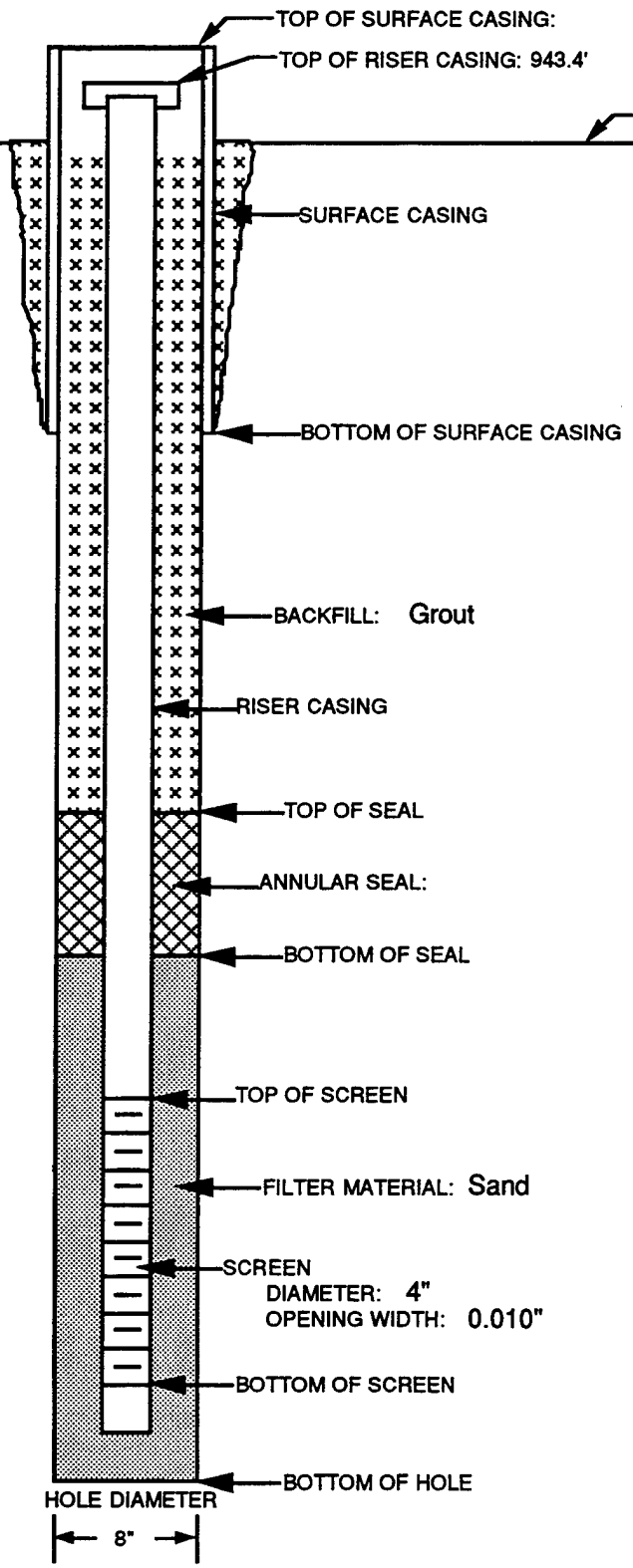
TIME DEVELOPED:

M&E

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO MW-40D
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13837128.13, X-2408756.65 (in feet)		

BEGUN: 7/24/92	SUPERVISOR: T. Smith	WELL SITE:	WATER LEVEL:	DEPTH/ELEV.
FINISHED: 7/24/92	DRILLER: D. Logan	Between Buildings 16 and 14.	35.0'	39.0'

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
	0.0	940.9
DIAMETER: 8" TYPE: Steel	2.5	938.4
TYPE: 95% Portland Cement 5% Volclay	37.5	903.4
DIAMETER: 4" TYPE: Schedule 40 PVC	42.5	898.4
TYPE: 3/8" Bentonite Pellets	47.5	893.4
TYPE: #2	67.5	873.4
TYPE: PVC TYPE: Machine Slotted	68.0	872.9

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

COMMENTS:

Metcalf & Eddy

GROUND WATER INSTALLATION

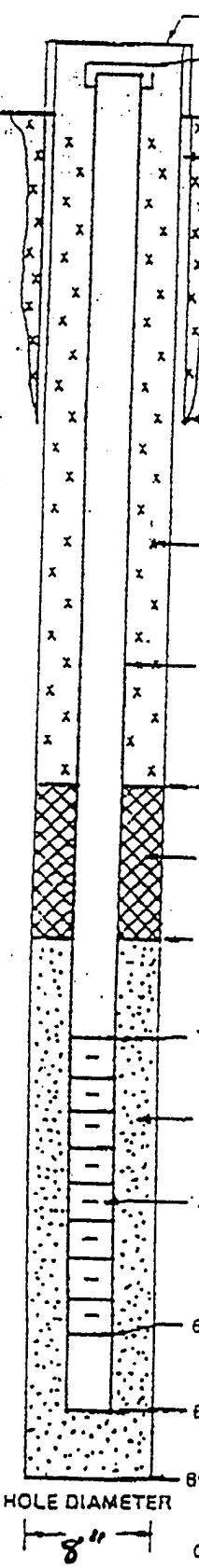
PROJECT: LBAD | JOB NO. 7248.3 | WELL NO. MW-40S

DRILLING CONTRACTOR: Falkner | COORDINATES: Y-138737128.13 X-2408754.65 (In Feet)

BEGUN: 7/24/92 | SUPERVISOR: T. Smith | WELL SITE: Between Bldg 16 & 14

FINISHED: 7/24/92 | DRILLER: Derbert | WATER LEVEL: DEPTH/ELEV. 35'/39'

REFERENCE POINT & ELEVATION:



DEPTH IN	ELEV. IN
37½'	
42½'	
47½'	
67½'	
68.0'	
68.0'	

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

TIME DEVELOPED:

COMMENTS:

GROUND WATER INSTALLATION

PROJECT: CBAD

JOB NO. 7248-3

WELL NO. MW-41

DRILLING CONTRACTOR: Fallkatr

COORDINATES: Y-13836756.00 X-2409539.10 (In Feet)

BEGUN: 7/23/92 SUPERVISOR: T. SMITH

WELL SITE:

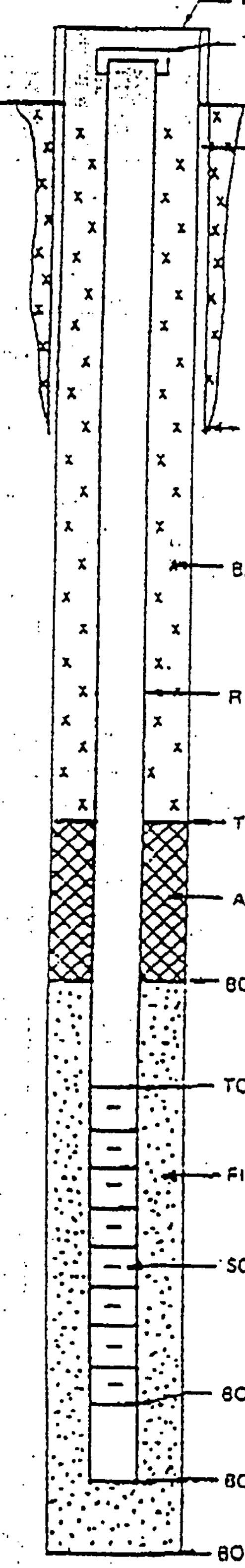
FINISHED: 7/23/92 DRILLER: Bennett

WATER LEVEL: DEPTH/ELEV 16.0'

REFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SEAL	9'	
BOTTOM OF SEAL	12'0"	
TOP OF SCREEN	16.0'	
BOTTOM OF SCREEN	25.5'	
BOTTOM OF SUMP	26.0'	
BOTTOM OF HOLE	26'	

GENERALIZED GEOLOGIC LOG



TOP OF SURFACE CASING:

TOP OF RISER CASING: 938.34'

GROUND SURFACE

SURFACE CASING: DIA.: TYPE:

BOTTOM OF SURFACE CASING

BACKFILL: TYPE:

RISER CASING: DIA.: 4" TYPE: PVC Sch. 40

TOP OF SEAL

ANNULAR SEAL: TYPE: Bentonite Pellets 3/8"

BOTTOM OF SEAL

TOP OF SCREEN

FILTER MATERIAL: Sand TYPE:

SCREEN: DIA.: TYPE:

OPENING WIDTH: 10 Slot TYPE: Machine

BOTTOM OF SCREEN

BOTTOM OF SUMP

BOTTOM OF HOLE

HOLE DIAMETER 8"

COMMENTS:

DEPTH DRILLED:

METHOD DEVELOPED:

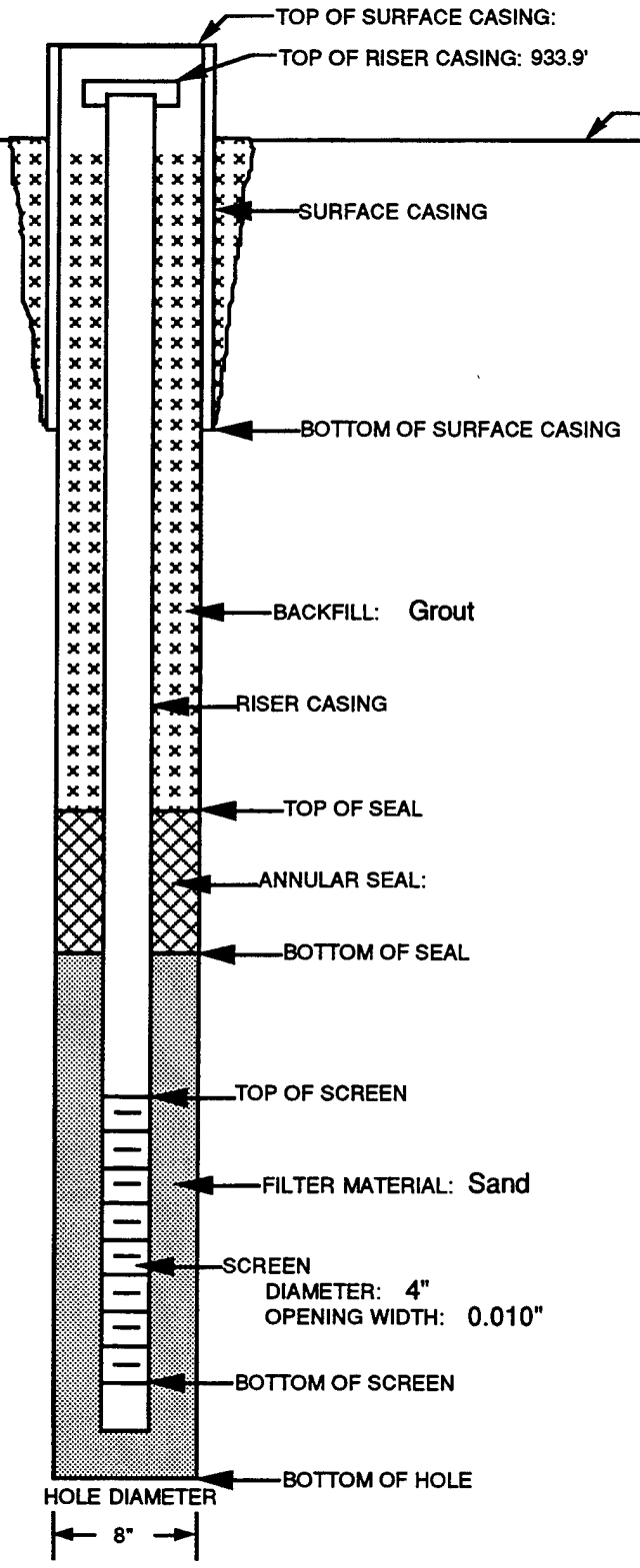
TIME DEVELOPED:

M&E

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO. MW-42
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13838200.35, X-2408094.15 (in feet)		

BEGUN: 7/30/92	SUPERVISOR: T. Smith	WELL SITE:	WATER LEVEL: DEPTH/ELEV.
FINISHED: 7/30/92	DRILLER: D. Logan	Southwest end of creek.	15.0'

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
	0.0	931.4
DIAMETER: 8" TYPE: Steel	2.5	928.9
TYPE: 95% Portland Cement 5% Volclay		
DIAMETER: 4" TYPE: Schedule 40 PVC	7.0	924.4
TYPE: 3/8" Bentonite Pellets	11.0	920.4
	15.0	916.4
TYPE: #2		
TYPE: PVC TYPE: Machine Cut	25.0	906.4
	25.5	905.9

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

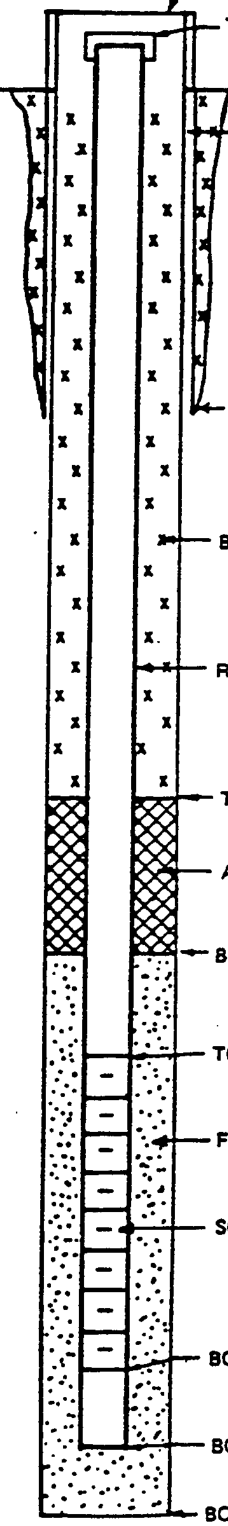
COMMENTS:

Metcalf & Eddy

GROUND WATER INSTALLATION	PROJECT: IBAD	JOB NO. 7248.3	WELL NO. MW-42
DRILLING CONTRACTOR: Faulkner	COORDINATES: Y-1383820.0.35 X-2408094.15 (In Fe...		

BEGUN: 7/30/92 FINISHED: 7/30/92	SUPERVISOR: T. Smith DRILLER: D. Logan	WELL SITE: Southwest End of Creek	WATER LEVEL: DEPTH/ELEV 15.0'

REFERENCE POINT & ELEVATION:



Item	Details	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:			
TOP OF RISER CASING:	933.87'		
GROUND SURFACE			
GENERALIZED GEOLOGIC LOG			
SURFACE CASING:	DIA.: TYPE:		
BOTTOM OF SURFACE CASING			
BACKFILL:	TYPE:		
RISER CASING:	DIA.: 4" TYPE: Schedule 40 PVC		
TOP OF SEAL		7.0'	
ANNULAR SEAL:	TYPE: 3/8" Bentonite Pellets		
BOTTOM OF SEAL		11.0'	
TOP OF SCREEN		15.0'	
FILTER MATERIAL: #2	TYPE: Sand		
SCREEN:	DIA.: 4" TYPE: PVC; OPENING WIDTH: 10 slot; TYPE: Machine Cut		
BOTTOM OF SCREEN		25.0'	
BOTTOM OF SUMP		25.5'	
BOTTOM OF HOLE		25.5'	

HOLE DIAMETER 8"

METHOD DRILLED :

METHOD DEVELOPED :

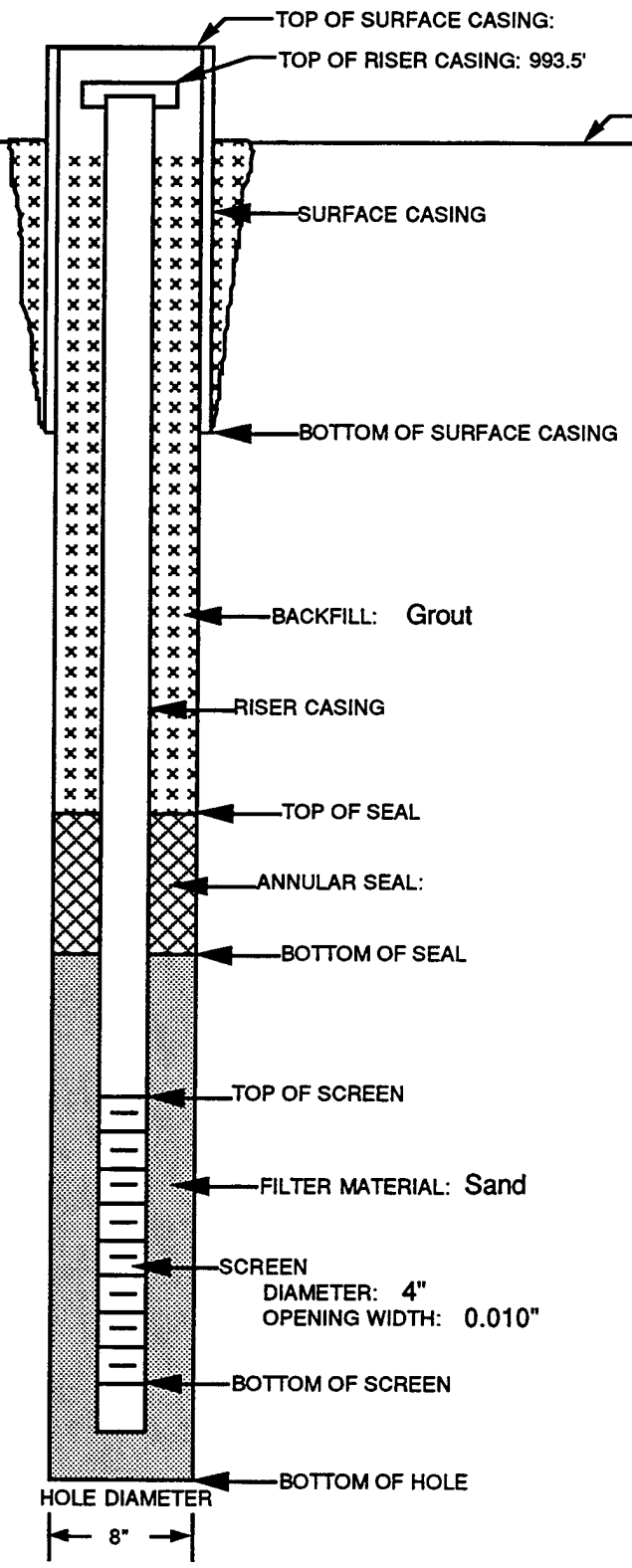
TIME DEVELOPED :

COMMENTS:

M&E Metcalf & Eddy

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO. MW-43
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13839144.96, X-2416706.39 (in feet)		
BEGUN: 7/30/92	SUPERVISOR: T. Smith	WELL SITE:	WATER LEVEL: DEPTH/ELEV.
FINISHED: 7/30/92	DRILLER: D. Logan	New Landfill former MW-24.	

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
TOP OF SURFACE CASING: / TOP OF RISER CASING: 993.5' / GROUND SURFACE	0.0	991.0
SURFACE CASING — DIAMETER: 8", TYPE: Steel	2.5	988.5
BOTTOM OF SURFACE CASING		
BACKFILL: Grout — TYPE: 95% Portland Cement, 5% Volclay		
RISER CASING — DIAMETER: 4", TYPE: Schedule 40 PVC	1.0	990.0
TOP OF SEAL		
ANNULAR SEAL: — TYPE: 3/8" Bentonite Pellets	2.0	989.0
BOTTOM OF SEAL		
TOP OF SCREEN	2.5	988.5
FILTER MATERIAL: Sand — TYPE: #2		
SCREEN — DIAMETER: 4", OPENING WIDTH: 0.010" — TYPE: PVC, TYPE: Machine Cut	12.5	978.5
BOTTOM OF SCREEN		
BOTTOM OF HOLE	13.0	978.0

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

COMMENTS:

Metcalf & Eddy

GROUND WATER INSTALLATION

PROJECT: CBAI JOB NO. 7248.3 WELL NO. MW-43

DRILLING CONTRACTOR: Faulkner

COORDINATES: Y-1383944.96 X-2416706.89 (In Feet)

BEGUN: 7/30/92 SUPERVISOR: T. Smith

COMPLETED: 7/30/92 DRILLER: D. Logan

WELL SITE: New Landfill Former MW-24

WATER LEVEL: DEPTH/ELEV.: —

REFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING: 993.50'		
GROUND SURFACE		
GENERALIZED GEOLOGIC LOG		
SURFACE CASING: DIA.: TYPE:		
BOTTOM OF SURFACE CASING		
BACKFILL: TYPE:		
RISER CASING: DIA.: 4" TYPE: Schedule 40 PVC		
TOP OF SEAL	1.0'	
ANNULAR SEAL: 3/8" TYPE: Bentonite Pellets		
BOTTOM OF SEAL	2.0'	
TOP OF SCREEN	2.5'	
FILTER MATERIAL: #2 TYPE: Sand		
SCREEN: DIA.: 4" TYPE: PVC OPENING WIDTH: 10 Slot TYPE: Mach. Cut		
BOTTOM OF SCREEN	12.5'	
BOTTOM OF SUMP	12.8'	
BOTTOM OF HOLE	13.0'	

HOLE DIAMETER: 8"

COMMENTS:

METHOD DRILLED: Air Rotary

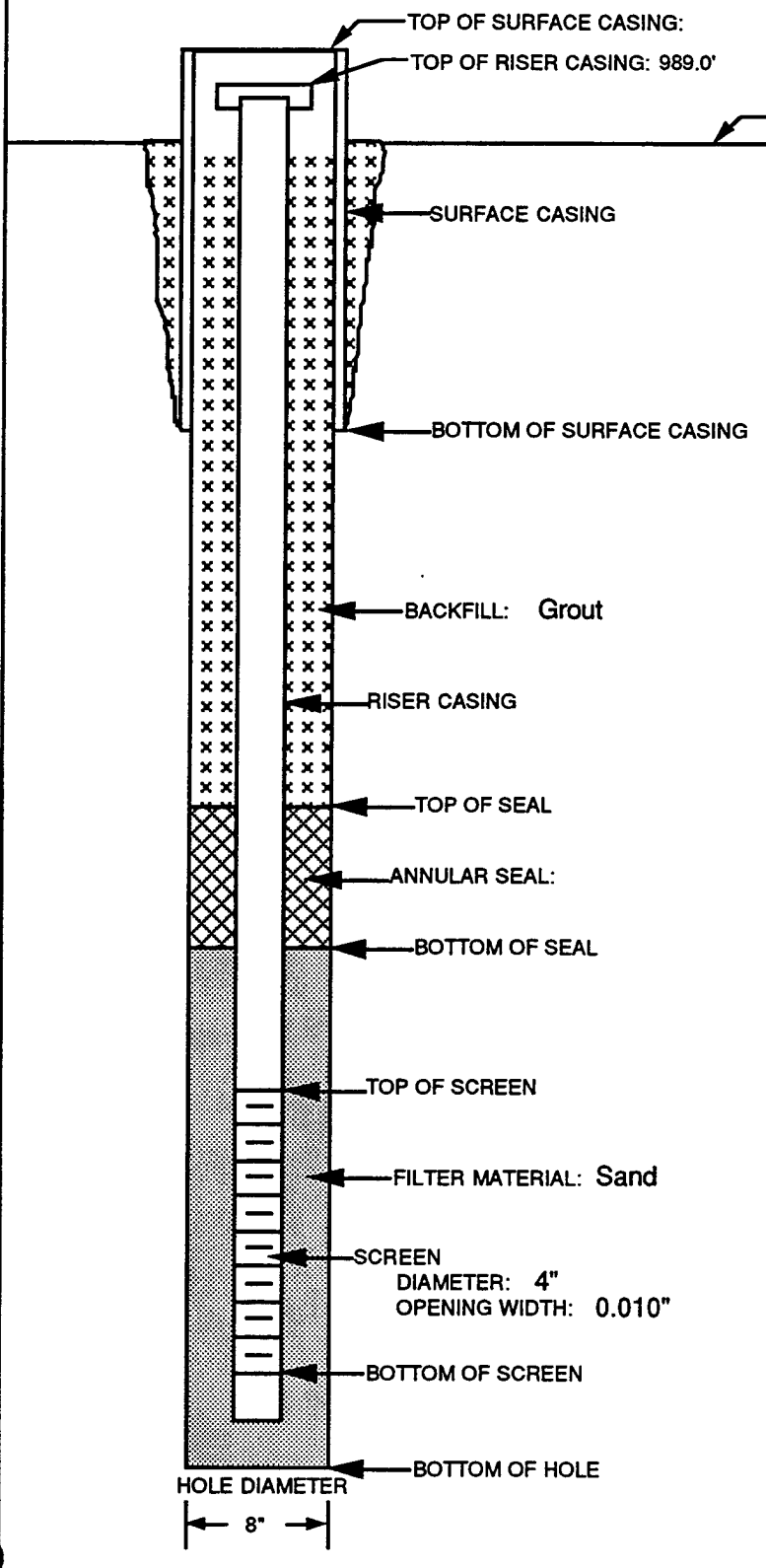
METHOD DEVELOPED:

TIME DEVELOPED:

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO. MW-44
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13840813.97, X-2416484.51 (in feet)		

BEGUN: 7/30/92	SUPERVISOR: Wurm/Jordan	WELL SITE:	WATER LEVEL:	DEPTH/ELEV.
FINISHED: 7/30/92	DRILLER: Charlie/Danny/Clarence	Next to dry hole MW-26 in northern end of golf course.	10' 6"	15' 10"

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
TOP OF SURFACE CASING: / TOP OF RISER CASING: 989.0' / GROUND SURFACE	0.0	986.5
BOTTOM OF SURFACE CASING	2.5	984.0
TOP OF SEAL	3.4	983.1
BOTTOM OF SEAL	4.5	982.0
TOP OF SCREEN	5.4	981.1
BOTTOM OF SCREEN	15.4	971.1
BOTTOM OF HOLE	15.9	970.6

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

COMMENTS: Hit bedrock at 7' 3".
Hit a damp spot at 10' 6".

Metcalf & Eddy

7/30/92

GROUND WATER INSTALLATION

PROJECT: LBAD | JOB NO.: 7248-3 | WELL NO.: MW-44

DRILLING CONTRACTOR: FAULKNER DRILLING CO.

COORDINATES: Y-1384013.97 X-2416484.51 (In Feet)

EGUN: 1505 | SUPERVISOR: WURM/JORDAN

ED: 1615 | DRILLER: CHARLIE/CLARENCE

WELL SITE: NEXT TO DRY HOLE MW-26 IN NORTHERN END OF GOLF COURSE.

WATER LEVEL: DEPTH/ELEV. 10'6" / 15'10"

EFERENCE POINT & ELEVATION:

GENERALIZED GEOLOGIC LOG

TOP OF SURFACE CASING:

TOP OF RISER CASING: ~~+2ft.~~ 989.01

GROUND SURFACE

SURFACE CASING: DIA.: TYPE:

BOTTOM OF SURFACE CASING

BACKFILL: GROUT TYPE: 95% PORTLAND CEMENT 5% VOLCLAY

RISER CASING: DIA.: 4" TYPE: PVC, Schedule 40

TOP OF SEAL

ANNULAR SEAL: 3/8" TYPE: BENTONITE PELLETS

BOTTOM OF SEAL

TOP OF SCREEN

T: BEDROCK AT 7'3"

FILTER MATERIAL: SAND TYPE:

SCREEN: DIA.: 4" TYPE: PVC

OPENING WIDTH: .010 inch TYPE: sch.40 slotted

WATER AT 10'6"

BOTTOM OF SCREEN

OD DRILLED: AIR ROTARY

BOTTOM OF SUMP

OD DEVELOPED:

BOTTOM OF HOLE

HOLE DIAMETER

8¾"

COMMENTS:

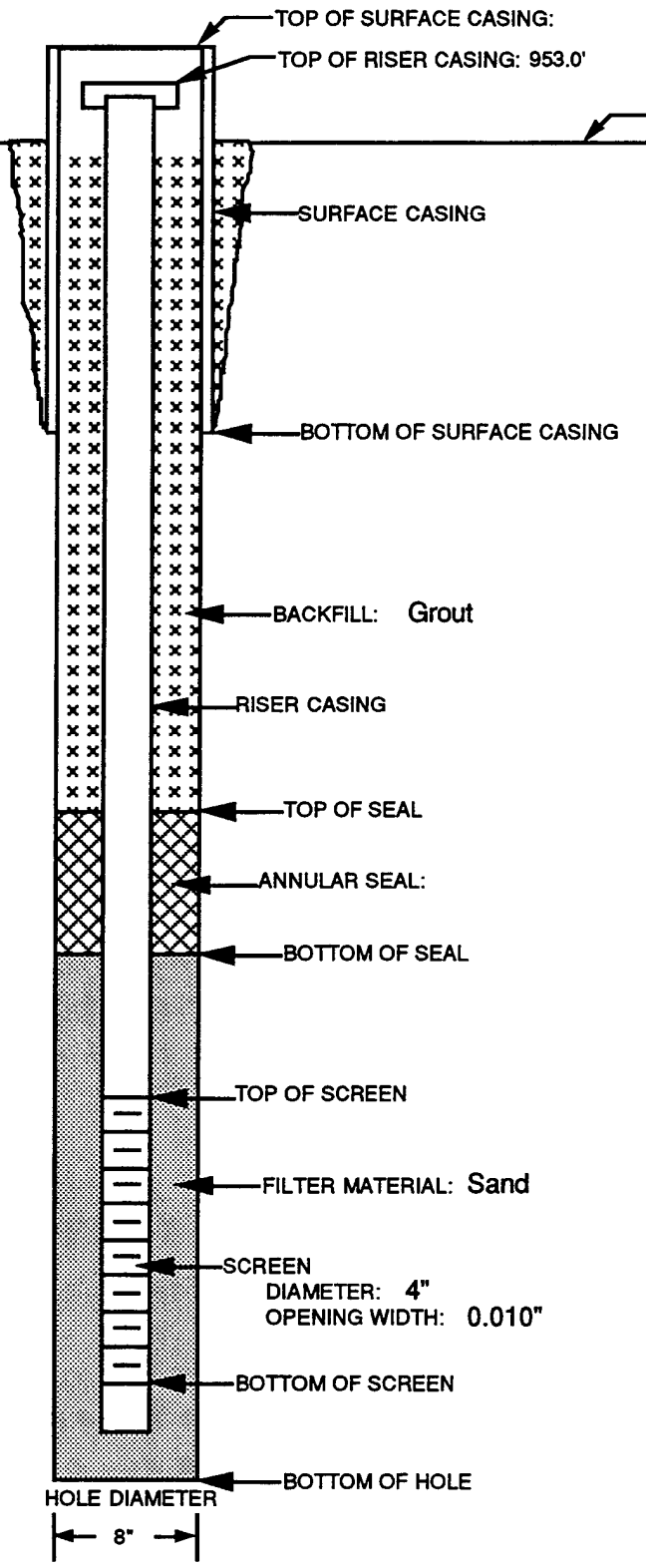
EVELOPED:

DEPTH IN	ELEV IN
3'5"	
4'6"	13"
5'4"	14"
15'4"	10'
15'10"	6"

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO. MW-45
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13839593.24, X-2410931.43 (in feet)		

BEGUN: 8/5/92	SUPERVISOR: T. Smith	WELL SITE:	WATER LEVEL:	DEPTH/ELEV.
FINISHED: 8/5/92	DRILLER: D. Logan	Area B along creek.	32.0'	41.5'

REFERENCE POINT & ELEVATION:



DEPTH IN FEET	ELEV. IN FEET
0.0	950.5
2.5	948.0
21.5	929.0
26.5	924.0
31.5	919.0
41.5	909.0
42.0	908.5

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

COMMENTS:

Metcalf & Eddy

GROUND WATER INSTALLATION

PROJECT: LBAD | JOB NO. 7248.3 | WELL NO. MW-45

DRILLING CONTRACTOR: Faulkner

COORDINATES: Y-1383959.24 X-2410931.43 (In Feet)

BEGUN: 8/5/92 | SUPERVISOR: T. SMITH

FINISHED: 8/5/92 | DRILLER: D. Logan

WELL SITE: AREA B along Creek

WATER LEVEL: DEPTH/ELEV. 49.5' / 432'

REFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING: 953.02		
GROUND SURFACE		
GENERALIZED GEOLOGIC LOG		
SURFACE CASING: DIA.: TYPE:		
BOTTOM OF SURFACE CASING		
BACKFILL: grout TYPE:		
RISER CASING: DIA.: TYPE:		
TOP OF SEAL		
ANNULAR SEAL: 3/8" TYPE: Bentonite Pellets		
BOTTOM OF SEAL		
TOP OF SCREEN	31.5'	
FILTER MATERIAL: #2 TYPE: Sand		
SCREEN: DIA.: 4" TYPE: PVC		
OPENING WIDTH: 10 Slot TYPE: MACHINE CUT		
BOTTOM OF SCREEN	41.5'	
BOTTOM OF SUMP	42.0'	
BOTTOM OF HOLE	42.0	

HOLE DIAMETER 8"

METHOD DRILLED: AIR ROTARY

METHOD DEVELOPED:

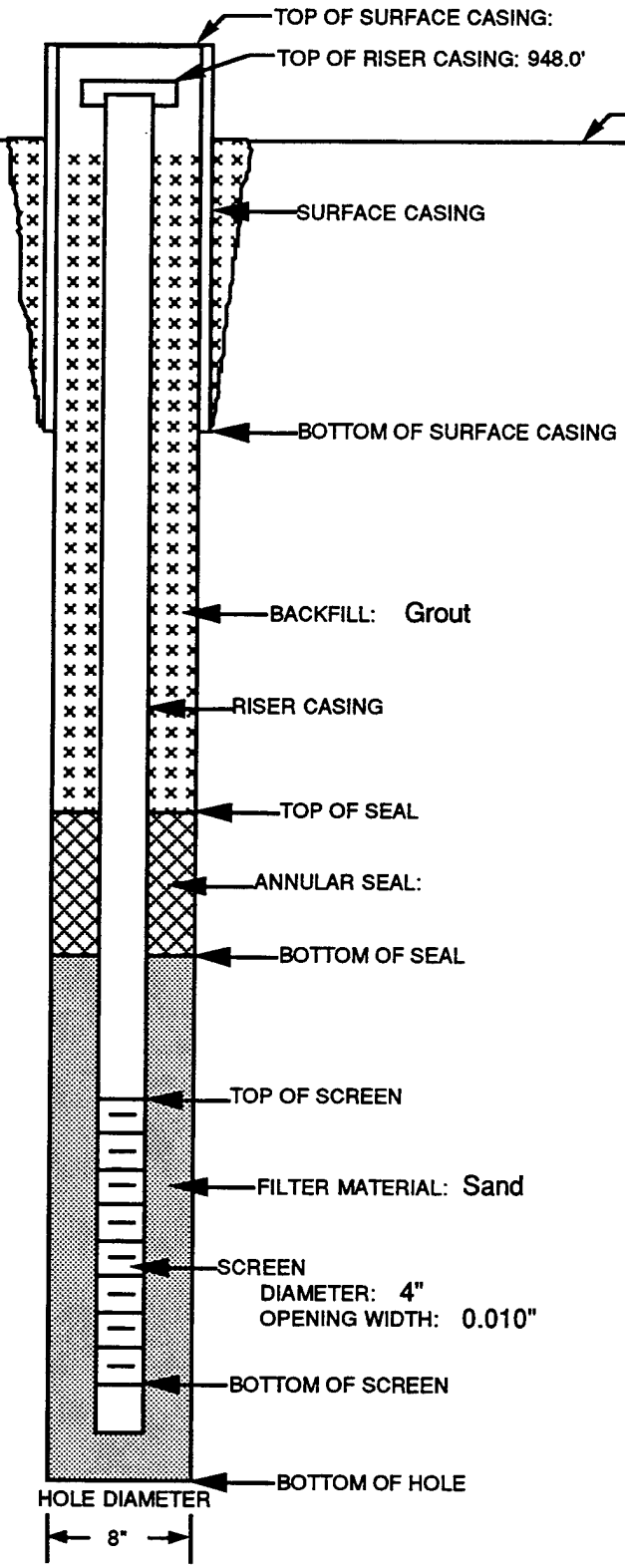
TIME DEVELOPED:

COMMENTS:

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO. MW-46
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13837154.91, X-2411373.92 (in feet)		

BEGUN: 8/4/92	SUPERVISOR: T. Smith	WELL SITE:	WATER LEVEL: DEPTH/ELEV.
FINISHED: 8/4/92	DRILLER: D. Logan	In front of Building 118.	41.0'

REFERENCE POINT & ELEVATION:



	DEPTH IN FEET	ELEV. IN FEET
	0.0	945.5
DIAMETER: 8" TYPE: Steel	2.5	943.5
TYPE: 95% Portland Cement 5% Volclay	31.1	914.4
DIAMETER: 4" TYPE: Schedule 40 PVC	36.0	909.5
TYPE: 3/8" Bentonite Pellets	40.5	905.0
TYPE: #2	50.5	895.0
TYPE: PVC TYPE: Machine Cut	51.0	894.5

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

COMMENTS:

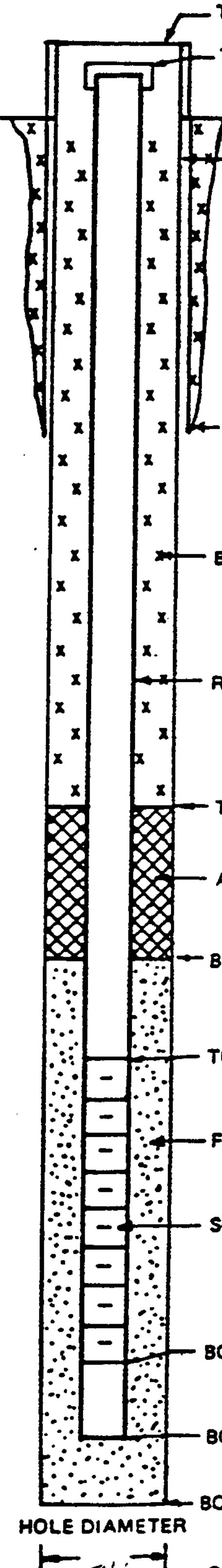
M&E Metcalf & Eddy

GROUND WATER INSTALLATION

GROUND WATER INSTALLATION	PROJECT: CBAD	JOB NO. 7748.3	WELL NO. MW-[illegible]
DRILLING CONTRACTOR: Faulkner	COORDINATES: N.138371 54.91 X-2411373.92 (In Feet [illegible]		
BEGUN: 8/4/92 FINISHED: 8/4/92	SUPERVISOR: T. Smith DRILLER: D. Logan	WELL SITE: In Front of Bldg. 118	WATER LEVEL: DEPTH/ELEV 41.0'

REFERENCE POINT & ELEVATION:

GENERALIZED GEOLOGIC LOG



Item	Details	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:			
TOP OF RISER CASING:	948.00'		
GROUND SURFACE			
SURFACE CASING:	DIA.: TYPE:		
BOTTOM OF SURFACE CASING			
BACKFILL:	TYPE:		
RISER CASING:	DIA.: 4" TYPE: Schedule 40 PVC		
TOP OF SEAL		31.1'	
ANNULAR SEAL:	TYPE: 3/8" Bentonite Pellets		
BOTTOM OF SEAL		36.0'	
TOP OF SCREEN		40.5'	
FILTER MATERIAL: #2	TYPE: Sand		
SCREEN:	DIA.: 4" TYPE: PVC; OPENING WIDTH: 10 slot TYPE: Machine Cut		
BOTTOM OF SCREEN		50.5'	
BOTTOM OF SUMP		51.0'	
BOTTOM OF HOLE		51.0'	

HOLE DIAMETER: 8"

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

TIME DEVELOPED:

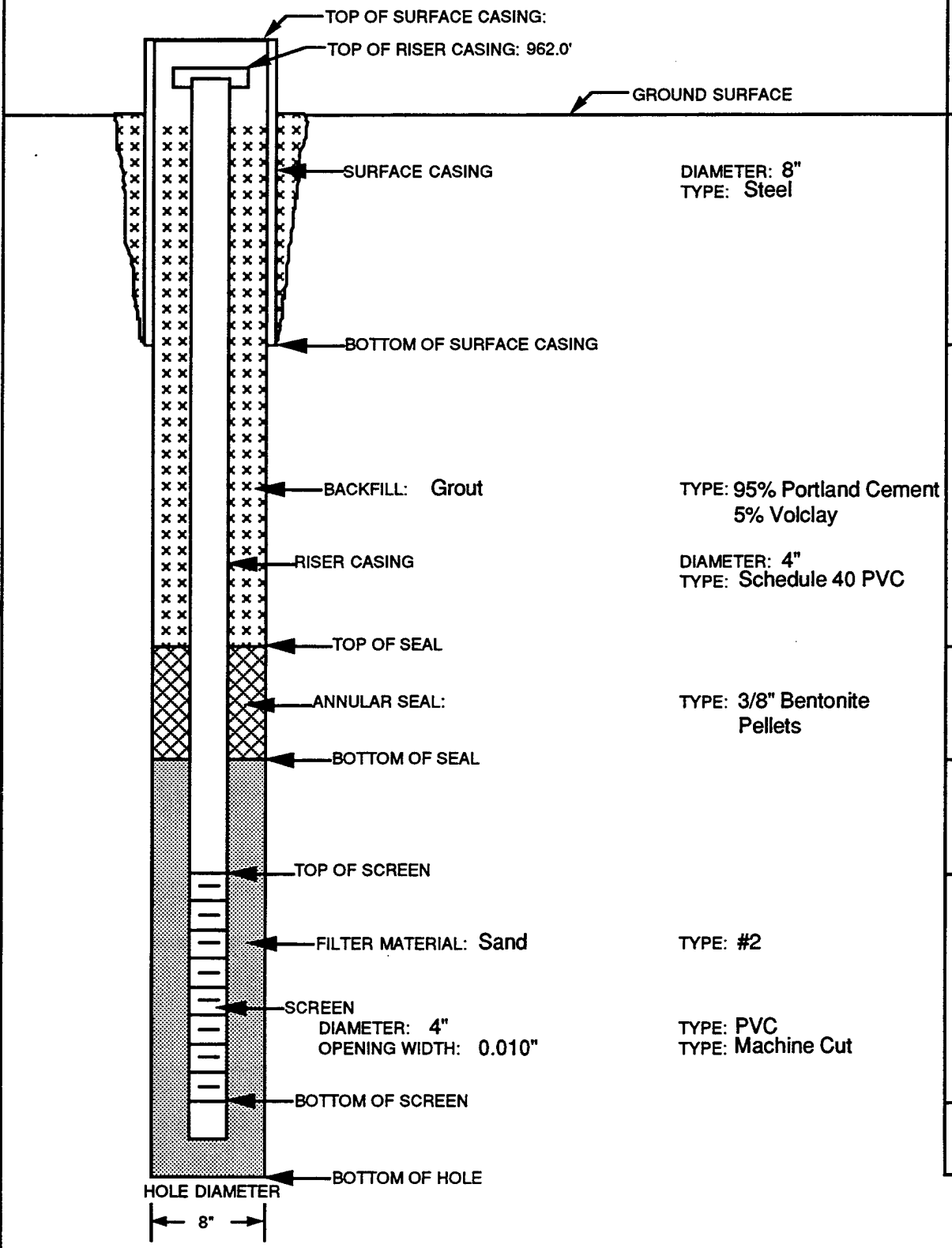
COMMENTS:

Metcalf & Eddy

MONITORING WELL CONSTRUCTION	PROJECT: LBAD	JOB NO. 007248-0003	WELL NO. MW-47
DRILLING CONTRACTOR: Faulkner Drilling Co.	COORDINATES: Y-13838361.21, X-2408743.21 (in feet)		

BEGUN: 8/6/92	SUPERVISOR: T. Smith	WELL SITE:	WATER LEVEL: DEPTH/ELEV.
FINISHED: 8/6/92	DRILLER: D. Logan	Old landfill.	30.5'

REFERENCE POINT & ELEVATION:



DEPTH IN FEET	ELEV. IN FEET
0.0	959.5
2.5	957.0
18.5	941.0
23.5	936.0
28.5	931.0
38.5	921.0
39.0	920.5

METHOD DRILLED: Air Rotary

METHOD DEVELOPED:

COMMENTS:

M&E Metcalf & Eddy

GROUND WATER INSTALLATION

PROJECT: LBAD JOB NO. 7248.3 WELL NO. mw-47

DRILLING CONTRACTOR: Faulkner

COORDINATES: Y-138383 el. 21 X-2408743.21 (In Feet)

BEGUN: 8/6/97 SUPERVISOR: T. Smith

FINISHED: 8/6/97 DRILLER: D. Cogen

WELL SITE: OLD Landfill

WATER LEVEL: DEPTH/ELEV 30.5'

REFERENCE POINT & ELEVATION:

GENERALIZED GEOLOGIC LOG

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING: 96.96'		
GROUND SURFACE		
SURFACE CASING: DIA.: TYPE:		
BOTTOM OF SURFACE CASING		
BACKFILL: Grout TYPE:		
RISER CASING: DIA.: 4" TYPE: Schedule 40 PVC		
TOP OF SEAL	18.5	
ANNULAR SEAL: 3/8" TYPE: Bentonite Pellets		
BOTTOM OF SEAL	23.5'	
TOP OF SCREEN	28.5'	
FILTER MATERIAL: TYPE: Sand		
SCREEN: DIA.: 4" TYPE: PVC OPENING WIDTH: 10 Slot TYPE: Machine Cut		
BOTTOM OF SCREEN	38.5'	
BOTTOM OF SUMP	39.0'	
BOTTOM OF HOLE	39.0'	

HOLE DIAMETER 8"

METHOD DRILLED: ROTARY DRILL

METHOD DEVELOPED:

TIME DEVELOPED:

COMMENTS:

GROUND WATER INSTALLATION

PROJECT: LBAD JOB NO. 012308-0003 WELL NO. MW-48

DRILLING CONTRACTOR: Faulkner COORDINATES:

BEGUN: 9/8/93 SUPERVISOR: Hulett WELL SITE: East of Environmental Bld. WATER LEVEL: DEPTH/ELEV

ED: 9/8/93 DRILLER Clarance & Bennet Gibbson

FERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING: 2.5 ft		
GROUND SURFACE		
SURFACE CASING: DIA.: 8" TYPE: Steel		
BOTTOM OF SURFACE CASING		
BACKFILL: Grout TYPE: Portland/Bentonite		
RISER CASING: DIA.: 4" TYPE: PVC sch. 40		
TOP OF SEAL	18 ft	
ANNULAR SEAL: Bentonite TYPE: Pellet 1/4"		
BOTTOM OF SEAL	23 ft	
TOP OF SCREEN	27.5	
FILTER MATERIAL: Silica TYPE: Sand		
SCREEN: DIA.: 4" TYPE: sch. 40		
OPENING WIDTH: 10slot TYPE: PVC		
BOTTOM OF SCREEN	37.5 ft	
BOTTOM OF SUMP	38 ft	
BOTTOM OF HOLE	38 ft	

GENERALIZED GEOLOGIC LOG

Silty Clay

5 ft TOR

Interbedded Micritic limestone & Shale

OD DRILLED :

METHOD DEVELOPED : 2" Grundfos Pump

TIME DEVELOPED : 110 gal

HOLE DIAMETER 8 3/4

COMMENTS:

GROUND WATER INSTALLATION

PROJECT: LBAD | JOB NO. 012308-0003 | WELL NO. MW-48D

DRILLING CONTRACTOR: Faulkner | COORDINATES:

BEGUN: 9/8/93 | SUPERVISOR: Hulett, Bennet

FINISHED: 9/15/93 | DRILLER Clarance, Gibbson

WELL SITE: Back East of Environmental Bld

WATER LEVEL: DEPTH/ELEV

REFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING:		
GROUND SURFACE		
SURFACE CASING: DIA.: 8" TYPE: Steel		
BOTTOM OF SURFACE CASING		
BACKFILL: Grout TYPE: Portland/Bentonite		
RISER CASING: DIA.: 4" TYPE: Sch 40		
TOP OF SEAL	41.5 ft	
ANNULAR SEAL: Bentonite: 1/4" pellets		
BOTTOM OF SEAL	47.5 ft	
TOP OF SCREEN	52.5 ft	
FILTER MATERIAL: Sand TYPE: Silica		
SCREEN: DIA.: 4" TYPE: PVC OPENING WIDTH: 10 slot TYPE: Sch 40		
BOTTOM OF SCREEN	72.5 ft	
BOTTOM OF SUMP	73 ft	
BOTTOM OF HOLE	73 ft	

GENERALIZED GEOLOGIC LOG

Silty Clay

5 ft

Interbedded Micritic Limestone and Shale

METHOD DRILLED: 7 7/8" Rotary

METHOD DEVELOPED: 2" Grundfos Pump

TIME DEVELOPED: 240 gal

HOLE DIAMETER: 8 3/4

COMMENTS:

M&E

GROUND WATER INSTALLATION

PROJECT: LBGD JOB NO. 012308 WELL NO. MW-47B

DRILLING CONTRACTOR: Faulkner COORDINATES:

BEGUN: 5/28/93 SUPERVISOR: Hulett

FINISHED: 5/28/93 DRILLER: Clarance

WELL SITE: Between Bld 6 and Bld 4

WATER LEVEL: DEPTH/ELEV.

REFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING:		
GROUND SURFACE		
SURFACE CASING: DIA.: TYPE:		
BOTTOM OF SURFACE CASING		
BACKFILL: Grout TYPE:		
RISER CASING: DIA.: 4" TYPE: PVC		
TOP OF SEAL	19ft	
ANNULAR SEAL: 1/4" TYPE: Bentonite		
BOTTOM OF SEAL	25ft	
TOP OF SCREEN	29.5	
FILTER MATERIAL: Silica TYPE: Sand		
SCREEN: DIA.: 4" TYPE: PVC		
OPENING WIDTH: 10 slot TYPE: PVC sched 40,		
BOTTOM OF SCREEN	39.5	
BOTTOM OF SUMP	40ft	
BOTTOM OF HOLE	40ft	

GENERALIZED GEOLOGIC LOG

Silty Clay

11ft TOR

Dark gray Micritic Limestone with interbedded Shale.

METHOD DRILLED: Air

METHOD DEVELOPED: 2" pump

AMOUNT DEVELOPED: 110 gal

HOLE DIAMETER: 8"

COMMENTS:

GROUND WATER INSTALLATION

PROJECT: LBAD | JOB NO. 012308-0003 | WELL NO. MW-47DR

DRILLING CONTRACTOR: Faulkner | COORDINATES:

BEGUN: 8-26-93 | SUPERVISOR: Jones | WELL SITE: Between Bldg & Bld. 4 | WATER LEVEL: DEPTH/ELEV.

FINISHED: 8-26-93 | DRILLER: Clarance Gibbson

REFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING: 2.5 ft		
GROUND SURFACE		
SURFACE CASING: DIA.: 8" TYPE: Steel		
BOTTOM OF SURFACE CASING		
BACKFILL: Grout TYPE: Portland/Bentonite		
RISER CASING: DIA.: 4" TYPE: PVC sch 40		
TOP OF SEAL	44.5	
ANNULAR SEAL: Bentonite TYPE: ¼" Pellet		
BOTTOM OF SEAL	49.5	
TOP OF SCREEN	54.5	
FILTER MATERIAL: Sand TYPE: Colorado Silica #5		
SCREEN: DIA.: 4" TYPE: PVC OPENING WIDTH: 10 Slot. TYPE: Sch 40		
BOTTOM OF SCREEN	74.5	
BOTTOM OF SUMP	75 ft	
BOTTOM OF HOLE	75 ft	

GENERALIZED GEOLOGIC LOG

Silty Clay

5 ft TOR

Dark gray micritic limestone with interbedded shale.

METHOD DRILLED: Air Rotary

METHOD DEVELOPED: 2" Grundfos Pump

TIME DEVELOPED:

HOLE DIAMETER: 8 3/4

COMMENTS:

M&E

GROUND WATER INSTALLATION

PROJECT: LBAP JOB NO: 012308-0003 WELL NO: Pyzo 1

DRILLING CONTRACTOR: Faulkner

COORDINATES:

BEGUN: 9/7/93 SUPERVISOR: Hulett

ENED: 9/7/93 DRILLER Clarence Gibbson

WELL SITE: South of ISWL ≈ 10F West MW-32

WATER LEVEL: DEPTH/ELEV

REFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING: 2.5 ft		
GROUND SURFACE		
SURFACE CASING: DIA.: 6" TYPE: Steel		
BOTTOM OF SURFACE CASING		
BACKFILL: Grout TYPE: Portland / Bentonite		
RISER CASING: DIA.: 2" TYPE: PVC sch 40		
TOP OF SEAL	34.7	
ANNULAR SEAL: 1/4" pellet TYPE: Bentonite		
BOTTOM OF SEAL	39.7	
TOP OF SCREEN	44.7	
FILTER MATERIAL: Sil. Sa TYPE: Sand		
SCREEN: DIA.: 2" TYPE: PVC OPENING WIDTH: 10 slot TYPE: Sch 40		
BOTTOM OF SCREEN	54.7 ft	
BOTTOM OF SUMP	55 ft	
BOTTOM OF HOLE	60 Ft	

GENERALIZED GEOLOGIC LOG

Silty Clay

5 ft 9"

interbedded Micritic Limestone and shale.

HOLE DIAMETER 6 3/4

METHOD DRILLED: Air

METHOD DEVELOPED: NOT

TIME DEVELOPED:

COMMENTS: Used as pumping well for pumping test. Thus overdrilled and filled with sand for 5 feet inorder to screen ~ Pooling zone.

M&E

GROUND WATER INSTALLATION

PROJECT: LBAD JOB NO. 007248 WELL NO. 7202

DRILLING CONTRACTOR: Faulkner

COORDINATES:

BEGUN: 8/26/93 SUPERVISOR: Raimond/Hulett

COMPLETED 8/26/93 DRILLER Clarance

WELL SITE: South of MW-32

WATER LEVEL, DEPTH/ELEV.

REFERENCE POINT & ELEVATION:

DEPTH IN	ELEV. IN

TOP OF SURFACE CASING:

TOP OF RISER CASING: 2.5 ft

GROUND SURFACE

GENERALIZED GEOLOGIC LOG

Silty Clay

SURFACE CASING: DIA.: 6" TYPE: Steel

BOTTOM OF SURFACE CASING

Micritic Limestone & interbedded Clay 20-30%

BACKFILL: Grout TYPE: Portland/Bentonite

RISER CASING: DIA.: 2" TYPE: PVC sch 40

TOP OF SEAL — 30'

ANNULAR SEAL: 1/4 TYPE: Bentonite Pellets

BOTTOM OF SEAL — 35'

TOP OF SCREEN — 39'8"

FILTER MATERIAL: Silica TYPE: Sand

SCREEN:1 DIA.: 2" TYPE: PVC

OPENING WIDTH: 10 Slot TYPE: PVC

BOTTOM OF SCREEN — 44'8"

BOTTOM OF SUMP — 45 ft

BOTTOM OF HOLE — 45 ft

METHOD DRILLED: Air

METHOD DEVELOPED: NOT

HOLE DIAMETER: 6 3/4

COMMENTS:

TIME DEVELOPED:

M&E

GROUND WATER INSTALLATION

PROJECT: LBAD | JOB NO. 007248 | WELL NO. Pyzo 3

DRILLING CONTRACTOR: Faulkner | COORDINATES:

BEGUN: 8/27/93 | SUPERVISOR: Hulea | WELL SITE: Pyzo 3 | WATER LEVEL: DEPTH/ELEV.

FINISHED: 8/27/93 | DRILLER: Clarence

REFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING: 2.5 ft		
GROUND SURFACE		
SURFACE CASING. DIA.: 6" TYPE: Steel		
BOTTOM OF SURFACE CASING		
BACKFILL: Grout TYPE: Portland/Bentonite		
RISER CASING: DIA.: 2" TYPE: PVC		
TOP OF SEAL	34' 8"	
ANNULAR SEAL: 1/4" TYPE: Bentonite Pellets		
BOTTOM OF SEAL	39' 8"	
TOP OF SCREEN	44' 8"	
FILTER MATERIAL: Silica TYPE: Sand		
SCREEN: DIA.: 2" TYPE: PVC OPENING WIDTH: 10 Slot TYPE:		
BOTTOM OF SCREEN	54' 8"	
BOTTOM OF SUMP	55	
BOTTOM OF HOLE	55	

GENERALIZED GEOLOGIC LOG

CLS, Silty Clay Dark Brown 7.5YR4/2

10 FT

Micritic Limestone Interbedded Shale, Dark Gray 2.5YR50

METHOD DRILLED: Air

METHOD DEVELOPED: NOT

TIME DEVELOPED:

HOLE DIAMETER 6 3/4

COMMENTS:

M&E

GROUND WATER INSTALLATION

PROJECT: LBAD | JOB NO. 009866 | WELL NO. PZ20 4

DRILLING CONTRACTOR: Faulkner | COORDINATES:

BEGUN: 8/27/93 | SUPERVISOR: Hulett

FINISHED: 8/27/93 | DRILLER: Clarence

WELL SITE: South of ISWL, West of MW-32 | WATER LEVEL: DEPTH/ELEV.

REFERENCE POINT & ELEVATION:

	DEPTH IN	ELEV. IN
TOP OF SURFACE CASING:		
TOP OF RISER CASING: 2.5 ft		
GROUND SURFACE		
SURFACE CASING: DIA.: 6" TYPE: Steel		
BOTTOM OF SURFACE CASING		
BACKFILL Grout TYPE: Portland/Bentonite		
RISER CASING: DIA.: 2" TYPE: PVC		
TOP OF SEAL	13'	
ANNULAR SEAL: 1/4 Bentonite pellets TYPE:		
BOTTOM OF SEAL	17'	
TOP OF SCREEN	28.8"	
FILTER MATERIAL: Sand TYPE: Silica		
SCREEN: DIA.: 2" TYPE: PVC OPENING WIDTH: 10 slot TYPE: Sch 40		
BOTTOM OF SCREEN	31.8"	
BOTTOM OF SUMP	32 ft	
BOTTOM OF HOLE		

GENERALIZED GEOLOGIC LOG

CLS, Silty Clay
Low-Med Soft Moist FeO2 Staining
8 ft

Dark Gray Micritic interbedded Shale and Limestone

HOLE DIAMETER
6 3/4

COMMENTS:

METHOD DRILLED: Air

METHOD DEVELOPED: Not

TIME DEVELOPED:

M&E

APPENDIX E
WELL AND PIEZOMETER BORING LOGS

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF3	MW-02
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION: OLD LANDFILL	GROUND ELEV.: 965.0	TOTAL DEPTH: 42.9

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (Per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
								965
	SS 1	0.0 2.0	16"	3-4 4-5		0-8" Brown (7.5YR-3/2) Clay (CL) w/ Low Plasticity, Stiff, Dry, Roots and Grass. 3% Silt. 8-16" LT. Brown (10YR-7/6) Clay (CL) 3% Silt		
	SS 2	2.0 4.0	14"	4-5 9-26		0-6" Brown (10YR-3/2) Clay (CL) w/ Low Plasticity, Stiff, Dry, Grass and Roots, Minor Silt (3%) 6-14" LT. Brown (10YR-7/6) Clay (CL) w/ Minor Silt (3%)		
	SS 3	4.0 6.0	18"	8-15 18-20		0-4" Brown (2.5Y-6/4) Clay (CL) w/ Low Plasticity, Stiff, Minor Silt (5%) w/ Limestone (Gray) Pebbles - Dry.		
5	O	5.0 5.0				4-18" LT. Brown (5Y-7/4) Clay (CL) w/ Minor Silt (5%) w/ Angular Limestone Pebbles Start Drilling At 4', HNu=0.0 ppm		960
	SS 4	6.0 6.3	3"	50/3"		Micritic Limestone, Medium Light Gray (N6), Some Fossils, Brachiopods, Replaced w/ Pinkish Gray Limestone (5YR8/11), Some Interbedded Shale, Medium Gray (N5) 0-2" Sluff in SS. Crushed Medium-Grained Sand (Well Rounded) Sticking To Clay Sluff. Auger Refusal At 6'4" Note: Auger Bringing To Surface Angular Partially Recrystalized Fossiliferous Limestone. Drillers Overdrill Hole To 12" OD Augers to Place 10" PVC Temp Casing.		
10								955
								950

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.: MW-02

DRILLING INSPECTOR: S. HULETT

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET 2 OF3	BOREHOLE NO. MW-02
CLIENT: USATHAMA	JOB NO.: 007248-0003		
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION OLD LANDFILL	GROUND ELEV. 965.0	TOTAL DEPTH 42.9

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
							950
20							945
25							940
							935

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.: MW-02

DRILLING INSPECTOR: S. HULETT

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET 3 OF3	BOREHOLE NO. MW-02
CLIENT: USATHAMA	JOB NO.: 007248-0003		
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION OLD LANDFILL	GROUND ELEV. 965.0	TOTAL DEPTH 42.9

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR ROD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
							935
	O	31.0 31.0			First Water At 34', HNu=15 ppm At Flume, 0.0 HNu In B.Z., Will Drill To 44' And Set Well		
	O	34.0 34.0					930
35							
							925
40							
	O	42.9 42.9			TD=42.9' Will Set Well		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.: MW-02

DRILLING INSPECTOR: S. HULETT

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: BGAD – LEXINGTON		SHEET 1 OF	BORING NO. S04-MW02
SITE LOCATION: OLD LANDFILL - SWMU-04	JOB NO.	LOCATION: LEXINGTON, KY	GROUND ELEV. / TOTAL DEPTH
DRILL CONTRACTOR: LAW ENG	ENS/GEO: RAIMONDE		BEGUN: 10/29/91
DRILL RIG: CME 55	DRILLER: WALLACE		FINISHED:
HOLE SIZE: 3¼" / 6¼ OD	WEATHER: WARM – PARTLY CLOUD		GROUND WATER (DEPTH/ELEV.): /
DRILLING METHOD: HOLLOW STEM AUGER	DRILLING FLUID/SOURCE: NONE / HSA		TOP OF ROCK (DEPTH/ELEV.): 6'4"

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING RATE (min/ft)	% RECOVERY ON ROD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
13:30 HAM-0	SS	0-2	16"	3.4.4.5		0-8" BROWN (7.5YR-5/2) ROOTS AND GRASS.			CLAY (CL) W/ LOW PLASTICITY STIFF, DRY 3% SILT
						8-16" LT BROWN (10YR-7/6) 3% SILT			CLAY (CL)
13:35 HAM-0	SS	2-4	14"	4.5.4.26		0-6" BROWN (10YR-5/3) GRASS + ROOTS			CLAY (CL) W/ LOW PLASTICITY STIFF, DRY MINOR SILT (3%)
						6-14" LT BROWN (10YR-7/6)			CLAY (CL) MINOR SILT (3%)
13:40 HAM-0	SS	4-6	18"	8.15.19.20		0-4" BROWN (2.5Y-6/4)			CLAY (CL) W/ LOW PLASTICITY, STIFF MINOR SILT (5%) W/ LIMESTONE (GRAV) PEBBLES – DRY
						4'-18" LT BROWN (5Y-7/4)			CLAY (CL) W/ MINOR SILT (5%) W/ ANGULAR LIMESTONE PEBBLES (20%
13:42 6	SS	6-8	2"	50/3" R		0-2" SLUFF IN SS. CRUSHED MEDIUM-GRAINED SAND (WELL ROUNDED) STICKING TO CLAY SLUFF.			
						AUGER REFUSAL AT 6'4"			
						NOTE: AUGER BRINGING TO SURFACE ANGULAR PARTIALLY RECRYSTALLIZED FOSSILIFEROUS LIMESTONE.			
						DRILLERS OVER DRILL HOLE TO 12" OD AUGERS TO PLACE 10" PVC TEMP CASING.			

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: S04-MW-02

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD | SHEET 1 OF | BORING NO. MW-02

SITE LOCATION: Lexington Army Depot | JOB NO. 007248 | LOCATION: Old Landfill | GROUND ELEV. To be surveyed | TOTAL DEPT 42.9 ft

DRILL CONTRACTOR: Faulkner | ENG/GEO: Hulett | BEGUN: 11/21/91

DRILL RIG: Schramm T66 | DRILLER: Bennet Gibson | FINISHED: 11/21/91

HOLE SIZE: 8" | WEATHER: RAIN Temp 250°F | GROUND WATER (DEPTH/ELEV.): /

DRILLING METHOD: 8" Tricone/Air | DRILLING FLUID/SOURCE: Air. | TOP OF ROCK (DEPTH/ELEV.): 6'4"

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR REC	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
4ft		1259				Start drilly at 4 ft. HNU = 0.0 ppm			
5						Micritic Limestone, Medium Light Gray (N6) some fossils, Brachiopods, replaced with Pinkish gray limestone (5YR 8/1) some interbeded shale, Medium Gray (N5)			
31ft		1327							
35						1st water at 34 ft HNU = 15 ppm at time, 0.0 HNU in 82. Will drill to 44 ft & set well.			
34ft		1332							
15						TD = 42.9 ft Will set Well.			
43ft		1412							
20									
25									

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-02

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

M&E

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	1 OF1	MW-03
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION: OLD LANDFILL	GROUND ELEV.: 941.3	TOTAL DEPTH: 23.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	SS 1	0.0 2.0	13"	2-4 6-11		DK. Brown (10YR3/3) Clay (CL) w/ Minor (5%) Silt And Minor (2%) Sand. Low Plasticity, Stiff, Dense, Dry-Moist, Roots Present		940
	SS 2	2.0 4.0	18"	4-7 10-11		DK. Brown (10YR4/3) Clay (CL) w/ Minor Silt - 0-6" (5%), 6-12" (3%), 12-18" (0%), Low Plasticity 0-9" To Med. Plasticity 9-18", Stiff, Dense, Dry-Moist, No Roots		
	SS 3	4.0 5.8	9"	4-5 50/6"		DK. Brown (10YR5/3) Clay (CL) 0-3", Minor Silt 3%, Low Plasticity, Stiff, Dense, Dry.		
5						3-9" Brown (2.5Y7/3), Minor Silt (5%), Minor Coarse-Grained Sand (3%) w/ Minor Iron Staining (Reddish Orange), Medium Plasticity, Stiff, Dense, Dry-Moist		935
						Note: Auger Refusal 5'8", Spoon Driven 50 Blows/6 inches. Blue-Gray Micro Sparite In End Of Spoon		
						Hit First Water At 12', Will Drill To 22', Gray Limestone (N6), Fossiliferous,		
10						Brachiopods, Some Thin Shale, Medium Dark Gray (N4), HNu=15 At Flume, 0.0 ppm In B.Z.		930
	O	12.0 12.0				Drillers Overdrill Hole to 12" OD To Place 10" PVC Temporary Casing. 5'8" Lithology Is Same, Making A Little Water, Will Let Sit And See If Makes More		
15								925
20								920
	O	23.0 23.0				Well TD At 23'		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.: MW-03

DRILLING INSPECTOR: HULETT/RAIMONDE

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: BGAD - LEXINGTON		SHEET 1 OF	BORING NO. SO4-MW-03
SITE LOCATION: OLD LANDFILL - SWMU #4	JOB NO.	LOCATION: LEXINGTON, KY	GROUND ELEV. / TOTAL DEPTH
DRILL CONTRACTOR: LAW ENGINEER	ENG/GEO: RAMONOE		BEGUN: 10/30/91
DRILL RIG: CME 55 - TRUCK	DRILLER: WALLACE		FINISHED:
HOLE SIZE: 3¼" ID / 6¼ OD	WEATHER: PTLY CLOUDY, 65°F		GROUND WATER (DEPTH/ELEV.): /
DRILLING METHOD: HOLLOW STEM AUGER	DRILLING FLUID/SOURCE: NONE / HSA		TOP OF ROCK (DEPTH/ELEV.): 5'8"

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
10/30/91 8:00	SS	0-2'	13"	2-4-6-11		DK BROWN (10YR 3/3) CLAY (CL) W/ MINOR (5%) SILT AND MINOR (2%) SAND. LOW PLASTICITY, STIFF, DENSE, DRY-MOIST - ROOTS PRESENT			
HAND -0									
8:05	SS	2-4	18"	4-7-10-11					
HAND -0						DK BROWN (10YR 4/3) CLAY (CL) W/ MINOR SILT - 0-6" (5%) 6-12" (3%) 12-18" (0%) LOW PLASTICITY 0-9" TO MED PLASTICITY 9-18", STIFF, DENSE, DRY-MOIST, NO ROOTS			
8:10	SS	4-6	9"	4-5-50/6(R)					
HAND ,0						DK BROWN (10YR 5/3) CLAY (CL) 0-3" MINOR SILT 3% LOW PLASTICITY, STIFF, DENSE, DRY. 3-9" BROWN ~~(2.5Y 6/4)~~ (2.5Y 7/3) MINOR SILT (5%) MINOR COARSE-GRAINED SAND (3%) W/ MINOR IRON STAINING (REDISH ORANGE) MEDIUM PLASTICITY, STIFF, DENSE, DRY-MOIST			
8:24						NOTE: AUGER REFUSAL 5'8" SPOON DRIVEN 50 BLOWS/3 INCHES. BLUE-GRAY MICAS SPARITE TIP IN END OF SPOON			
						DRILLER OVER DRILL HOLE TO 12" OD TO PLACE 10" PVC TEMPORARY CASING.			
						5'8"			

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: SO4-MW-03

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD		SHEET 1 OF	BORING NO. MW-03
SITE LOCATION: Lexington Army Depot	JOB NO.	LOCATION: OLD LANDFILL	GROUND ELEV. To be surveyed / TOTAL DEPTH 23 ft
DRILL CONTRACTOR: Faulkner	ENG/GEO: Hulett		BEGUN: 11/22/91
DRILL RIG: Schramm T66	DRILLER: Bennet Gibson		FINISHED: 11/22/91
HOLE SIZE: 8"	WEATHER: Rain, 50°F		GROUND WATER (DEPTH/ELEV.): /
DRILLING METHOD: 8" Tricone Air	DRILLING FLUID/SOURCE: Air		TOP OF ROCK (DEPTH/ELEV.): 5ft 8in

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
4ft		0804							
5						Hit 1st water at 12 ft will Micro drill to 22 ft. Limestone, Medium Light gray, (N6), fossiliferous, brachiopods, some shale, Medium Dark Gray, (N4) HNU = 15 at plume. 0.0 ppm in BZ.			
15 12ft		0829							
						Lithology is same. Make a little water, will let sit + see if makes more.			
22ft		0839							
						Well TD at 23 ft.			
0850									
20									
25									

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-03

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF1	MW-04
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		OLD LANDFILL NORTH SIDE	932.9	29.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	SS 1	0.0 2.0	17"	2-3 5-5		17": Clay (CLM), Silty, Little Gravel, Damp-Moist, Dark Brown-7.5YR3/2 HNu=0 ppm		
	SS 2	2.0 4.0	14"	2-3 3-3		14": Clay (CLM), Silty, Little Gravel, Trace Sand Top 3" Is Dark Brown 2.5YR3/2 Bottom 11" Is Grayish Brown 2.5YR4/2 HNu=0 ppm		930
	SS 3	4.0 5.0	9"	8-50/3"		6": 10YR3/2-Dark Brown, Clay (CLM), Silty, Gravelly, Damp		
5						3": Sand (SG), Gravelly, Saturated, Little Clay, Color 10YR5/6-Yellowish Brown Auger Refusal At 5'! HNu=0 ppm		925
	O	9.0 9.0				Micritic Limestone, Some Fossil Fragments, 10YR4/1, Brachiopods		
10						HNu=1 ppm In B.Z., 5 ppm At Well Head, Will Upgrade To Level C, Lithology Same		920
15								
▽	O	17.0 17.0				Water At 17', Will TD At 29'		915
20								910
	O	24.0 24.0				B.Z.=0.5, Flume 5.0 ppm, Blowing A Lot Of Water		
25								905
						TD=29'		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.: MW-04

DRILLING INSPECTOR: HULETT/STRAYTON

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT : LBAD		SHEET 1 OF	BORING NO. MW04
SITE LOCATION:	JOB NO.		
	LOCATION: S04MW04	GROUND ELEV.	TOTAL DEPTH
DRILL CONTRACTOR:	ENG/GEO: STRATTON		BEGUN 0810
DRILL RIG: CME55	DRILLER: ERIC FLEMMING		FINISHED:
HOLE SIZE: 8 1/4" / 12"	WEATHER: CLOUDY, 65°F, RAIN FORCAST		GROUND WATER (DEPTH/ELEV.): /
DRILLING METHOD: HSA	DRILLING FLUID/SOURCE: NA.		TOP OF ROCK (DEPTH/ELEV.):

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 3 inches) OR DRILLING RATE (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	PID/FID (ppm)	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
0	SS			2		17": CLAY (CLM), silty, little gravel, damp-moist			
0810			17"	3 5 5	HNU=0	Dark Brown - 7.5YR 3/2			
2	SS			2 3		14": CLAY (CLM), silty, little gravel, trace sand			
0820			14"	3 3	HNU=0	Top 3" is dark brown (2.5YR 3/2)			
4	SS			9		Bottom 11" is grayish brown (2.5YR 4/2)			
0829			9"	50/3"	HNU=0	6": 10YR 3/2 - dark brown. CLAY (CLM), silty, gravelly, damp;			
6	SS					3": SAND (SG), gravelly, saturated, little clay			
						Color 10YR 5/6 - yellowish brown.			
						AUGER REFUSAL @ 5'!			
8	SS								
10	SS								

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW04

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD		SHEET 2 OF	BORING NO. MW-004
SITE LOCATION: Old Landfill, Lexington Army Depot	JOB NO.: 007248		
	LOCATION: North side old landfill	GROUND ELEV. To be surveyed	TOTAL DEPTH 29 ft BG
DRILL CONTRACTOR:	ENG/GEO: Hazlett et al		BEGUN: 11/7/91 15:27
DRILL RIG: Sahramm T66	DRILLER: B. Wallace Gibson		FINISHED: 11/7/91
HOLE SIZE: 8"	WEATHER: cloudy, 32°F slight wind from SW		GROUND WATER (DEPTH/ELEV.): /
DRILLING METHOD: 8" Tucon Air	DRILLING FLUID/SOURCE: Air		TOP OF ROCK (DEPTH/ELEV.): 5 ft BG

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) (N)	DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
										started Air 1051
							Micrite LS, some fossil Frag; 10YR4/1, Brachiopods			
1537		9ft								
1542 restarted to drill							HN=1ppm in BZ, 5ppm at well head, Will upgrade to Level C with log of Sand			
1557		17ft					Water at 17ft, will TD at 29ft +12/29			
1606		24ft					BZ=0.5, Flame 5.0ppm, Blow out of water			
1615							TD=29ft			

SAMPLE TYPES	NOTES:	BORING NO.:
SS=SPLIT SPOON, ST=SHELBY TUBE, R=ROCK CORE, O=OTHER		MW-04

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF1	MW-05
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		OLD LANDFILL NORTH SIDE	938.8	33.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	SS 1	0.0 2.0	15"	2-3 5-5		5": Clay (CLM), Silty, Little Sand And Gravel, Damp, 7.5YR3/2, Brown 10": Ash, Sand And Gravel Size Particles, Damp, Black 7.5YR2/0 11": Same		
	SS 2	2.0 4.0	11"	1 WOH				
						14": Same		935
5	SS 3	4.0 6.0	20"	1-2 2-2		6": Clay (CLM), Silty, Trace Sand, Little Gravel, Color-7.5YR4/6-Orange Brown 3": Same		
	SS 4	6.0 8.0	22"	1-1 1-2		19": Clay (CLG), Gravelly, Soft, Wet, Becomes Saturated In Bottom 3", Gray 5YR3/1 17": Clay (CLG), Gravelly, Hard, Damp-Moist, Little Sand, 2.5YR5/0-Gray		930
	SS 5	8.0 10.0	17"	3-4 6-8				
10	SS 6	10.0 11.0	11"	8-50/5"		9": Clay (CLM), Silty, Gravelly, Little Sand, Moist, 2.5YR4/2 2": Sand (SC), Clayey, Reddish Gray 5YR5/2, Grained, Saturated, HNu=0 ppm At All Intervals, In Spoon, And At Hole		
								925
15						~~Start Boring At 11', Approximately 0.5' Of~~ Water In Hole		
								920
20	O	20.0 20.0				HNu=35 ppm At Flume Discharge, 0.0 ppm In B.Z., Dust LT. Gray, Cuttings Gray 7.5YRN7, Micritic, Brachiopod Fragments		
								915
25	O	25.0 25.0				Water Hit At 25', Driller Said Hit At 23' Having Drillers Drill To 33'		
	O	27.0 27.0				HNu=0.0 ppm In B.Z. HNu=0.0 ppm At Drum		
								910
30	O	30.0 30.0				Drillers Adding Rod At 30', B.Z.=0.0 ppm HNu, Lithology Same		
						TD=33'		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.: MW-05

DRILLING INSPECTOR: HULETT/STRAYTON

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD		SHEET 1 OF 2	BORING NO. MW05
SITE LOCATION: Lexington Ky.	JOB NO.		
	LOCATION: SPLIT MW05	GROUND ELEV. To be Surveyed	TOTAL DEPTH 33 ft/66
DRILL CONTRACTOR:	ENG/GEO: STRAYTON		BEGUN 11:39
DRILL RIG: CME 55	DRILLER: E. Fleming		FINISHED:
HOLE SIZE: 8 3/4/12 1/2	WEATHER:		GROUND WATER (DEPTH/ELEV.): /
DRILLING METHOD: HSA	DRILLING FLUID/SOURCE: N.A.		TOP OF ROCK (DEPTH/ELEV.):

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY ON ROD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
1139 0	SS			2		5": CLAY (CLM), silty, little sand & gravel, damp			
			15"	3		~~2.5Y~~ 7.5YR 3/2, brown			
				5		10": ASH, sand & gravel size particles, damp, black			
2				5		7.5YR 2/0			
				1		11": Same			
1145			11"	WOH					
4				1		14": Same			
				2					
1151			20"	2		6": CLAY (CLM), silty, trace little SAND, little gravel, damp			
6				2		color - 7.5YR 4/6 - orange brown			
				1		3": Same			
			22"	1		19": CLAY (CLG), gravelly, soft, wet, becomes saturated in bottom 3". Gray: 5YR 3/1			
1157				2					
8				3		17": CLAY (CLG), gravelly, hard, damp - dry, little sand. 2.5YR 5/0 - Gray			
				4					
1202			17"	6					
				8					
10				8		9": CLAY (CLM), silty, gravelly, little sand, moist. 2.5YR 4/2			
1207			11"	50/5"		2": SAND (SC), clayey, fine to coarse. 5YR 5/2			

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: GRAINED, Saturated.
HNu = 0 ppm At All intervals
1V spoon & At hole

BORING NO.: MW-05

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD		SHEET 2 OF 2	BORING NO. MW05
SITE LOCATION: Old Landfill, North Side, Lexington Ky	JOB NO.	LOCATION: old landfill North side 500'-N105	GROUND ELEV. To be Surveyed / TOTAL DEPTH 33 ft
DRILL CONTRACTOR:	ENG/GEO: Hulett		BEGUN: 0950
DRILL RIG: SCHRAM T66	DRILLER: C. Wallace		FINISHED: 1153
HOLE SIZE: 8"	WEATHER: 30°F, Cloudy		GROUND WATER (DEPTH/ELEV.): /
DRILLING METHOD: Tricone, Air Rotary	DRILLING FLUID/SOURCE: Air		TOP OF ROCK (DEPTH/ELEV.): 11 feet

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
11 ft 0950						start boring at 11 ft. ~.5 feet of water in hole.			
1007 20 ft						HNV 35 ppm at flume discharge, 0.0 ppm in BZ. Dust Lt. Gray. Cuttings gray 7.5YR N7 Micritic, Brachiopod Frag.			
23 ft ▽						Water bit at 25 ft. Driller said bit at 23 ft Have drillers drill to 33 ft.			
1029 25 ft									
1058 27 ft						HNV = 0.0 ppm in BZ HNV = 0.0 ppm at drum.			
30 ft						Drillers added rod at 30 ft BZ = 0.0 ppm HNV. Lithology same			
1136 33 ft						TD = 33 ft.			

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-05

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	1 OF2	MW-06
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
	WASTE LAGOONS	957.3	35.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR ROD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	SS 1	0.0 2.0	12"	5-8 10-12		DK. Brown (7.5YR5/6), 10% Silty Clay (CLM) w/ Minor Mottling, Med. Sand Grains w/ Oxide Staining Present, Stiff, Dry, Low Plasticity, Loose-Dense, Roots And Grass Present		
	SS 2	2.0 4.0	16"	5-7 10-16		Yellow Brown (10YR6/6) Clay w/ Minor Silt (2%) (CLM), Small-Med. Reddish Black Oxide Staining From Sand Pebbles, Tannish-Gray Mottling, Dry, Stiff, Low-Med. Plasticity, Dense		955
	SS 3	4.0 6.0	15"	7-12 17-40		Yellow Brown (10YR6/6) Clay w/ Very Little Silt (4%) (CL), Tannish/Gray Mottling, ~~Med. Sand Grains Of Reddish/Black Oxide~~ Staining, Small-Med. Rocks Of Limestone, Some Weathered Clays, Stiff, Dry, Low-Med. Plasticity, Dense		
5	SS 4	6.0 8.0	10"	9-22 50/3"		Yellow Brown (10YR5/2) Clay w/ Very Little Silt (<1%) (CL), Small-Med. Angular Rocks Of Limestone, Little Oxide Staining Vertically, Dry, Dense-Hard, Low-Med. Plasticity, Limestone Is Gray w/ Recrystalized Calcite, Light Color		950
	SS 5	8.0 8.2	NR	50/2"		Note: Drillers Overdrill Hole w/ 12" OD Auger To Place 10" PVC Temporary Casing		
10						Medium Gray Limestone, Micritic, (N5), Fossiliferous (Brachiopods), Very Little Shale, HNu=0.0 ppm, Drillers Wearing Level C Due To Dust		945
15								940

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
NR=NO RECOVERY O=CUTTINGS

BOREHOLE NO.: MW-06

DRILLING INSPECTOR: HULETT/RAIMONDE

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	2 OF2	MW-06
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION: WASTE LAGOONS	GROUND ELEV.: 957.3	TOTAL DEPTH: 35.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
20	O	20.0 20.0			Start To Get HNu Readings, HNu=20 ppm At Flume, 0.0 ppm In B.Z., Drillers In Level C, Medium Gray Limestone (N5), Brachiopod Fragments, Showing Some Water At About 25'		935
▽25							930
	O	28.5 28.5			Drilled To 35', Hit Water At 25', Medium Gray Limestone (N5), Micrite, Brachiopods, HNu=0.0 ppm At B.Z., HNu At Flume=150 ppm		
30							925
35					Will Drill And Set Well At 35.5'		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
NR=NO RECOVERY O=CUTTINGS

BOREHOLE NO.: MW-06

DRILLING INSPECTOR: HULETT/RAIMONDE

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT :

SITE LOCATION:

JOB NO. 20728

SHEET OF

BORING NO. 5002 MW-06

LOCATION: Lexington, KY

GROUND ELEV.

TOTAL DEPTH

Ramon-e / Smith

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING RATE (min/ft)	% RECOVERY OR ROD	SAMPLE DESCRIPTION	GRAPHIC LOG
1020 HNu=0ppm	SS	0-2'	12"	5-8-10-12		DK Brown (7.5YR 3/4) Silty Clay (10%) w/ (CLAY) minor mottling, med. sand grains of oxide staining present, stiff, dry, low plasticity, loose-dense roots & grass present	
1029 HNu=0ppm	SS	2-4'	16"	5-7-10-16		Yellow Brown (10YR 6/6) Clay w/ minor silt (2%) (CLAY), small-med. reddish/black oxide staining from sand pebbles, tannish gray mottling, dry, stiff, low-med. plasticity, dense	
1036 HNu=0ppm	SS	4-6'	15"	7-12-17-40		Yellow Brown (10YR 6/6) Clay w/ a little silt (<2%) (CL) tannish/gray mottling, med. sand grains of reddish/black oxide staining, small-med pebbles of limestone, some weathered clays, stiff, dry, low-med. plasticity, dense	
1048 HNu=0ppm	SS	6-8'	10"	9-22-50/3		Yellow Brown (10YR 5/2) Clay w/ a little silt (<2%) (CL) small-med. angular rocks of limestone, little oxide staining vertically, dry, dense, hard, low-Mod. Plasticity, limestone is grey w/ recrystalized crystals of calcite, light color	
		Weathered bedrock					
1107	SS	8-10'	0	50/2		Auger Refusal @ 8'3"	

Note: Drillers overdrill hole w/ 12" OD Auger to place 10" PVC temporary casing

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-06

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD		SHEET 1 OF	BORING NO. MW-06
SITE LOCATION: Lexington Army Depot, Lexington Ky	JOB NO. LOCATION: Waste Lagoons	GROUND ELEV.	TOTAL DEP 35.5 ft
DRILL CONTRACTOR: Faulkner	ENG/GEO: Holett	BEGUN: 11/20/91	
DRILL RIG: Schramm T66	DRILLER: B. Wallace	FINISHED: 11/20/91	
HOLE SIZE: 8"	WEATHER: Rain, Temp 65°F	GROUND WATER (DEPTH/ELEV.): /	
DRILLING METHOD: 8" Tricone Air	DRILLING FLUID: Air	TOP OF ROCK (DEPTH/ELEV.): 8 ft 3"	

Time	Depth	Sample Description / Stratigraphic Description
0819 start	8 ft	Medium Gray Limestone, Micrite, (N5), fossiliferous (Brachiopods) very little Shale. Hnu = 0.0 ppm, Drillers wearing Level C due to dust.
0837	20 ft	Starts to get HNU readings HNU = 20 ppm at flame, 0.0 ppm in BZ. Driller in Level C, Medium gray Limestone (N5) Brachiopod fragments, Showing some water @ 25 ft
0850	28.5 ft	Drilled to 35 ft. Hit water at 25 ft. Medium Gray Limestone, (N5) Micrite, Brachiopods. HNU = 0.0 ppm at BZ. HNU at flame = 950 ppm.
0901	35 ft	Will drill & set well at 35.5 ft. TD = 35.5 ft.

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-06

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	1 OF 6	MW-07
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
	SANITARY LANDFILL	989.3	82.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	SS 1	0.0 2.0	14" 3-5 10-14		0-7" Brown/Gray (7.5YR6/2) Clay (CL) w/ Fine Grained Limestone Pebbles (5%), Minor (3%) Silt, Low Plasticity, Stiff, Dense, Dry, Gray Mottling		
	SS 2	2.0 4.0	17" 17-18 23-25		7-14" LT. Brown (7.5YR7/8) Silt Rich (10%) Clay (CLM), Low Plasticity, Stiff, Dense, Dry HNu=0 ppm LT. Brown (7.5YR7/6) Silt Rich (10%) Clay (CLM), Low Plasticity, Stiff, Dense, Dry, Minor (<1%) LT. Gray Limestone Pebble. HNu=0 ppm		
	SS 3	4.0 6.0	13" 5-7 7-10		Brown/Yellow (7.5YR6/6) Clay (CL) w/ Very Minor silt (3%), Low Plasticity, Stiff, Dense, Dry, Minor Gray Mottling, Minor LT. Orange Iron Staining HNu=0 ppm		985
5	SS 4	6.0 8.0	16" 5-9 12-13		Brown/Yellow (7.5YR8/6) Clay (CL) w/ Very Minor Silt (3%), Low Plasticity, Stiff, Dense, Dry, Minor Gray Mottling, Minor LT. Orange Iron Staining, Concave Fractures Apparent From Disruption w/ Sampler HNu=0 ppm		
	SS 5	8.0 10.0	16" 8-21 24-31		DK. Brown (7.57/2) Clay (CL) w/ Minor (3%) Silt And Abundant LT. Gray Limestone (Fine-Grained) Pebbles (10%), The Clay Acting As Matrix Supporting Limestone, Low Plasticity, Stiff, Dense, Dry HNu=0 ppm		980
10	SS 6	10.0 12.0	13' 17-21 21-28		Gray/Olive (5Y6/3) Clay w/ Minor Silt (3%) Abundant (10%) Gray Fine-Grained Limestone Pebbles, Gray Mottling, Low Plasticity, Stiff, Dense, Dry HNu=0 ppm		
	SS 7	12.0 14.0	14" 3-4 7-9		Micritic Limestone, No Fossils, Little Shale, Medium Dark Gray (N4), HNu=0 ppm Brown (10YR5/8) Clay (CL) w/ Minor (3%) Silt, Medium Plasticity, Med. Stiff, Dense, Dry, Minor LT. Gray Fine-Grained Limestone Pebble, Minor Iron Staining, Very Light Gray Mottling HNu=0 ppm		
	SS 8	14.0 14.7	3" 7-50/2"		Brown (10YR7/3) Clay (CL) w/ Minor (4%) Silt, Med. Plasticity, Med.-High Stiff,		975

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.:
MW-07

DRILLING INSPECTOR: HULETT/RAIMONDE

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	4 OF6	MW-07
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION: SANITARY LANDFILL	GROUND ELEV.: 989.3	TOTAL DEPTH: 82.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
50	O	49.0 49.0			Micritic Limestone, Medium Dark Gray, (N4), No Fossils, Little Shale, Drilling Becoming Harder, HNu=0 ppm		940
55							935
							930

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.: MW-07

DRILLING INSPECTOR: HULETT/RAIMONDE

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	2 OF 6	MW-07
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION: SANITARY LANDFILL	GROUND ELEV.: 989.3	TOTAL DEPTH: 82.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					Small-Med. Grain Size Limestone Pebbles, Iron Staining		970
20							
							965
25							
	O	28.0 28.0			Micritic Limestone, No Fossils, Little Shale, Medium Dark Gray (N4)		960

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.: MW-07

DRILLING INSPECTOR: HULETT/RAIMONDE

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET 3 OF 6	BOREHOLE NO. MW-07
CLIENT: USATHAMA	JOB NO.: 007248-0003		
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION SANITARY LANDFILL	GROUND ELEV. 989.3	TOTAL DEPTH 82.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
35							955
40							950
							945

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.: MW-07

DRILLING INSPECTOR: HULETT/RAIMONDE

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	5 OF 6	MW-07
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		SANITARY LANDFILL	989.3	82.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
							925
65							
							920
	O	69.0 69.0			First Water, Will Drill Past And See If Makes Water, Very Little There		
70							
	O	71.0 71.0			Continue To Drill To 81', Will Let Set Overnight And Set A Well In The Morning, HNu=0 ppm		
							915

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.:
MW-07

DRILLING INSPECTOR: HULETT/RAIMONDE

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET 6 OF 6	BOREHOLE NO. MW-07
CLIENT: USATHAMA	JOB NO.: 007248-0003		
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION SANITARY LANDFILL	GROUND ELEV. 989.3	TOTAL DEPTH 82.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
80							910

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.: MW-07

DRILLING INSPECTOR: HULETT/RAIMONDE

Metcalf & Eddy, Inc. ENGINEERS — GEOLOGIC LOG

PROJECT: BGAD - Lexington | SHEET 1 OF | BORING NO. S2567-MW-7

SITE LOCATION: Sanitary Landfill | JOB NO. | LOCATION: Lexington, Ky. | GROUND ELEV. | TOTAL DEPTH

DRILL CONTRACTOR: Law Engineer | ENG/GEO: Raimende | BEGUN: 10/30/91

DRILL RIG: CME 55 - Truck | DRILLER: Wallace | FINISHED:

HOLE SIZE: 3¼" ID/6¼" OD | WEATHER: PTLY Cloudy, 65° | GROUND WATER (DEPTH/ELEV.): /

DRILLING METHOD: Hollow Stem Auger | DRILLING FLUID/SOURCE: None/HSA | TOP OF ROCK (DEPTH/ELEV.):

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
10/30/91 12:35 HNU-0	SS	0-2	14"	3·5·10·14		0-7" Brown/Lt Brown (7.5YR 7/4) CLAY (CL) w/ FINE-GRAINED LIMESTONE PEBBLES (5%) & MINOR (3%) SILT. LOW PLASTICITY, STIFF, DENSE, DRY, GRAY MOTTLING.	7.5 4.5 6/2		
12:44 HNU-0	SS	2-4	17"	7·8·23·25		7-14" LT BROWN (7.5YR 7/6) SILT RICH (10%) CLAY (CL) LOW PLASTICITY, STIFF, DENSE, DRY.			
12:47 HNU-0	SS	4-6	13"	5·7·7·10		LT BROWN (7.5YR 7/6) SILT RICH (10%) CLAY (CL) LOW PLASTICITY, STIFF, DENSE, DRY. MINOR (<1%) LT GRAY CHERT PEBBLE.			
12:55 HNU-0	SS	6-8	16"	5·9·12·13		BROWN/YELLOW (7.5YR 6/6) CLAY (CL) w/ U. MINOR SILT (3%) LOW PLASTICITY, STIFF, DENSE, DRY. MINOR GRAY MOTTLING. MINOR LT ORANGE IRON STAINING.			
13:00 HNU-0	SS	8-10	16"	8·21·24·71		BROWN/YELLOW (7.5YR 8/6) CLAY (CL) w/ U. MINOR SILT (3%) LOW PLASTICITY, STIFF, DENSE DRY. MINOR GRAY MOTTLING. MINOR ORANGE IRON STAINING. CONCAVE FRACTURES APPARENT FROM DISRUPTION W/ SAMPLER			
13:07 HNU-0	SS	10-12	13"	17·27·21·28		DK BROWN (7.5YR 7/2) CLAY (CL) w/ MINOR (3%) SILT AND ABUNDANT LT GRAY LIMESTONE (FINE-GRAINED) PEBBLES (10%). THE CLAY ACTING AS MATRIX SUPPORTING CS. CLAST. LOW PLASTICITY, STIFF DENSE, DRY.			
				3·4·7·9		GRAY/OLIVE (5Y 6/3) CLAY W/ MINOR SILT (3%) ABUNDANT (10%) LT GRAY FINE-GRAINED LIMESTONE PEBBLES. GRAY MOTTLING. FAINT HORIZONTAL STRUCTURE. LOW PLASTICITY, STIFF, DENSE, DRY			

SAMPLE TYPES: SS=SPLIT SPOON, ST=SHELBY TUBE, R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-07

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG

S2567-MW-7

PROJECT: BGAD - LEXINGTON		SHEET 1 OF	BORING NO. ~~S02 MW-07~~
SITE LOCATION: SANITARY LANDFILL - SWMU #2	JOB NO.		
	LOCATION: LEXINGTON, KY	GROUND ELEV.	TOTAL DEPTH
DRILL CONTRACTOR: LAW ENGINEERING	ENG/GEO: RAIMONDO	BEGUN: 10/30/91	
DRILL RIG: CME 55	DRILLER: WALLACE	FINISHED:	
HOLE SIZE: 3¼ID / 6¼OD	WEATHER: CT CLOUDY, BREEZY, COOL	GROUND WATER (DEPTH/ELEV.): /	
DRILLING METHOD: HOLLOW STEM AUGER	DRILLING FLUID/SOURCE: NONE / HSA	TOP OF ROCK (DEPTH/ELEV.):	

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
	SS	12-14	14"	3-4-7-9		BROWN (10YR 5/8) CLAY (CL) W/ MINOR (<20) SILT. MEDIUM PLASTICITY, MED. STIFF, DENSE, DRY. MINOR LT GRAY FINE-GRAINED LIMESTONE PEBBLE. MINOR IRON STAINING & V. LIGHT GRAY MOTTLING.			
5	SS	14-16	03"	7-50/2	6"				
						Brown (10YR 7/3) Clay (CL) w/ minor (<20) Silt. Med. Plasticity, MED-High stiff, small-Medium Grain size limestone pebble Iron Staining			
10									
15									
20									
25									

13:15
HNU
-0
13:24

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-07

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

M&E

PROJECT : LBAD		SHEET	BORING NO.
SITE LOCATION: Sanitary Landfill Lexington Ky.	JOB NO. 007248	3 OF	MW-7
	LOCATION: Sanitary Lf	GROUND ELEV. ≈790	TOTAL DEPTH 82.5

Hulett 1 Air, 8", 11/18/91

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
						Will drill to H2O @ 870 ft Elev.	
1559 11 ft TD Grout Plug.						Micritic limestone, no fossils, a little shale.	
1611 28 ft						Medium Dark gray (N4) HNV = 0	
49 ft 1631						Micritic limestone, no fossils, little shale Medium Dark Gray (N4)	
1658 69 ft						Micritic limestone, Medium Dark Gray (N4) no fossils, little shale, Unit becoming harder, HNV = 0	
1716 71 ft						1st water will drill past + see if makes water. Very little here.	
1729 81 ft						Continued to drill to 81 ft. Will let set overnight + set a well - the next day. HNV = 0	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER (Air Rotary)

NOTES:

BORING NO.: MW-07

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	1 OF1	MW-08
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
	SANITARY LANDFILL	953.6	31.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	SS 1	0.0 2.0	10"	3-4 6-8		6": Clay (CLM), Silty, Some Gravel, Damp, Root Matter, 10YR3/2, Color-Dark Brown 4": Clay (CLM), Silty, Some Sand, Damp, 7.5YR3/4		
	SS 2	2.0 4.0	14"	4-4 4-6		7": Clay (CLS), Sandy, Little Silt, Damp, 5YR4/6-Color		950
	SS 3	4.0 6.0	20"	3-4 4-6		7": Clay (CLM), Silty, Little Sand, Damp, Organic Matter, Woodchips, 7.5YR4/2		
5	SS 4	6.0 8.0	22"	4-7 10-11		8": Sand (SC), Fine-Medium, Very Clayey, Damp, Brown-10YR3/3		
	SS 5	8.0 10.0	20"	6-8 10-10		12": Clay (CLS), Sand, Damp-Moist, Soft, Plastic, 2.5YR6/3		945
10	SS 6	10.0 10.2	1.5"	50/1.5"		22": Clay (CLM), Silty, Little Gravel, Damp, 2.5YR6/3 Yellowish Brown, Orange Mottled		
						20": Clay (CLM), Very Silty, Gravelly, Damp, Hard, Orange And Gray Mottled, 2.5YR6/3-Light Brown 2": Clay (CLM), Some Silt, Little Sand, Damp, 2.5Yr4/3, Orange Mottled, Powdered Rock (White) In Bottom Of Spoon.		940
15						HNu=0.0 ppm At Well Head And Air Flume, Micritic Fossiliferous Limestone, Medium Gray (N3), Brachiopod Fragments,		
								935
20	O	19.5 19.5				First Water, HNu=50 ppm At Flume, 0.0 ppm In B.Z., Micritic Fossiliferous Limestone (N5), Med. Gray		
								930
25								
	O	28.5 28.5				HNu=20 ppm At Flume, 1.0 ppm In B.Z., Will Go To Level C, Will Wait And Blow Out Hole		925
30	O	31.0 31.0				Blow Hole, Making A Little Water, Will Set Well At TD=31'		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.:
MW-08

DRILLING INSPECTOR: HULLET/STRAYTON

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG

PROJECT :		SHEET	BORING NO.
SITE LOCATION:	JOB NO.	1 OF	MW-08
	LOCATION: S2567MW08	GROUND ELEV.	TOTAL DEPTH
DRILL CONTRACTOR:	ENG/GEO: STRATTON	BEGUN 1603	
DRILL RIG: CME 55	DRILLER: FLEMING	FINISHED:	
HOLE SIZE: 8¼/12¼	WEATHER:	GROUND WATER (DEPTH/ELEV.): /	
DRILLING METHOD: HSA	DRILLING FLUID/SOURCE: N.A.	TOP OF ROCK (DEPTH/ELEV.):	

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY ON ROD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
0	SS			3		6": CLAY (CLM) silty, some gravel, damp, Rootmatter, 10YR 3/2 - color - dark brown			
1603			10"	4					
HNU=0				6					
LEL=20%				8					
2						4": CLAY (CLM) silty, some sand, damp 7.5YR 3/4			
				4					
				4		7": CLAY (CLS), sandy, little silt, damp			
1610			14"	4		5YR 4/6 - color			
				6					
4						7": CLAY (CLM), silty, little sand, damp, orange matrix & woodchips; 7.5YR 4/2.			
				3					
				4		9" - SAND (SC), fine-medium, very clayey, damp, brown - 10YR 3/3			
1615			20"	4					
				6		12" - CLAY (CLS), sandy, damp - moist, soft, plastic - ~~10YR 5/3~~ 2.5YR 6/3 -			
6									
				4		22" - CLAY (CLM), silty, little gravel, damp, 2.5YR 6/3 yellowish brown. orange mottling			
	SS			7					
			22"	10					
1624.				11					
8									
				6		20" - CLAY (CLM), very silty, gravelly, damp, hard, orange & gray mottled, 2.5YR 6/3 - light brown.			
			20"	8					
1629				10					
				10					
10									
				50/1.5"		7" - CLAY (CLM), some silty gravel, little sand, damp. 2.5YR 4/3; orange mottled. Powdered rock (white) in bottom of spoon.			
1636									
12									

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-08

Metcalf & Eddy, Inc. GEOL[illegible] LOG

ENGINEERS

PROJECT: LBAD

SITE LOCATION: Lexington Army Depot. Lexington Ky

JOB NO.: 007248

SHEET 1 OF

BORING NO.: MW-08

LOCATION: Sanitary Landfill

GROUND ELEV.: To be Surveyed

TOTAL DEPTH: 31 ft

DRILL CONTRACTOR: Faulkner

ENG/GEO: Hulett

BEGUN: 11/1/91

DRILL RIG: Schramm T66

DRILLER: B. Gibson

FINISHED: 11/1/91

HOLE SIZE: 8"

WEATHER:

GROUND WATER (DEPTH/ELEV.):

DRILLING METHOD: 8" Tricone/Air Rotary

DRILLING FLUID: Air

TOP OF ROCK (DEPTH/ELEV.): 10 ft

SAMPLE DESCRIPTION | STRATIGRAPHIC DESCRIPTION

10 ft — 1315

HNU = 0.0 ppm at well head + air flume. Micritic fossiliferous Limestone, Medium Gray (w/ Brachiopod frag.

19.5 ft — 1332

1st Water, HNU = 50 ppm at flume, 0.0 ppm in BZ. Micritic fossiliferous Limestone (15) Med. Gray,

28.5 ft — 1346

HNU = 20 ppm at flume, 1.0 ppm in BZ, Will go to Level C, will wait & blow out hole.

1420

Slow hole, making a little water, will set well at TD = 31 ft

SAMPLE TYPES
SS=SPLIT SPOON ST=SHELBY TUBE
C=ROCK CORE O=OTHER

NOTES:

BORING NO.: MW-08

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF 4	MW-09
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		SANITARY LANDFILL	975.6	69.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	SS 1	0.0 2.0	4.5"	3-5 7-10		Reddish Brown (7.5YR4/4) Silt Rich (>10%) Clay (CLM) w/ Roots 0-3", Very Low Plasticity, Stiff, Dense, Damp-Dry, No Noticeable Fractures		975
	SS 2	2.0 4.0	14"	7-5 8-9		HNu=0 ppm Brownish-Red (7.5YR4/4) Silt Rich (>10%) Clay (CLM) w/ Very Low Plasticity, Stiff, Dense, Dry, Very Small Pebbles Of Gray Well Rounded Limestone		
	SS 3	4.0 6.0	16"	5-6 7-8		HNu=0 ppm Orange-Brown (7.5YR5/8) Silt Rich (15%) Clay (CLM) w. Very Low Plasticity, Stiff,		
5						Dense, Dry, Very Minor Gray Limestone Pebbles, DK. Red Staining Grains		970
	SS 4	6.0 8.0	18"	5-7 12-18		HNu=0 ppm Orange-Brown (7.5YR5/8) Silt Rich About 10% Clay (CLM), w/ Very Low Plasticity, Stiff, Dense, Dry, Abundant Orange-Looking Black Staining Along Vertical Blocky Fractures, Very Blocky Texture, Minor Well Rounded Gray Limestone Clasts		
	SS 5	8.0 10.0	10"	4-9 12-15		HNu=0 ppm		
10	SS 6	10.0 12.0	16"	3-7 10-13		Orange-Brown (7.5YR6/8) Silt Rich (10%) Clay (CLM) w/ Minor (2%) Gray Well Rounded Limestone Pebbles And Red Siltstone Pebbles. Reddish/Black Staining Along Vertical Fractures, Blocky Texture, Very Minor Gray Mottling, Very Low Plasticity, Stiff, Dense, Dry		965
	SS 7	12.0 14.0	8.5"	4-6 10-31		HNu=0 ppm Orange-Brown (7.5YR7/4) Silt Rich (10%) Clay (CLM), Reddish/Black Staining, Fractures, Blocky Texture, Mottling, Low Plasticity, Stiff, Dense, Dry, Minor (2%) Grain Well Rounded Pebbles (Limestone)		
	SS 8	14.0 14.8	10"	4-50/3'				
15						Tan/Gray (5YR7/2) Clay w/ (10%) Silt (CLM), Minor Fragmented Limestones, Reddish/Black Staining, Minor Gray/Orange Mottling, Med. Plasticity, Stiff, Dense, Dry		960
						Tannish Gray (5YR7/4) Clay w/ (10%) Silt (CLM), Small-Med. Limestone Pebbles (Angular), Thinly Laminated, Low Plasticity, Stiff, Dense, Dry-Moist.		
						Auger Refusal 14'6"		
						Note: Drillers Overbore Hole w/ 12" OD Auger To Place 10" PVC Temporary		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.:
MW-09

DRILLING INSPECTOR: HULETT/RAIMONDE

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET 2 OF4	BOREHOLE NO. MW-09
CLIENT: USATHAMA	JOB NO.: 007248-0003		
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION SANITARY LANDFILL	GROUND ELEV. 975.6	TOTAL DEPTH 69.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					Casing		955
					Micritic Limestone, Some Fossil Fragments, Medium Gray, N5, HNu=0.0 ppm At Well Head And At Flume, Some Small Pyrite Crystals Less Than 5%		
25							950
30							945
35							940
	O	37.0 37.0			HNu=1 ppm At Flume, Micritic Limestone, Fossil Fragments, Med. Gray (N5), 0.0 ppm In B.Z.		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.: MW-09

DRILLING INSPECTOR: HULETT/RAIMONDE

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	3 OF4	MW-09
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION: SANITARY LANDFILL	GROUND ELEV.: 975.6	TOTAL DEPTH: 69.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
							935
	O	44.0 44.0			Same, HNu=25 ppm At Flume, 2 ppm In B.Z., Going To Level C		
45							930
	O	48.0 48.0			Same, HNu=20 ppm At Flume, B.Z.=3 ppm		
50	O	50.0 50.0			HNu=25 ppm At Flume, 3 To 7 ppm In B.Z., Shut Down Rig And Will Prepare To Go To Level B Decided To Let Air Out And Drill Another 10', Will Just Start And Get Back And Let Rig Drill To 60'		925
55							920

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.: MW-09

DRILLING INSPECTOR: HULETT/RAIMONDE

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET 4 OF4	BOREHOLE NO. MW-09
CLIENT: USATHAMA	JOB NO.: 007248-0003		
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION SANITARY LANDFILL	GROUND ELEV. 975.6	TOTAL DEPTH 69.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	O	60.0 60.0			Went To 60', First Water At 58', 5 ppm At Flume, 0.0 ppm In B.Z., Hit First Water At 58' So Will Drill To 68'		915
65							910
	O	69.0 69.0			TD=69', Wait To See If Well Makes Water		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.: MW-09

DRILLING INSPECTOR: HULETT/RAIMONDE

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: BLAD - LEXINGTON		SHEET 1 OF	BORING NO. S2567 - MW9
SITE LOCATION: SANITARY LANDFILL S2567 MW9	JOB NO.	LOCATION: LEXINGTON, KY	GROUND ELEV. / TOTAL DEPTH
DRILL CONTRACTOR: LAW ENVIRONMENTAL	ENG/GEO: RAIMONDE		BEGUN: 10/31/91
DRILL RIG: CME 55	DRILLER: WALLACE		FINISHED:
HOLE SIZE: 3¼ / 6¼ OD	WEATHER: 55°C PTLY CLOUDY / SMOKEY - FOREST FIRE DOWN SOUTH		GROUND WATER (DEPTH/ELEV.): /
DRILLING METHOD: HOLLOW STEM AUGER	DRILLING FLUID/SOURCE: HSA - NONE		TOP OF ROCK (DEPTH/ELEV.):

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING RATE (min/ft)	% RECOVERY ON ROD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
	SS	0-2	14.5	3.5.7.10					
	SS	2-4	14"	7.6.8.9					
	SS	4-6	16"	5.6.7.8					
	SS	6-8	18"	5.7.12.18					
	SS	8-10	18"	4.9.12.15					

REDISH BROWN (7.5YR 4/4) SILT RICH (>10%) CLAY (CLM) W/ ROOTS 0-3", V. LOW PLASTICITY, STIFF, DENSE, DAMP-DRY, NO NOTICABLE FABRIC

BROWNISH-RED (7.5YR 4/4) SILT RICH (>10%) CLAY (CLM) W/ V. LOW PLASTICITY, STIFF, DENSE, DRY. FEW V. SMALL PEBBLES OF GRAY WELL ROUNDED LIMESTONE

ORANGE-BROWN (7.5YR 5/8) SILT RICH (10%) CLAY (CLM) W/ V. LOW PLASTICITY, STIFF, DENSE, DRY. V. MINOR GRAY LIMESTONE PEBBLES. DK RED STAINING AROUND GRAINS.

ORANGE BROWN (7.5YR 5/8) SILT RICH ~10% CLAY (CLM) W/ V. LOW PLASTICITY, STIFF, DENSE, DRY. ABUNDANT FE ORGANIC-LOOKING (BLACK) STAINING ALONG VERTICAL BLOCKY FRACTURES. V. BLOCKY TEXTURE. MINOR WELL ROUNDED GRAY LIMESTONE CLASTS.

ORANGE BROWN (7.5YR 6/8) SILT RICH (10%) CLAY (CLM) W/ MINOR (2%) GRAY WELL ROUNDED LIMESTONE PEBBLES + RED SILTSTONE PEBBLES. REDISH/BLACK STAINING ALONG VERTICAL FRACTURES. BLOCKY TEXTURE. V. MINOR GRAY MOTTLING. V. LOW PLASTICITY, STIFF, DENSE, DRY.

7:50 HNU - 0

8:02 HNU - 0

8:07 HNU - 0

8:12 HNU - 0

8:18 HNU - 0

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-09

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: BGAD		SHEET 1 OF	BORING NO. S2567-MW9
SITE LOCATION: SANITARY LANDFILL SWMU 2 S67	JOB NO.	LOCATION: LEXINGTON, KY	GROUND ELEV. / TOTAL DEPTH
DRILL CONTRACTOR: LAW ENV.	ENG/GEO: RAIMONDO		BEGUN: 10/31/91
DRILL RIG: CME 55	DRILLER: WALLACE		FINISHED:
HOLE SIZE: 3¼ID / 6¼OD	WEATHER: 55°C SMOKEY (FOREST FIRE SOUTH)		GROUND WATER (DEPTH/ELEV.): /
DRILLING METHOD: HOLLOW STEM AUGER	DRILLING FLUID/SOURCE: NONE - HSA		TOP OF ROCK (DEPTH/ELEV.):

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY W/I ROD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
	SS	10-12	16"	3-7-10-13		ORANGE BROWN (7.5YR 7/4) SILT RICH (10%) CLAY REDISH/BLACK STAINING. FRACTURES. BLOCKY TEXTURE. MOTTLING, LOW PLASTICITY, STIFF DENSE, DRY (CLM) W MINOR (<2% GRAIN WELL ROUNDED PEBBLES (LIMESTONE)			
5	SS	12-14	18½"	4-6-10-31		TAN GRAY (5YR 7/2) CLAY W (10%) SILT (CL) MINOR FRAGMENTED LIMESTONE, LAYERED ISH/BLACK STAINING, MINOR GRAY/ORANGE MOTTLING, MED. PLASTICITY, STIFF, DENSE, DRY.			
10	SS	14-16	10"	4-5-6/3		TAWISH GRAY (5YR 7/4) CLAY W/ (10%) SILT (CL) SMALL-MED. LIMESTONE PEBBLES (ANGULAR) THINLY LAMINATED, ~~MED. PL~~ LOW PLASTICITY STIFF, DENSE, DRY-MOIST. AUGER REFUSAL 1416 ft.			
15									
20						NOTE: DRILLERS OVER BORE HOLE W/ 12" OD AUGER TO PLACE 10" PVC TEMPORARY CASING.			
25									

8:25 HNM

8:40

9:00

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.:

Metcalf & Eddy, Inc. ENGINEERS

GEOL BID LOG

PROJECT: LBAD

SITE LOCATION: Sanitary Landfill LBAD, Lexington Ky

JOB NO.: 0172

SHEET: 1 OF

BORING NO.: MW-09

LOCATION: Sanitary Landfill

GROUND ELEV.: To be Surveyed

TOTAL DEP: 69ft BG

DRILL CONTRACTOR:

ENG/GEO: Hulett

BEGUN: 11/12/91

DRILL RIG: Schramm T60

DRILLER: Bennet Wallace

FINISHED: 11/12/91

HOLE SIZE: 8"

WEATHER: Clear, 53°F

GROUND WATER (DEPTH/ELEV.):

DRILLING METHOD: 8" Tricone, Air

DRILLING FLUID/PURGE: Air

TOP OF ROCK (DEPTH/ELEV.): 14.5ft

DEPTH	SAMPLE NUMBER/TYPE	RECOVERY	BLOW COUNTS (TYPE)	SAMPLE DESCRIPTION	USCS	STRATIGRAPHIC DESCRIPTION
14.5ft						
0821				Micritic Limestone, some fossil fragments, Medium Gray, N5, HNV = 0.0 ppm at well head and at flue. Some small pyrite xtals <5%		
20						
30 ft						
0842				HNV = 1 ppm at flue, Micritic limestone, fossil fragment, Med Gray (N5) 0.0 ppm in BZ.		
0858	49ft			Same, HNV = 25ppm at flue, 2 ppm in BZ. Going to level C.		
0905	48ft			Same, HNV = 20ppm at flue, BZ = 3ppm		
0913	50ft			HNV = 25ppm at flue, 3 to 7ppm in BZ. Shut down rig & will prepare to go to level B.		
0933				Decided to let air out & drill another 10 ft. will just start & get back & let rig drill to 60ft.		
30						
0954	60ft			Went to 60 ft, 1st water at 58 ft. 5ppm at flume, 0.1ppm in BZ. At 1st water at 58 ft will drill to 68ft.		
1010	69ft			TD = 69ft. Went to see if will make water		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.:
MW-09

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	1 OF1	MW-16
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
	BETWEEN OLD LANDFILL & LAGOON	942.8	23.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	SS 1	0.0 2.0	6"	3-3 5-7		(10YR3/4) Dark Yellowish Brown, Topsoil, CLM Silt, 5% Sand (CLS), Low Plasticity, Loose, Moist, No Bedding, Fill		
	SS 2	2.0 4.0	15"	11-37 12-34		(10YR3/4) Dark Yellow Brown, Silt (CLM), 15% Clay (CL), Few Well Rounded Limestone Pebbles, Plasticity-Medium, Stiff, Dense, Moist, No Bedding, Weathered, Limestone Pebble In Shoe End!		940
	SS 3	4.0 5.5	12"	20-30 50/6"		(10YR3/4) Dark Yellowish Brown, Clay (CL),		
5						20% Silt (CLM), Bottom 8" Weathered Gray Fossiliferous Limestone, Plasticity-High, Stiff, Moist, No Bedding Auger Refusal 5'5", Will Set 10" PVC Sch 40 Temp Casing, A 12" OD Hole 1712, 12" OD Auger TD At 5'2" 10" Temp Casing Grouted Out, 1735 Start Drilling At 4', Top Of Grout		935
10						Medium Gray, Micritic Limestone (N5), ~~Fossiliferous, Brachiopods, Some Shale,~~ (N4)		
	O	12.0 12.0				Medium Gray Micritic Limestone (N5), Fossiliferous, Brachiopods, Some Shale (N4), First Water, HNu=100 ppm In Flume, 4 ppm In B.Z., Drillers Go To Level C		930
15								925
20								920
	O	23.0 23.0				TD=23', HNu=0.0 ppm At Flume, 0.0 ppm At B.Z. Will Set A Well At TD=23'		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.: MW-16

DRILLING INSPECTOR: S. HULETT

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD | SHEET 1 OF | BORING NO.: MW-16

SITE LOCATION: Old Landfill DRMO, & Waste Lagoons, Lexington Army Depot, Lexington Ky | JOB NO. | LOCATION: | GROUND ELEV. | TOTAL DEPTH

DRILL CONTRACTOR: LAW Eng. | ENG/GEO: Hulett | BEGUN: 11/21/91

DRILL RIG: CME 55 | DRILLER: Chris | FINISHED: 11/21/91

HOLE SIZE: | WEATHER: Cloudy Lt. Rain, 60°F | GROUND WATER (DEPTH/ELEV.): /

DRILLING METHOD: HSA 3.25 | DRILLING FLUID/SOURCE: NA | TOP OF ROCK (DEPTH/ELEV.):

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
1631	SS+	0-2	6"	3/3/5/7		(10YR 3/4) Dark yellowish Brown, Topsoil, Cln silt, 5% Sand (CLS), Low Plasticity, Loose Moist, No bedding, Fill.			
1640 1740	SS	2-4	15"	11/32/10/44		(10YR 3/4) Dark yellow Brown, Silt (cln), 15% Clay (CL), Pebbles, Plasticity - Medium Stiff, Dense, Moist, No bedding, Few well rounded Limonite Weathered, Limestone pebble in shoe end.)			
1655 1755	SS	4-6	12"	20/30/50/6		(10YR 3/4) Dark Yellowish Brown, Clay (CL), 20% Silt (cln), Bottom 8" weathered gray fossiliferous Limestone, Plasticity - High; Stiff; Moist, No bedding			

Auger refusal 5 ft 5 in will set 10" PVC sch 40 temp casing - a 12 in DD hole - TD at 5 ft 2" 1742 12" od auger 10" temp casing grouted at: 1735

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-16

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD | SHEET 1 OF | BORING NO. MW-16

SITE LOCATION: Lexington Army Depot | JOB NO. | LOCATION: Between old landfill + Waste Lagoons | GROUND ELEV. ≈ 995 | TOTAL DEPT 23 ft

DRILL CONTRACTOR: Faulkner | ENG/GEO: Hewlett | BEGUN: 11/22/91

DRILL RIG: Schramm T66 | DRILLER: Bennet Gibson | FINISHED: 11/22/91

HOLE SIZE: 8" | WEATHER: Rain 49°F | GROUND WATER (DEPTH/ELEV.): /

DRILLING METHOD: 8" Tricone/Air | DRILLING FLUID/SOURCE: Air | TOP OF ROCK (DEPTH/ELEV.): 5.2 ft

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
4 ft		13:00				Start drilling at 4 ft, Top of Grout			
						Medium Gray Micritic Limestone (N5) Fossiliferous, Brachiopods, Some shale, (N4)			
12 ft		1328				Medium Gray Micritic Limestone, (N5) Fossiliferous, Brachiopods, Some shale (N4) Ist water, HNU = 100 ppm in flume, 4 PPM in B.Z. Driller go to level C.			
23 ft		1342				TD = 23 ft HNU = 0.0 ppm at flume, 0.0 ppm at B.Z.			
						Will set a well at TD = 23 ft.			

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER Cuttings

NOTES:

BORING NO.: MW-16

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF2	MW-18
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		INDUST. AND SANITARY LANDFILL	973.1	68.9

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	SS 1	0.0 2.0	24"	0		LT. Brown To DK. Brown 10YR4/3 (Moist) w Iron Oxide Staining, Silty Clay, Trace Fine Sand, Med. Plasticity, Dense, Soft To Firm, Moist, Root Tubes, Mottled, No Stratification, No Blocky Structure (Organic Rich Top 6")		
	SS 2	2.0 4.0	16"	0				970
	SS 3	4.0 6.0	19"	0		A.A.		
5						A.A.		
	SS 4	6.0 8.0	16"	0		A.A. Including DK. Brown, Mottled, Damp		
	SS 5	8.0 8.4	4"	0		Indistinct Contact Gray 7.5YR6/0 Clay, Thin Laminated, Some Staining, Including Rock Fragments Down Section, Damp Dense, Stiff, Med. Soft,		965
10	O	10.0 10.0				Med Plasticity DK. Gray Argillaceous Limestone Note: (1) All Samples Driven By Hydraulics Due To Rain--No Blow Counts (2) 0 ppm Breathing; Bore Hole; All Samples; No Saturated Section Encountered; Top Dry		960
15						~~Note: (1)All Samples Driven By Hydraulics~~ Due To Rain--No Blow Counts (2) 0 ppm Breathing; Bore Hole; All Samples; No Saturated Section Encountered; Top Dry Micritic Fossiliferous Limestone, Medium Dark Gray (N4), Some Interbedded Shale, (N3), Few Pyrite Crystals, HNu=0.0 ppm		955
20								
								950
25								
	O	28.0 28.0				Micritic Fossiliferous Limestone, Medium Dark Gray (N4), HNu=50 ppm At Flume, 3.0 ppm In B Z		945
30								
								940

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.: MW-18

DRILLING INSPECTOR: HULETT/GOYDAS

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET 2 OF2	BOREHOLE NO. MW-18
CLIENT: USATHAMA	JOB NO.: 007248-0003		
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION INDUST. AND SANITARY LANDFILL	GROUND ELEV. 973.1	TOTAL DEPTH 68.9

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
							935
40	O	40.0 40.0			Micritic Fossiliferous Limestone, Medium Dark Gray (N4), B.Z.=0.0 ppm, 15.0 In Flume, Brachiopods, Pyrite Crystals, Few		930
45							925
50	O	49.0 49.0			First Water, Approximately 2-3 Gal/Min., Lithology Same, Pull Tools, WL=54', Will Drill To 69' And Set Well		920
55							915
60	O	59.0 59.0					910
65							905
					TD=69'		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
O=CUTTINGS

BOREHOLE NO.: MW-18

DRILLING INSPECTOR: HULETT/GOYDAS

Metcalf & Eddy, Inc. ENGINEERS — GEOLOGIC LOG

PROJECT: Lexington LBAD | SHEET 1 OF | BORING NO. MW-18

SITE LOCATION: MW-18 | JOB NO. 007248 | LOCATION: | GROUND ELEV. | TOTAL DEP

DRILL CONTRACTOR: LAW Engineering | ENG/GEO: M. GOYDAS | BEGUN: 11/22/91 0830

DRILL RIG: CME-55 Truck Mounted | DRILLER: Chris Wallace | FINISHED:

HOLE SIZE: 5¼ HS | WEATHER: 11/22/91 - Raining 55° | GROUND WATER (DEPTH/ELEV.): /

DRILLING METHOD: Samples-Driven by hydraulics 5¼ H/S Auger Due to rain | DRILLING FLUID/SOURCE: 0-8.3' (None) | TOP OF ROCK (DEPTH/ELEV.): 8.3'

M.J.G. 11/24/91 0830

Set Temporary Casing

M.J.G. 11/22/91 0930

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
0	SS-1	0	2.0'	Hydraulic Driven	0 ppm	Lt br. to dk br. 10YR 4/3 (moist) w/ w/ iron oxide staining, silty CLAY; trace f. sand; med. plasticity, dense, soft to firm; moist; root tubes, bioturbated; mottled – No stratification – No blocky ped. structure. (organic rich top: 6")			
2	SS-2	2							
4	SS-3	4	1.3'		0 ppm	A.A.			
6	SS-4	6	1.7'	NA	0 ppm	A.A. inc dk br. mottled blebs; damp.			
8	SS-5	8.3'			0 ppm	Indistinct Contact.	7.3'		
						Gray 7.5YR 6/0 CLAY; thin laminated - rhythmite interlam w/ lt brown clay. some staining.; inc. Rk fgmts down section; damp dense; stiff; Med soft, Med plastic	8.3'		T.O.R.
10						Dk. Gr. argillaceous LST;			

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: Oppm breathing; borehole; all samples: No saturated sections encountered TOR dry;

BORING NO.: MW-18

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD

SITE LOCATION: Lexington Army Depot

JOB NO.: 002248

SHEET: 1 OF

BORING NO.: MW-18

LOCATION: Industrial & Sanitary Landfill

GROUND ELEV.: To be Surveyed

TOTAL DEPTH: 69 ft B.G.

DRILL CONTRACTOR: Faulkner

ENG/GEO: Hulett

BEGUN: 11/25/91

DRILL RIG: Schram T66

DRILLER: Bennet & Gibson

FINISHED:

HOLE SIZE: 8"

WEATHER: Cloudy, Temp 17°F

GROUND WATER (DEPTH/ELEV.): 54 ft B.G. /

DRILLING METHOD: 8" Tricone, Air

DRILLING FLUID: Air

TOP OF ROCK (DEPTH/ELEV.): 8.5 ft /

DEPTH	TIME	SAMPLE DESCRIPTION	STRATIGRAPHIC DESCRIPTION
		Micritic fossiliferous Limestone, Medium Dark Gray, Brachiopods, (N3), Some shale interbeds. Hnu = 0.0ppm Start drill.	
10'	1305	Micritic fossiliferous Limestone, Medium Dark Gray (N4), Some interbedded shale, (N3) few pyrite x-tals. Hnu = 0.0ppm	
28 ft	1319	Micritic fossiliferous Limestone, Medium Dark Gray (N4), Hnu = 50ppm at flume, 3.0ppm in B.Z.	
40 ft	1332	Micritic fossiliferous Limestone, Medium Dark Gray (N4) BZ = 0.0ppm, 15.0ppm in flume. Brachiopods, pyrite x-tals few.	
49 ft	1344	1st water. ≈2-3 gal/min, Lithology Same, Pull Tools, WL = 54', will drill to 69' & set well	
59 ft	1355	TD = 69 ft.	

SAMPLE TYPES
SS=SPLIT SPOON ST=SHELBY TUBE
R=ROCK CORE O=OTHER

NOTES:

BORING NO.: MW-18

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	1 OF 3	MW-2D
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION: OLD LANDFILL	GROUND ELEV.: 963.5	TOTAL DEPTH: 80.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					1542 SET UP RIG HIT YELLOW BROWN SILTY CLAY		960
5					HIT BEDROCK AT 7.5' 1600 HNu READING: NONDETECTABLE		955
10					1604 HNu READING: NONDETECTABLE		950
15							945
20							940
25							935
30							930

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE MW-2 LOGS FOR DESCRIPTION

BOREHOLE NO.: MW-2D

DRILLING INSPECTOR: C. WURM/J. JORDAN

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	2 OF3	MW-2D
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		OLD LANDFILL	963.5	80.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
40							925
							920
45							
							915
50					1700 HIT 49.0' ~~HNu READING: NONDETECTABLE~~ 1701 DAMP AT 49.0' STRONG ODOR 1706 HNU READING: 10 ppm IN DUST		
							910
55							
							905
60							
							900
65							
							895

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE MW-2 LOGS FOR DESCRIPTION

BOREHOLE NO.: MW-2D

DRILLING INSPECTOR: C. WURM/J. JORDAN

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	3 OF3	MW-2D
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION: OLD LANDFILL	GROUND ELEV.: 963.5	TOTAL DEPTH: 80.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					1733 WET AT 72'		890
75							
							885
80					~~1740 HIT 80'~~ 1745 HNu READING: NONDETECTABLE 1800 BLOWING THE HOLE		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE MW-2 LOGS FOR DESCRIPTION

BOREHOLE NO.:
MW-2D

DRILLING INSPECTOR: C. WURM/J. JORDAN

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: LOAD | SHEET 1 OF 1 | BORING NO. MW-20

SITE LOCATION: | JOB NO. 7248-3 | LOCATION: | GROUND ELEV. | TOTAL DEPTH 80'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG

1542 setup rig
1545 hit yellow brown silty clay.
1547 hit bedrock at 7.5'
1600 HNu reading: nondetectable
1604 HNu reading: nondetectable.
1700 Hit 49.0'
HNu reading: nondetectable.
1701 Damp at 49.0'
Strong odor
1706 HNu reading: 10ppm in dust
1733 wet at 72'
1740 Hit 80 ft.
1745 HNu reading: nondetectable.
1800 Blowing the hole
Charlie left to get another barrel.
1840 Charlie arrives w/ piping.
1945 Charlie left to get bentonite & Lock.
1852 Charlie returned.
1904 casing in
1915 well capped & locked.
1916 10 bags of sand, measured 58'
1929 10.5 bags to reach 55ft.
1934 1.5 buckets of bentonite at 49'.
1935 plastic around well.
1936 drillers clean up area.

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-2D

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF2	MW-6D
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		DEEP WELL TO MW-6 ON LAGOON	850.6	72.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
								850
5								845
						1419 7.5' SEE BORING LOGS FROM MW-6, ADDING 20' ROD 1413 RESUME DRILLING		
10						1432 HIT ROCK AT 9.5', GREY, MICRITIC, FOSSILIFEROUS LIMESTONE W/ INTERBEDDED SHALE, SEE MW-6 LOGS FOR LITHOLOGY		840
15								835
20								830
25								825
						1455 27.5', ADDING 20' ROD		
30								820
35								815

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE MW-6 LOGS FOR DESCRIPTION

BOREHOLE NO.: MW-6D

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET 2 OF 2	BOREHOLE NO. MW-6D
CLIENT: USATHAMA	JOB NO.: 007248-0003		
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION DEEP WELL TO MW-6 ON LAGOON	GROUND ELEV. 850.6	TOTAL DEPTH 72.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY / BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR ROD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
							810
45							805
50					1520 HIT WATER AROUND 40', ADDING 20' ROD AT 48'		800
					1539 53' HIT WATER		
55							795
60							790
65							785
70					1545 68', LITHOLOGY SAME, PETROLEUM SMELL, ADDING 20' ROD		780
					1549 DOWN TO 72', STOP DRILLING, SET WELL HERE		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE MW-6 LOGS FOR DESCRIPTION

BOREHOLE NO.: MW-6D

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG

- 6592
- 32-0
- 32

7/29/92

PROJECT: LBA(I) (T. Smith)

SITE LOCATION: MW-45 (6) adjacent to MW-6 on the terrace

JOB NO. 7348.3

LOCATION: adjacent to MW-6

SHEET 1 OF

BORING NO. MW-45 (6)

GROUND ELEV.

TOTAL DEPTH

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
						air rotary rig	
					1419	7½ feet, see borings logs from MW-6, adding 20' rod	
				1430 1432	1425 T.S.	resume drilling	
						hit rock at 9½ feet, grey micritic fossiliferous limestone w/ interbedded shale, see MW-6 logs for lithology T.S.	
					1455	27½', adding 20' rod	
					1520	hit water around 40', adding 20' rod at 48'	
					1531	53' hit water	
					1545	68', lithology same, petroleum smell, adding 20' rod	
					1549	down to 72', stop drilling, set well here	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-45 (6)

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET 1 OF2	BOREHOLE NO. MW-8D
CLIENT: USATHAMA	JOB NO.: 007248-0003		
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION DEEP WELL TO MW-8 ISLF	GROUND ELEV. 954.0	TOTAL DEPTH 64.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					0756 BEGIN DRILLING		
5							950
					0803 DRILLED TO 8', HIT ROCK, SEE LOGS FROM MW-8 FOR DESCRIPTION ~~OF SOIL AND ROCK, ADDING 20' ROD~~		945
10					0814 RESUME DRILLING, WATER ON TOP OF BEDROCK AT 8', PROBABLY FROM RAIN 0817 STOP DRILLING 0825 RESUME DRILLING		940
15							
20							935
25							930
					0846 STOP DRILLING AT 28', DUE TO LIGHTENING		925
30					~~8/3/92 1310 RESUME DRILLING~~ DRILLERS FLUSHING RUNOFF WATER OUT OF HOLE PRIOR TO DRILLING 1334 ADDING 20' ROD		920
35					1347 APPROXIMATELY 34', NOTHING BUT MUD RETURNING 1352 HIT WATER AT 37'		915

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE MW-8 LOGS FOR DESCRIPTION

BOREHOLE NO.: MW-8D

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)			SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003		2 OF2	MW-8D
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.		TOTAL DEPTH
	DEEP WELL TO MW-8 ISLF	954.0		64.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR ROD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
45							910
					1418 ADDING 20' ROD AT 48'		905
50							
							900
55							
							895
60							
					DRILLED DOWN TO 64', WILL FLUSH OUT HOLE, THEN SET WELL		890

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE MW-8 LOGS FOR DESCRIPTION

BOREHOLE NO.:
MW-8D

DRILLING INSPECTOR: T. SMITH

GEOLOGIC LOG

DEPTH	SAMPLE TYPE/NO	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inch) OR DRILLING RATE (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
						Air Rotary Rig	
					0756	begin drilling	
					0803	drilled to 8', hit rock, all logs from MW-8 for descriptions of soil & rock; setting 20' rod	
					0814	resume drilling, water on top of bedrock at 8'; probably from hair,	
					0817	stop drilling	
					0825	resume drilling	
					0846	stop drilling at 28', due to lightening	
			8/3/92		1310	resume drilling	
					1330	driller flushing runoff water out of hole prior to drilling	
					1334	setting 20' rod	
					1347	~34', nothing but mud returning	
					1352	hit water at 37'	
					1415	setting 20' rod @ 49'	
					1440	drilled down to 64'; will flush out hole then set well	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.:
MW-8D

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	1 OF4	MW-18D
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
	DEEP WELL TO MW-18	971.9	105.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE " RECOVERY BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					0728 DRILLERS SET RIG, WELL IS DOWN GRADIENT (TOPOGRAPHICALLY) FROM MW-18 0735 HIT REDDISH BROWN SILTY CLAY		970
5					0743 AT 8', SOME BROWN SHALE AND VERY STIFF BROWN CLAY		965
10					0802 HIT BEDROCK AT 9'4", A LOT OF BROWN SHALE ABOVE BEDROCK 0850 HNu READING OF 5 ppm RIGHT IN THE DUST CLOUD 0855 HNu READING: 3 ppm IN HOLE, KEITH MARKS IN LEVEL C, ADVISED TO MASK UP IF APPROACHING HOLE		960
15					0856 CONTACTED R. JONES CONCERNING HNu READING, ADVISED TO BACKOFF HOLE		955
20							950
25							945
30							940

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE MW-18 LOGS FOR DESCRIPTION

BOREHOLE NO.: MW-18D

DRILLING INSPECTOR: J. JORDAN/C. WURM

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET 2 OF4	BOREHOLE NO. MW-18D
CLIENT: USATHAMA	JOB NO.: 007248-0003		
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION: DEEP WELL TO MW-18	GROUND ELEV.: 971.9	TOTAL DEPTH: 105.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
								935
40								930
45						0909 DAMP AT 47'		925
50								920
55								915
▼60						0925 WET AT 60' 0929 KEITH IN LEVEL C CHECKS HOLE, HNu READING: UNDETECTABLE 0943 HNu READING: NONDETECTABLE		910
65						~~0950 PIPE THAT CONNECTS TO TUB IS~~ PLUGGED, DRILLERS STOP TO UNPLUG PIPE 1000 BEGIN DRILLING AGAIN AT 69.5'		905

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE MW-18 LOGS FOR DESCRIPTION

BOREHOLE NO.: MW-18D

DRILLING INSPECTOR: J. JORDAN/C. WURM

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	3 OF4	MW-18D
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		DEEP WELL TO MW-18	971.9	105.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					1002 STOP DRILLING, PROBLEMS WITH BLOWOUT PREVENTOR 1019 BEGIN DRILLING AGAIN		900
75							895
80							890
85							885
90							880
95							875
100					1140 HIT 104', BLOWING OUT HOLE		870

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE MW-18 LOGS FOR DESCRIPTION

BOREHOLE NO.:
MW-18D

DRILLING INSPECTOR: J. JORDAN/C. WURM

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	4 OF4	MW-18D
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		DEEP WELL TO MW-18	971.9	105.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					1240 SNACK BREAK IN FIELD 1301 DRILLERS LEAVE TO GET PIPING 1345 DRILLERS RETURN 1410 CASING TO 105' 1434 9.5 BAGS OF SAND IN 1440 SAND MEASURED: 80' 1447 72.5' (BENTONITE LEVEL) 1455 WELL CAPPED AND COVERED, DRUMS CAPPED ALSO		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE MW-18 LOGS FOR DESCRIPTION

BOREHOLE NO.:
MW-18D

DRILLING INSPECTOR: J. JORDAN/C. WURM

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD

SITE LOCATION:

JOB NO. 7248-3 | SHEET 1 OF 2 | BORING NO. MW-18D

LOCATION: | GROUND ELEV. | TOTAL DEPTH 105'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY (RQD)	SAMPLE DESCRIPTION	GRAPHIC LOG
						0728 drillers set up rig, well is downgradient (topographically) from MW18.	
						0735 hit reddish brown silty clay.	
						0743 at 8' → some brown shale. and v. stiff brown clay.	
						0802 hit bedrock at 9'4". Alot of brown shale above bedrock.	
						0850 HNu reading of 5ppm right in the dust cloud.	
						0855 HNu reading: 3 ppm in hole. Keith marks in Level C, advised to mask up if approaching hole.	
						0856 contacted R. Jones concerning HNu reading. Advised to back off hole.	
						0909 Damp at N47'	
						0925 wet at N60'	
						0929 Keith in Level C → checks hole, HNu reading: undetectable.	
						0943 HNu reading: nondetectable.	
						0950 pipe that connects to tub is plugged, drillers stop & unplug.	
						1000 Begin drilling again at 69.5'	
						1002 stop drilling, problems w/ Blowout Preventor.	
						1019 → Begin drilling again	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-18D

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD		SHEET	BORING NO.
SITE LOCATION:	JOB NO 7248-3	2 OF 2	MW-18D
	LOCATION:	GROUND ELEV.	TOTAL DEPTH 105'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
						11 40 Hit 104' Blowing out hole.	
						1240 Snack break in field	
						1301 drillers leave to get piping.	
						1345 Drillers return	
						1410 casing to 105'	
						1434 9.5 bags of sand in	
						1440 Sand measured 80'	
						1447 72.5' (bentonite level)	
						1455 well capped and covered, drums capped also.	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-18D

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF2	MW-22
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION: NEW LANDFILL	GROUND ELEV.: 1001.7	TOTAL DEPTH: 32.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	SS 1	0.0 2.0	15"	3-5 9-11	63			
	SS 2	2.0 4.0	12"	6-10 14-15	50	1535 SILT AND CLAY WITH BLACK OXIDE PEBBLES, SOME ROOTS, LESS THAN 2% SILT , SOFT, MED. PLASTICITY, SOME IRON STAINING, ~~DRY, DK. YELLOWISH BROWN~~ (10YR4/4)		1000
5	SS 3	4.0 6.0	9"	11-13 14-16	38			
	SS 4	6.0 8.0	24"	14-16 17-18	100	1538 SILTY CLAY, IRON STAINING, MINOR MOTTLING, STIFF, DRY, LOW PLASTICITY, LESS THAN 2% SILT, YELLOWISH BROWN (10YR5/4)		995
	SS 5	8.0 10.0	15"	8-10 14-16	63	1542 YELLOWISH BROWN SILTY CLAY, ~~DRY, STIFF, HARDER, IRON~~ STAINING, MOTTLING HORIZONTALLY, LOW/MED. PLASTICITY, 10YR5/4, SOME ROOTS, LESS THAN 2% SILT		990
10	SS 6	10.0 12.0	15"	10-13 50/3"	63			
15						1545 YELLOWISH BROWN (10YR5/4), LESS SILT, CLAY, MED PLASTICITY, ~~BLACK STAINED PEBBLES, IRON~~ STAINING, STIFF, DRY , MOTTLING		985
20						1553 YELLOWISH BROWN (10YR6/2), GREY MOTTLING, IRON STAINING, CLAY WITH MINOR SILT, DRY, STIFF, MED. PLASTICITY, LESS THAN 1% SILT, SOME OXIDE STAINING, ~~COLOR CHANGING TO LIGHT~~ GREYISH 10-15"		
						1600 GREYISH BROWN (10YR5/4), 1-8" SILTY CLAY, MOTTLING, HARD, MED. PLASTICITY, DRY		980
25						8-15" WEATHERED LIMESTONE PEBBLES, MED. SIZE, ANGULAR, MICRITIC		
						7/21/92 1305 BEGIN DRILLING THROUGH YELLOWISH BROWN, SILTY CLAY (10YR4/6)		975
30		29.0 29.0		1 Ft/Min		1313 REACHED 8', DRILLING RATE=1Ft./Min.		
		32.0 32.0		.875 Ft/Min		1330 BEGIN DRILLING THROUGH SILTY CLAY AGAIN 1332 HIT BEDROCK AT 10.5', VERY SOFT LIMESTONE AND SHALE, DRILL RATE=.875Ft./Min. 1336 HIT HARDER LAYER OF INTERBEDDED LIMESTONE AND		970

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SOIL BORINGS DONE 7/20/92

BOREHOLE NO.: MW-22

DRILLING INSPECTOR: T. SMITH/J. JORDAN

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	2 OF2	MW-22
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION: NEW LANDFILL	GROUND ELEV.: 1001.7	TOTAL DEPTH: 32.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE " RECOVERY	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR ROD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
						SHALE AT 14', SHALE AND LIMESTONE ARE SOFT AND DRY, CRUMBLING UNDER PRESSURE (7.5YR7/0) 1344 OVA READING=NONDETECTABLE 1347 HIT WATER AT 22.5', CONTINUE DRILLING TO 28.5' 1354 HIT 28.5' 1407 WATER ROSE APPROXIMATELY 10' UP TO 18.5' 1420 BEGIN DRILLING DOWN TO 32.5', THERE MUST BE A FRACTURE ZONE ABOVE THIS DEPTH WHICH IS THE ONLY AREA FILLED WITH WATER BECAUSE THE LAST FEW FEET DOWN TO 32.5' WERE DRY 1600 INSTALL CASING, SCREEN WITH A .010 SLOT SCREEN FROM 22.5'-32.5' 1605 ADD 14' OF SAND FILTER WHICH IS 6 1/4 50-POUND BAGS OF SAND 1615 ADD 5.5' OF BENTONITE PELLETS WHICH IS 2 5-GALLON BUCKETS		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SOIL BORINGS DONE 7/20/92

BOREHOLE NO.: MW-22

DRILLING INSPECTOR: T. SMITH/J. JORDAN

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

7/20/92 1540

PROJECT: CBAD (T. Smith)

SITE LOCATION: MW-22 New Landf.11

JOB NO. 7248-3

SHEET 1 OF 1

BORING NO. MW-22

LOCATION: New Landf.11

GROUND ELEV.

TOTAL DEPTH 11'3"

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OF CORE	SAMPLE DESCRIPTION	GRAPHIC LOG
35 0-2	SS		15"	3.5.9.11		Silt & Clay w/ black oxide pebbles, some water, less than 2% silt, soft med. plasticity, some iron staining, dry, dk. yellowish brown (10YR4/4)	
38 2-4			12"	6.10.14.15		silty clay, iron staining, minor mottling, stiff, dry, low plasticity, less than 2% silt (10YR 5/4) yellowish brown	
542 4-6			9"	11.13.14.16		yellowish brown silty clay, dry, stiff, harder, low plasticity, T.S. iron staining, mottling horizontally, some med plasticity, 10YR5/4, some rocks, less than 2% silt	
1545 6-8			24"	14.16.17.18		yellowish brown (10YR 5/4) less silt, clay, med T.S. plasticity, black stained pebbles, iron staining, stiff, dry, mottling	
553 8-10			15"	8.10.14.16		yellowish brown (10YR6/6), gley mottling, iron staining, clay w/ minor silt, dry, stiff, med. plasticity, less than 2% silt, some oxide staining, Color changing to light olive gray (0-15"	
1600 10-12"			15"	10.13.54/3		grayish brown (10YR5/4), 1-8" silty clay, mottling, hard, med. plasticity, dry, 8-15 weather limestone pebbles, med. dry, angular, moistic	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: B.K. at 11'3"
drilling complete

BORING NO.: MW-22

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

M&E

PROJECT: LBAD		SHEET	BORING NO.
SITE LOCATION: Golf course, to the left of the yellow X	JOB NO. 7248-3	2 OF 2	MW-22
	LOCATION: West of golf course	GROUND ELEV.	TOTAL DEPTH 32.5'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR FAM	SAMPLE DESCRIPTION	GRAPHIC LOG
						1305 Begin drilling through yellowish-brown, silty clay (10 YR 4/6).	
						1313 Reached 8'. Drilling rate = 1 ft/min	
						1330 Begin drilling through silty clay again	
						1332 Hit bedrock at 10.5'. very soft limestone and shale. Drill rate = .875 ft/min	
						1336 Hit harder layer of interbedded limestone and shale at 14'. Shale and limestone are soft and dry, crumbling under pressure. (7.5 YR 7/0)	
						1344 OVA reading = nondetectable.	
						1347 Hit water at 22.5'. Continue drilling to 28.5'	
						1354 Hit 28.5'.	
						1407 water rose ~10' up to 18.5'.	
						1420 Begin drilling down to 32.5'. There must be a fracture zone above this depth which is the only area filled with water because the last few feet down to 32.5' were dry.	
						1600 Install casing. Screen with a .010 slot screen from 22.5'–32.5'	
						1605 Add 14' of sand filter which is 6 1/4 50-pound bags of sand.	
						1615 Add 5.5' of bentonite pellets which is 2 5-gallon buckets.	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: Bedrock at 10.5'.
Water at 22.5'.
Used 6 1/4 bags sand
Used 2 5-gallon buckets of bentonite pellets.

BORING NO.: MW-22

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF3	MW-22D
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		DEEP WELL TO MW-22 N.L.	1002.3	67.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					0800 ARRIVE ON SITE AND SET UP FOR MW-22D 0807 BEGIN DRILLING		1000
5							995
					0813 HIT 8', FROM 0-8' IS A REDDISH BROWN SILTY CLAY, BLOW OUT HOLE AND ADD THE NEXT 20.5' OF DRILL BIT BEGIN DRILLING AGAIN AT 8'		
10							990
15					0832 HIT BEDROCK AT 15'4", DRILLING RATE=1.16Ft/Min FROM 8'-15'4" HIT INTERBEDDED SHALE AND LIMESTONE LAYERS 0835 INTO A PURE LIMESTONE-LIGHT GREY COLOR AND VERY DUSTY		985
20					0838 HNu READING=20 ppm, BUT BELIEVE HNu IS CALIBRATED IMPROPERLY 0839 HIT A DAMP SPOT AT 18'		980
25							975
					0848 HIT 28.5', DRILLING RATE=1Ft/Min, ADDED THE NEXT 20.5' OF DRILL BIT 0849 BEGIN DRILLING AT 28.5'		
30							970

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE LOGS FROM MW-22 FOR DESCRIPTION

BOREHOLE NO.: MW-22D

DRILLING INSPECTOR: J. JORDAN/C. WURM

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	2 OF3	MW-22D
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		DEEP WELL TO MW-22 N.L.	1002.3	67.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
							965
40							960
45							955
50					0904 REACHED 49', DRILLING RATE=1.3Ft/Min, ADDED ANOTHER 20.5' DRILL BIT DRILL CUTTINGS ARE DAMP FROM 47'-49', PROBABLY FROM THE DAMP LAYER ABOVE AT 18' 0906 RESUME DRILLING AT 49' 0918 DETECT A STRONG ODOR OF WHAT DRILLERS CALL "LIMEGAS", SMELLS LIKE SULPHUR AND FUEL OIL, DRILLERS SAY IT IS SULPHUR CAUGHT IN THE SHALE LAYER, ODOR STARTED AROUND 59', SO FAR THE ENTIRE COLUMN OF ROCK HAS BEEN INTERBEDDED LIMESTONE AND SHALE		950
55							945
60							940
65					0929 REACHED 67.5', DRILLING RATE=.89Ft/Min, BLOW OUT HOLE 0940 DECIDE WITH RICK JONES TO SET THE WELL AT 67.5' WITH 20' OF SCREEN UP TO47.5' AND 25' OF SAND		935

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE LOGS FROM MW-22 FOR DESCRIPTION

BOREHOLE NO.:
MW-22D

DRILLING INSPECTOR: J. JORDAN/C. WURM

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	3 OF3	MW-22D
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
	DEEP WELL TO MW-22 N.L.	1002.3	67.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					UP TO 42.5', NEED 5' OF BENTONITE TO 37.5' AND THE REST GROUT 1050 BEGIN INSTALLING CASING 1105 ADD SAND FILTER 1115 6 BAGS OF SAND ADDED, MEASURED SAND AT 53.3' 1125 DRILLERS STOP BECAUSE OF A "MUDDING" APPROXIMATELY 6 FEET DOWN CUTTINGS ARE STUCK HERE AND IT IS GOING TO BE DIFFICULT TO GET THE PELLETS DOWN THE HOLE, THEY APPROXIMATE THE RING TO BE 1" THICK 1128 ADD 2 MORE BAGS OF SAND, MEASURED 49.5' 1132 ADD 2 MORE BAGS OF SAND, MEASURED 44' 1138 ADD 1/2 MORE BAG OF SAND, MEASURED 42.8' 1148 ADD 1/4 MORE BAG OF SAND, MEASURED 42.3' 1150 ADD 2 5 GALLON BUCKETS OF BENTONITE PELLETS, MEASURED 34.6' 1200 COVER WELL IN PLASTIC AFTER LOCKING IT, LEAVE SITE		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE LOGS FROM MW-22 FOR DESCRIPTION

BOREHOLE NO.:
MW-22D

DRILLING INSPECTOR: J. JORDAN/C. WURM

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD		SHEET	BORING NO.
SITE LOCATION:	JOB NO. 7248-3	2 OF	MW-22D
	LOCATION:	GROUND ELEV.	TOTAL DEPTH 67.5'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
						0800 Arrive at site and set up for MW-22D.	
						0807 Begin drilling	
						0813 Hit 8'. From 0'-8' is a reddish-brown, silty clay. Blow out hole and add the next 20.5' of drill bit.	
						0827 Begin drilling again at 8'.	
						0832 Hit bedrock at 15'4". Drilling rate = 1.16 ft./min From 8'-15'4" hit interbedded shale and limestone layers.	
						0835 Into a pure limestone - light grey color and very dusty.	
						0838 HNu reading = 20 ppm but believe HNu is calibrated improperly.	
						0839 Hit a damp spot at 18'.	
						0848 Hit 28.5'. Drilling rate = 1 ft./min. Added the next 20.5' of drill bit.	
						0849 Begin drilling at 28.5'.	
						0904 Reached 49'. Drilling rate = 1.30 ft/min Added another 20.5' drill bit. Drill cutting are damp from 47'-49'. Probably from the damp layer above at 18'.	
						0906 Resume drilling at 49'.	
						0918 Detect a strong odor of what drillers call "limegas." Smell like sulpher and fuel oil. Drillers say it is sulpher caught in the shale lay - Odor started around 59'. So far the entire column of rock has been interbedded limestone and shale.	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-22D

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT : LBAD		SHEET 3 OF	BORING NO. MW-22D
SITE LOCATION	JOB NO. 7298-3		
	LOCATION:	GROUND ELEV.	TOTAL DEPTH 67.5'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG

0929 Reached 67.5! Drilling rate = .89 ft/min. Blow out the hole.

0940 Decide with Rick Jones to set the well at 67.5' with 20' of screen up to 47.5' and 25' of sand up to 42.5'. Need 5' of bentonite to 37.6' and the rest grout.

1050 Begin installing casing.

1105 Add sand filter.

1115 6 bags of sand added. Measured sand at 53.3!

1125 Drillers stop because of a "mud ring" approximately 6 feet down. Cuttings are stuck here and it is going to be difficult to get the pellets down the hole. They approximate the ring to be 1" thick.

1128 Add 2 more bags of sand. Measured 49.5!

1132 Add 2 more bags of sand. measured 44!

1138 Add 1/2 more bag of sand. Measured 42.8'.

1148 Add 1/4 more bag of sand. Measured 42.3!

1150 Add 2 5 gallon buckets of bentonite pellets. Measured 34.6!

1200 Cover well in plastic after locking it. Leave site.

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: 10 3/4 bags of sand
2 5-gallon buckets of bentonite pellets.

BORING NO.: MW-22D

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF2	MW-23
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		LOCATED IN NEW LANDFILL	986.9	53.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR ROD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	SS 1	0.0 2.0	8"	2-2 3-4	33			
	SS 2	2.0 4.0	9"	4-6 7-9	38	1649 DK. BROWN SILTY CLAY, ROOTS AND GRASS, MINOR IRON STAINING, LOOSE/SOFT, LOW PLASTICITY, DRY, OBLONG OXIDE ANGULAR		985
5	SS 3	4.0 6.0	24"	9-10 10-13	100	ROCK, 2-5% SILT VISIBLE, 10YR3/3		
	SS 4	6.0 8.0	0"	7-9 11-14	0	1653 DK. BROWN SILTY CLAY, GRASS AND ROOTS, MINOR IRON STAINING, LOW PLASTICITY, DRY, 2-5% SILT, 10YR3/3, SOFT		980
	SS 5	8.0 10.0	6.5"	6-50/0.4"	27			
10						1656 DK. BROWN/REDDISH BROWN LAST 12", CLAY WITH SILT, DENSE, SOME ROOTS DRY, OXIDE STAINING, LOW PLASTICITY, 10YR4/6, SMALL ROUNDED OXIDE STAINED PEBBLES		975
15						1700 NO RECOVERY AUGER DOWN TO 8'		
						1710 0-4" DK. BROWN SILTY CLAY (10YR4/4), 10% SILT, LOW PLASTICITY, SOME ROOTS, DRY, LOOSE 4"-6.5" WEATHERED GREY CLAY, LAMINAR BEDDING, HARD, LOW PLASTICITY, DENSE, 2.5YR5/0		970
20						BEGIN AIR ROTARY DRILLING HERE 0900 START AT 9' LIMESTONE, SOFT, GREY, WEATHERED (9.28'), DRY, EASILY CRUMBLES UNDER PRESSURE, PIECES OF SHALE PRESENT		965
25								960
30								955

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BOREHOLE NO.: MW-23

DRILLING INSPECTOR: T. SMITH/B. ROGERS

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

M&E

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	2 OF2	MW-23
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION: LOCATED IN NEW LANDFILL	GROUND ELEV.: 986.9	TOTAL DEPTH: 53.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
							950
40					AT 38' LIMESTONE GRADES INTO HARDER MATERIAL (MORE DUST EMITTED (DRIER)), SLOWER DRILLING, CRYSTALLINE LIMESTONE AT 42.5' DUST GONE! HIT WATER AT 43'		945
45							940
50					STOP DRILLING AT 52', SAME MATERIAL AS ABOVE (38' AND BELOW) TOTAL DEPTH IS 53'		935

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BOREHOLE NO.: MW-23

DRILLING INSPECTOR: T. SMITH/B. ROGERS

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG

7/20/92 1650

PROJECT: (BAD

SITE LOCATION: Mw-23 N.L.

JOB NO. 7248-3

SHEET 1 OF 2

BORING NO. MW-23

LOCATION: MW-23 N.L.

GROUND ELEV.

TOTAL DEPTH 8.5'

Terry, Paul, Jackie

	DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
1649	0-2'	SS		8"	2.2.3.4		Dk. brown silty clay, roots & glass, minor iron staining, loose/soft, low plasticity, dry, oblong oxide angular rock. 2-5% silt visible (10YR3/3)	
1653	2-4'			9"	4.6.7.9		Dk. brown silty clay, glass & roots, minor iron staining, low plasticity, dry. 2-5% silt, 10YR 3/3, soft	
1656	4-6'			24"	9.10.10.13		Dk. brown/reddish brown last 12" clay w/ silt, dense, some roots, dry, oxide staining, low plasticity, (10YR 4/6), small rounded oxide stained pebbles	
700	6-8'			0"	7.9.11.14		No recovery auger down to 8'	
710	8-10'			7½	6.50/4.0		0-4" Dk. brown silty clay (10YR 4/4) 10% silt, low plasticity, some roots, dry, loose 4-8½" weathered grey clay ~~turning to limestone~~, laminar bedding, hard, low plasticity, dense, 2.5YR 5/0	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: B.R. at 8.5"

BORING NO.: MW-23

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

7/21/92 0817

PROJECT : LBAD		SHEET 2 OF	BORING NO. MW-23
SITE LOCATION: MW-23	JOB NO. 7248.3		
	LOCATION:	GROUND ELEV.	TOTAL DEPTH

PAAL / Bob

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
0 8.5						SEE Page 1. Begin air rotary drilling. → 0900 → start @ 9. Limestone, soft, Gray, Weathered (9.28'). Dry, easily crumbles under pressure. Pieces of Shale present. At 38 FT. Limestone grades into harder material, more dust emitted (drier), Slower drilling. (Crystalline limestone.) At 42.5' Dust Gone! Hit water. Blow hole out, go to 43.5'. @1000 Continue drilling. Stop @ 52.0' Same material as above, (38' ↓). TOTAL Depth 53.0 ft. PAAL	
8.5							

→ Correction 7/21/92 12:00 Hit water @ 43.0'

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-23

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	1 OF3	MW-23D
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
	DEEP WELL TO MW-23 IN N.L.	986.7	88.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					0750 DRILLERS BEGIN DRILLING WITH AIR ROTARY		985
5					0755 HIT BEDROCK AT 6'		980
					DRILLERS DOWN TO 7.5', DRILLERS ADD 20' ROD 0813 DRILLERS RESUME WITH DRILLING 0814 EASY DRILLING		
10					0820 AVG. ABOUT 1.5Ft/Min, THICK INTERBEDDED SHALE ZONE		975
15							970
20							965
25					0822 DRILLERS ADDING 20' ROD		960

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE LOGS FROM MW-23 FOR DESCRIPTION

BOREHOLE NO.:
MW-23D

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET 2 OF3	BOREHOLE NO. MW-23D
CLIENT: USATHAMA	JOB NO.: 007248-0003		
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION DEEP WELL TO MW-23 IN N.I.	GROUND ELEV. 986.7	TOTAL DEPTH 88.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					0825 DRILLING THROUGH SHALE STILL		955
35					0830 PENETRATING LIMESTONE, GREY MICRITIC, ABOUT AT 37'		950
40					0835 HIT SOME WATER AT ABOUT 41'		945
					0838 APPROXIMATELY 43.5', GREY MICRITIC LIMESTONE WITH ~~INTERBEDDED SHALE~~		
45					0841 DIESEL SMELL, 47', WATER		940
					0843 APPROXIMATELY 48, ADD ROD (20'), AVG. ABOUT 1Ft/Min		
50							935
55							930

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE LOGS FROM MW-23 FOR DESCRIPTION

BOREHOLE NO.: MW-23D

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET 3 OF3	BOREHOLE NO. MW-23D
CLIENT: USATHAMA	JOB NO.: 007248-0003		
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION DEEP WELL TO MW-23 IN N.L.	GROUND ELEV. 986.7	TOTAL DEPTH 88.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
							925
65							
							920
					0940 68.5', ADD ANOTHER 20' ROD		
70							
							915
75							
							910
80							
							905
					0958 84', EASY DRILLING		
85							
							900
					1003 87.5', DRILLING COMPLETE, WILL SET WELL HERE		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE LOGS FROM MW-23 FOR DESCRIPTION

BOREHOLE NO.: MW-23D

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

7/28/82

PROJECT: LBAD (T. Smith)		SHEET	BORING NO.
SITE LOCATION: MW-231 Adjacent to Softball field	JOB NO.	1 OF	MW-231
	LOCATION: MW-231	GROUND ELEV.	TOTAL DEPTH

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (use 8 blows) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
					0750	Driller begin drilling w/ air hammer	
					0855	Hit bedrock at 6.0', driller down to 7½'	
					0913	driller add 20' rod	
					0914	driller resume w/ drilling	
					0920	easy drilling	
						avg. ~ 1.5'/min, thick interbedded shale zone	
					0930	driller adding 20' rod,	
					0935	drilling through shale still	
					0938	penetrating limestone, grey micritic, about	
						at 37'	
					0835	hit some water at about 41'	
					0838	~43½', grey micritic limestone w/ interbedded	
					0941	shale	
						diesel smell 47', water	
					0843	~48', add rod (20'), avg. ~ 1'/min	
					0940	68½', add another 20' rod	
					0958	~84', easy drilling	
					1003	87½', drilling complete, will set	
						well here	

SAMPLE TYPES	NOTES:	BORING NO.:
SS=SPLIT SPOON, ST=SHELBY TUBE R=ROCK CORE, O=OTHER		MW-231

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF2	MW-32
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		NORTH- EAST CORNER BLDG 147	968.8	54.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	SS 1	0.0 2.0	13"	3-3 7-6	54	1547 0-4" DK. BROWN (10YR3/1), SILTY CLAY, ROOTS AND GRASS PRESENT, SMALL ANGULAR LIMESTONE, DRY, SOFT 4"-13" YELLOW BROWN (10YR4/6), SILTY CLAY, OXIDE BLOTCHES, ~~MINOR MOTTLING, SOFT, STIFT~~, DRY		965
	SS 2	2.0 4.0	24"	3-7 8-12	100	1548 YELLOWISH BROWN (10YR5/4) CLAY WITH SILT, OXIDE PEBBLES, DRY, STIFF LOW PLASTICITY, MINOR MOTTLING, TURNING TO ~~WEATHERED CLAY WITH~~ LIMESTONE END OF SPOON		960
5	SS 3	4.0 6.0	10"	8-12 12-50/1"	42	1551 YELLOWISH TAN (2.5YR5/4) WEATHERED CLAY WITH SMALL ANGULAR LIMESTONE PEBBLES, BEDROCK AT 5'7"		955
10						1010 FIRST BEDROCK-LIMESTONE WEATHERED, FOSSILIFEROUS WITH THIN LAYERS OF BROWN, WEATHERED SHALE INTERBEDDED, VERY SOFT, BROWN DUST		950
15								945
20								940
25						1035 GREY LIMESTONE, HARDER, FOSSILS, GREY WHITISH DUST, RATE OF DRILLING IS SLOWER 1040 STRONG PETROLEUM ODOR, STILL IN LIMESTONE		935
30								

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BOREHOLE NO.: MW-32

DRILLING INSPECTOR: T. SMITH/P. RODGERS

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	2 OF2	MW-32
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
	NORTH- EAST CORNER BLDG 147	968.8	54.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					1045 STRONG ODOR, ROTTEN SMELL 1046 ODOR NOT NOTICED NOW		930
40					1055 NOTICE ODOR AGAIN, HARD LIMESTONE, GREY		
45					1057 HIT FRACTURE IN ROCK, BIT GETS ~~STUCK MOMENTARILY, BOUNCING~~ AROUND DRILLER REPORTS HE IS IN A FRACTURE IN BEDROCK, SLOW IT DOWN, CUTTINGS ARE WET, CLEAN HOLE OUT , LET SIT A WHILE (15 MIN.) ~~STOP AT 46'~~		925
50					1115 AFTER LETTING HOLE SIT FOR 15 MINUTES, BLEW OUT FREE WATER, MUD BROWN, LIMESTONE FRAGMENTS, WILL DRILL TO 54 FEET AND BLOW HOLE OUT THREE SEPARATE TIMES, VERY DIRTY WATER STOP AT 54 FEET, SET WELL SEE WELL CONSTRUCTION DIAGRAM		920 915

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BOREHOLE NO.: MW-32

DRILLING INSPECTOR: T. SMITH/P. RODGERS

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

7/21/92 1546

PROJECT: CBADCT Smith

SITE LOCATION: MW-32 Bldg. 147 N.E. Corner

JOB NO. 7248.3 | SHEET 1 OF 1 | BORING NO. MW-32

LOCATION: Bldg. 147 | GROUND ELEV. | TOTAL DEPTH 5'7"

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (or g Lacked) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
1547 0-2'	SS		13"	3-3-7-6		0-4" Dk. Brown (10YR3/3) silty clay, roots and grass present, small angular limestone, dry soft 4-13" Yellow Brown (10YR4/6) silty clay oxide blotches, minor mottling, soft/stiff, dry	
1548 2-4'			24"	3-2-8-12		Yellowish Brown (10YR5/4) Clay w/ silt, oxide pebbles, dry, stiff, low plasticity, minor mottling turning to weathered clay w/ limestone end of core	
1551 4-6'			10"	8-12-12-30/1"		Yellowish Brown 10YR5/4 weathered clay w/ small angular limestone pebbles, Bedrock at 5'7"	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: 5'7" = B.C.

BORING NO.: MW-32

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD		SHEET	BORING NO.
SITE LOCATION: L STREET AND 2nd STREET	JOB NO.	2 OF 2	MW-32
	LOCATION:	GROUND ELEV.	TOTAL DEPTH

7/23/92 Air Rotary - 8 3/4" Roller Cone Bit

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
0	5					Soil → See #1 log sheet for MW-32	
5	8.5	1010				First bedrock - limestone, weathered, fossiliferous within layers of brown, weathered shale interbedded. Very soft, brown dust	
8.5	28.5	1035				Gray limestone, harder, fossils, gray whitish dust. Rate of drilling is slower.	
34		1040				strong Petroleum odor. Still in limestone	
34.5		1045				STRONG odor, rotten smell.	
35.0		1046				Odor NOT Noticed Now.	
42		1055				Notice odor again. Hard limestone, gray.	
44		1057				Hit fracture in Rock, bit gets stuck momentarily, bouncing around. Driller reports he is in a fracture in bedrock. Slow it down. Cuttings wet. Clean hole out, let it sit a while (15 min.)	
						STOP AT 46 Feet.	
46		1115				After letting hole sit for 15 min, blew out free water, mud (brown) and limestone fragments.	
						Drill to 54 feet and blow hole at three separate times. Very dirty water.	
						STOP AT 54 Feet	
						Set well	
						see Well Construction Diagram	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-32

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET 1 OF3	BOREHOLE NO. MW-32D
CLIENT: USATHAMA	JOB NO.: 007248-0003		
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION DEEP WELL TO MW-32 BLDG 147	GROUND ELEV. 968.8	TOTAL DEPTH 89.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR ROD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					0900 BEGIN DRILLING		965
5							
					0904 DRILLER SAYS THAT HE IS IN AND OUT OF ROCK, DOES NOT THINK IT IS BEDROCK, HIT FIRST ROCK AROUND 5', HE IS NOW DOWN TO 8', ADDING 20' ROD		960
10					0915 DRILLER SAID BEDROCK AT 8', SEE LOGS FOR MW-32		955
15							950
20							945
25					0927 APPROXIMATELY 27', GREY MICRITIC, FOSSILIFEROUS LIMESTONE WITH INTERBEDDED SHALE, EASY DRILLING IN SOME PLACES		940
30					0929 ADDING 20' ROD AT 29'		935

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE LOGS FOR MW-32 FOR DESCRIPTION

BOREHOLE NO.: MW-32D

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET 2 OF3	BOREHOLE NO. MW-32D
CLIENT: USATHAMA	JOB NO.: 007248-0003		
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION DEEP WELL TO MW-32 BLDG 147	GROUND ELEV. 968.8	TOTAL DEPTH 89.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
40					0942 APPROXIMATELY 40', LITHOLOGY SAME, EASY DRILLING, AVG 1Ft/Min.		930
45 ▽					0945 HIT SOME WATER AROUND 45'		925
50					0949 ADDING 20' ROD AT 49'		920
▽					0959 DRILLER SAID HIT WATER AGAIN AT 52'		915
55							
60							910
65							905
							900

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE LOGS FOR MW-32 FOR DESCRIPTION

BOREHOLE NO.: MW-32D

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	3 OF3	MW-32D
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		DEEP WELL TO MW-32 BLDG 147	968.8	89.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					1012 DOWN TO 69.5', DRILLERS FLUSHING OUT AND WILL CLEAN TUB OUT PRIOR TO ADDING ANOTHER ROD AND DRILLING AGAIN 1049 ADDING 20' ROD		895
75							890
80							885
85					1110 DRILLED TO 89.5', WILL SET WELL HERE, USING A 20' SCREEN		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
SEE LOGS FOR MW-32 FOR DESCRIPTION

BOREHOLE NO.: MW-32D

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG

8/4/92

PROJECT : (BAI)		SHEET 1 OF	BORING NO. MW-32D
SITE LOCATION: Next to MW-32 Behind Bldg. 147	JOB NO. LOCATION: N.E. Corner of Bldg. 147	GROUND ELEV.	TOTAL DEPTH 89

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
					0900	begin drilling	
					0904	driller says that he is in and out of rock; does not think it is bedrock; hit first rock around 5', he is now down to 8', adding 20' rod	
					0915	driller said bedrock at 8', see logs for MW-32	
					0927	~27', grey micritic, fossiliferous limestone w/ interbedded shale. Easy drilling in some places	
					0929	adding 20' rod at 29'	
					0942	~40', lithology same, easy drilling avg. 1'/min	
					0946	hit some water @ 45'	
					0949	adding 20' @ 49'	
					0959	driller said hit water again at 52'	
					1012	down to 69½', drillers flushing with [illegible] & will clean out tub prior to adding another rod & ~~[illegible]~~ drilling again	
					1049	adding 20' rod	
					1110	drilled to 89½', will set well [illegible] using a 20' screen	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO. MW-32D

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF2	MW-33
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		2nd AVE. FIELD EAST	961.6	62.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	SS 1	0.0 2.0	12"	2-3 3-9	50			960
	SS 2	2.0 4.0	NR	7-19 24-21	0	1603 YELLOWISH BROWN (10YR4/4), SILTY CLAY, GRASS AND ROOTS, BECOMING WEATHERED VERTICALLY, MINOR MOTTLING, LOW PLASTICITY, DRY, DENSE BLACK SUB-ROUNDED OXIDE PEBBLES		
5	SS 3	4.0 6.0	NR	12-21 30-32	0			
	SS 4	6.0 8.0	2"	18-24 50/2"	17			955
						1606 NO RECOVERY, 2 LARGE SUB-ROUNDED MICRITIC LIMESTONES		
10						1610 WEATHERED CLAY AND LIMESTONE, NO RECOVERY 1613 WEATHERED CLAY AND LIMESTONE		950
15						1315 SET UP RIG AT MW-33 1323 BEGIN DRILLING THE FIRST 8'. A BROWN TO LIGHT BROWN SILTY CLAY APPROXIMATELY 3'8" HIT A BROWN SHALE, DRY AND BRITTLE		945
20						1330 AT 6.5' HIT LIMESTONE, LIGHT GREY IN COLOR 1348 HNu READING: NONDETECTABLE 1354 ODOR DETECTED, HNu WAS NONDETECTABLE 1400 BEGIN TO ENCOUNTER MASSIVE LIMESTONE, DRILLING RATE SLOWS		940
25						1407 ODOR DETECTED, HNu READING 15ppm, RICK JONES NOTIFIED, ADVISED TO EVACUATE AREA IMMEDIATELY 1408 DAMP AT 28'		935
30						1412 DRILLERS UPGRADE TO LEVEL C 1414 RICK JONES IN RESPIRATOR, HNu READING OF 2ppm		930
35						1427 RICK JONES IN RESPIRATOR HNu IN TUB 1ppm, HNu AT WELL HEAD NON-DETECTABLE		925

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
NR = NO RECOVERY IN SPLIT SPOON

BOREHOLE NO.: MW-33

DRILLING INSPECTOR: J. JORDAN/C. WURM

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	2 OF2	MW-33
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
	2nd AVE. FIELD EAST	961.6	62.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 In.) OR DRILLING TIME (min/ft)	% RECOVERY OR ROD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
							920
45							915
50					1503 DAMP AT 52' (WET)		910
55							905
60					1540 HIT 62' 1605 DRILL RIG OUT OF FUEL, DRILLERS LEAVE TO GET FUEL 1705 DRILLERS HAVE RETURNED WITH FUEL AND PUMPED IT INTO RIG 1710 START BREAKING DOWN RIG 1716 INSTALL CASING (10' FROM 52' TO 62') 1737 15' OF SAND FROM 47'-62' 1750 AFTER 7 BAGS OF SAND, MEASURED 46.5' 1751 START ADDING 1.5 BUCKETS OF BENTONITE TO 41.5' 1752 PUT LOCK ON THE WELL AND PLASTIC AROUND BASE 1758 BREAK DOWN RIG		900

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
NR = NO RECOVERY IN SPLIT SPOON

BOREHOLE NO.: MW-33

DRILLING INSPECTOR: J. JORDAN/C. WURM

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

7/21/92 1605

PROJECT : (BAAF) T. Smith

SITE LOCATION: MW-33 2nd avenue. Field east

JOB NO. 7248-3

SHEET 1 OF

BORING NO. MW-33

LOCATION: 2nd ave. Field East

GROUND ELEV.

TOTAL DEPTH 7.0'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
1603	0-2' SS		12"	2·3·3·4		yellowish Brown (10YR 5/4) silty clay, grass & roots, occasional weathered vertically, minor mottling, low plasticity, dry, dense, black sub-rounded angular pebbles	
1606	2-4			7·19·24·21		No recovery 2 large sub-rounded micritic limestones	
1610	4-6'			12·21·30·32		Weathered clay & limestone No recovery	
1613	6-8'		4"	18·24·30/4"		Weathered clay & limestone	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: 7' to B.R.

BORING NO.: MW-33

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD		SHEET 1 OF 2	BORING NO. MW-33
SITE LOCATION:	JOB NO. 7248-3		
	LOCATION:	GROUND ELEV.	TOTAL DEPTH 62'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
						1315 set-up rig at MW-33	
						1323 begin drilling the first 8'. a brown to light brown silty clay. Approx. 3'8" hit a brown shale. Dry & brittle.	
						1330 At 6.5' hit limestone, light grey in color.	
						1348 HNu reading → nondetectable	
						1354 odor detected → HNu was nondetectable.	
						1400 begin to encounter massive limestone, drilling rate slows.	
						1409 odor detected → HNu reading 15 ppm. Rick Jones notified → advised to evacuate area immediately.	
						1408 Damp at 28 ft.	
						1412 Drillers upgrade to Level C.	
						1414 Rick Jones in respirator, HNu reading of 2ppm.	
						1427 → Rick Jones in respirator HNu on tub = 2 ppm HNu at well-head = nondetectable.	
						1503 damp at 52'. (wet)	
						1540 Hit 62'	
						1605 Drill rig out of fuel, drillers leave to get fuel.	
						1905 Drillers have returned w/ fuel and pumped it into rig.	
						1910 start breaking down rig.	
						1916 install casing (10' from 52' to 62')	
						1937 15' of sand from 47'-62'.	
						1950 after 7 bags of sand → measured 46.5'.	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-33

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT : LBAD		SHEET 2 OF 2	BORING NO. MW-33
SITE LOCATION:	JOB NO. 7248-3		
	LOCATION:	GROUND ELEV.	TOTAL DEPTH 602'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
						1751 start adding 1.5 buckets of bentonite to 41.5' 1752 put lock on the well and plastic around base. 1758 break down rig.	

SAMPLE TYPES
S=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-33

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF1	MW-35
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		AREA B ALONG CREEK	952.7	24.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	SS 1	0.0 2.0	12"	2-2 3-4	50			
	SS 2	2.0 4.0	7"	1-1 1-3	29	0842 DK. BROWN (10YR3/3) CLAY WITH SILTY, ABOUT 8% SILT, DRY/MOIST, GRASS AND ROOTS PRESENT, BLACK STAINED ROUNDED PEBBLES, LOW PLASTICITY		950
5	SS 3	4.0 6.0	24"	3-1 1-5	100	SOFT, DENSE		
	SS 4	6.0 8.0	2"	50/2"	8	0844 DK. BROWN (10YR4/2) CLAY WITH SILT, SOFT, MOIST, DENSE, BLACK STAINED PEBBLES, SOME ROOTS, LOW PLASTICITY		945
						0845 DK. BROWN (5YR3/2) WEATHERED CLAY AND LIMESTONE END OF SPOON		
10						DENSE, WET, BLACK PEBBLES PRESENT THROUGHOUT, LOW/MED PLASTICITY		
						0846 MUD WITH ABOUT AN 1" OF WEATHERED CLAY		940
						BEDROCK AT 6'2"		
15						BEDROCK, GREY LIMESTONE, FOSSILIFEROUS, WEAK PETROLEUM ODOR, THIN BEDS OF SHALE PRESENT, NOTED SHALE IN CUTTINGS		935
20						STRONGER PETROLEUM ODOR, ALL LIMESTONE, BIT ADVANCING SLOWER		930
						STOP DRILLING, WILL SET TEMPORARY WELL IN BOREHOLE		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BOREHOLE NO.: MW-35

DRILLING INSPECTOR: T. SMITH/P. ROGERS

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG

7/22/92 0842

PROJECT : LBAD (T. Smith)		SHEET 1 OF	BORING NO. MW-35
SITE LOCATION: MW-35 ~~Area C~~ Area B	JOB NO. 7248-3 LOCATION: ~~Area C~~ AREA B	GROUND ELEV.	TOTAL DEPTH 6'2"

	DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
0842	0-2'	SS		12"	2-2-3-4		Dk. Brown (10YR 3/3) Clay w/ Silt, about 8% silt, dry/moist, grass and roots present, mod. black stained rounded pebbles, low plasticity, soft, dense	
0844	2-4'			7"	9-1-1-3		Dk. Brown (10YR 4/2) clay w/ silt, soft, moist, dense, black stained pebbles, some roots, low plasticity	
0845	4-6'			24"	3-1-1-5		Dk. Brown (5YR 3/2) weathered clay & limestone end of spoon, dense, wet, ~~low plasticity~~ black pebbles present throughout, low plasticity	
0848	6-8			~~[illegible]~~	~~20-10~~ 50/2"		Tried w/ about an 1" of weathered clay. Bedrock at 6'2"	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: B.R. = 6'2"

BORING NO.: MW-35

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD		SHEET 2 OF 2	BORING NO. MW-35
SITE LOCATION: MW-35 Fence Border	JOB NO.		
	LOCATION:	GROUND ELEV.	TOTAL DEPTH

Air Rotary - 8 3/4" O.D. Bit 7/22/92 & 7/23/92

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH Time	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
0						Soil - See lg. Sheet #1.	
5.5						Bedrock → Gray limestone, fossiliferous, weak petroleum odor. Thin beds of shale present, noted shale in cuttings.	
20		7655				Stronger petroleum odor. All limestone. Bit advancing slower.	
24.5		0800				STOP drilling. Will set temporary well in borehole.	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-35

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF2	MW-39D
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		EAST END OF WASTE LAGOON	953.3	81.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	SS 1	0.0 2.0	19"	1-2 4-7	79	1131 BROWN (10YR5/6) CLAY W/ MINOR SILT BLACK PEBBLES, MINOR MOTTLING, ~~SOME IRON STAINING, DRY, SOFT~~ BECOMING STIFF, DRY, DENSE, LOW PLASTICITY		950
	SS 2	2.0 4.0	19"	4-7 9-13	79			
5	SS 3	4.0 6.0	5"	9-11 17-50/2"	21	1132 BROWN (10YR5/6) CLAY W/ SILT, HARD, DRY, LOW PLASTICITY, IRON STAIN-		945
10						ING, SMALL BLACK ROUNDED PEBBLES, SOME MOTTLING 1135 SAME AS LAST INTERVAL BEDROCK AT 5'7"		940
15						7-29-92 ~~0801 DRILLERS BEGIN DRILLING~~ 0803 DRILLERS HIT BEDROCK AT 5', SEE BORING LOGS FOR MW-1052 0807 AT 8', FOSSILIFEROUS, GREY, MICRITIC LIMESTONE W/ INTERBEDDED SHALE		935
20						DRILLERS ADDING 20' ROD 0815 DRILLING RESUMES 0823 APPROXIMATELY 16', SAME LITHOLOGY, LOTS OF DUST		930
25								
30						0835 28', ADDING RODS, LITHOLOGY SAME, DRILLING ABOUT 1 Ft./Min.		925
								920
▼35						0843 HIT WATER AROUND 35'		915
40								910

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
DEEP WELL TO AN EXISTING WELL MW-1052

BOREHOLE NO.:
MW-39D

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	2 OF2	MW-39D
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		EAST END OF WASTE LAGOON	953.3	81.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					0900 DRILLERS ADDING 20' ROD AT 48', SAME LITHOLOGY		905
50							
							900
55							
							895
60							
							890
65							
					0920 ADDING 20' ROD AT 68'		885
70							
							880
75							
							875
80					1000 QUIT DRILLING TO EMPTY TUB, DRILLED TO 81', WILL SET WELL HERE		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
DEEP WELL TO AN EXISTING WELL MW-1052

BOREHOLE NO.: MW-39D

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

7/22/92 1129

PROJECT : (BA) (T. Smith)

SITE LOCATION: MW-39 Near MW-1052

JOB NO. 7248-3

SHEET 1 OF

BORING NO. MW-39D

LOCATION: Waste Lagoon next MW-1052

GROUND ELEV.

TOTAL DEPTH 5'7"

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING RATE (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
1131	0-2'		19"	1.2.4.7		Brown (10YR 5/6) Clay w/ minor silt, black pebbles, minor mottling, some iron staining, dry soft becoming stiff dry, dense, low plasticity	
1132	2-4'		19"	4.7.9.13		Brown (10YR 5/3) Clay w/ silt, hard, dry, low plasticity, iron staining, small black rounded pebbles, some mottling	
1135	4-6		5"	9.11.17.50/2"		same as last interval bedrock at 5'7" air rotary drilling starts here	
MW-1052 TD = 46'				7/29/92			
15				0801		driller begin drilling	
6 1				0803		driller hit bedrock at 5', all lithologys for MW-39	
20				0807		≈8', fossiliferous, grey, micritic limestone w/ interbedded shale, driller adding 20' rod	
81'				0815		~16', same lithology, lots of dust	
				0823		28', adding rods, lithology same, drilling about 1'/min	
				0835		1st water encountered around 35'	
				0843		driller adding 20' rod at 48', same lithology	
				0900		adding 20' at 68'	
				0920		quit drilling to empty bbl. drilled to 81'	
				1000		will set well tell	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: 5'7" = B.R.

BORING NO.: MW-39D

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF1	MW-40
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		BETWEEN BLDG. 14 AND 16	941.6	33.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	SS 1	0.0 2.0	12"	6-17 18-10	50			940
	SS 2	2.0 4.0	1"	50/1"	4	1339 FILL MATERIAL 1341 AUGER REFUSAL AT 2'1"		
5						1530 DRILLERS BEGIN DRILLING 1532 BEDROCK AT 2'6", GREY MICRITIC LIMESTONE		935
10						1541 CUTTINGS COMING BACK DAMP, NOT WET OR DEEP ENOUGH FOR WELL APPROXIMATELY 8' 1543 BEGIN TO ADD 20' ROD, GREY MICRITIC LIMESTONE W/ INTERBEDDED SHALE 1553 RESUME DRILLING		930
15						1559 ABOUT 16', GREY MICRITIC LIMESTONE W/ INTERBEDDED SHALE, NO SIGNS OF WATER		925
20								920
25						1610 WATER AT 23'6", WILL DRILL TO 32' AND PULL RODS, THEN CHECK WATER LEVEL 1616 DRILLERS ADD ANOTHER 20' ROD, GREY MICRITIC LIMESTONE W/ INTERBEDDED SHALE		915
30						1619 CUTTINGS COMING BACK VERY, WET DOWN TO ABOUT 28'		910
						1625 DRILLED TO 32'6", WILL PULL RODS AND CHECK HOLE, CUTTINGS STILL COMING BACK WET		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BOREHOLE NO.: MW-40

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

7/22/92 1336

PROJECT : (BADCT. Smith)

SITE LOCATION: MW-40 between Bldg. 16 & 14

JOB NO. 7248-3

SHEET 1 OF

BORING NO. MW-40

LOCATION: Between Bldg. 16 & 14

GROUND ELEV.

TOTAL DEPTH 2'1"

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING RATE (min/ft)	% RECOVERY OR ROD	SAMPLE DESCRIPTION	GRAPHIC LOG
1339 0-2'5"			12"	6-14-18-10		fill material	
2-4'				30/1"		auger refusal at 2',1"	
						Begin at drill field	
						Drillers: Oliver, Lawson, Herbert	
					1530	Driller begin drilling	
					1532	bedrock at 2½', grey micritic limestone	
					1541	Cuttings coming back down, not wet or deep enough for well ~ 8'	
					1543	begin to add 20' rod, grey micritic limestone w/ interbedded shale	
					1555	begin drilling w/ 20' rod	
					1559	about 16', grey micritic limestone w/ interbedded shale, no signs of water	
					1610	water at 23½', will drill to 32' and pull rods, then check for water level	
					1616	Drillers add another 20' rod, grey micritic limestone w/ interbedded shale	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: 2'1" = B.R.

BORING NO.: MW-40

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG

M&E

PROJECT: LBAD (T. Smith)

SITE LOCATION: MW-40 Between Bldg. 14 & 16

JOB NO. 7248-3

SHEET 2 OF

BORING NO. MW-40

LOCATION: Between Bldg. 14 + 16

GROUND ELEV.

TOTAL DEPTH

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR ROD	SAMPLE DESCRIPTION	GRAPHIC LOG
					16:19	Cuttings coming back very wet down to about 28'	
					16:25	drilled 32½', will pull rods & check hole, cuttings still coming back wet	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-40

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF2	MW-40D
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		BETWEEN BLDG. 14 AND 16	941.4	68.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					0745 DRILLERS BEGIN DRILLING W/ AIR ROTARY		940
5					0748 BEDROCK AT 4'		
					0751 EASY DRILLING THROUGH 5'6", MICRITIC GREY LIMESTONE W/ INTERBEDDED SHALE		935
10					0755 ADDING 20' ROD AT 7'6", 6-8" ~~FRACTURE AT ABOUT 6'6"~~		
					0809 DRILLING CONTINUES FROM 7'6"		930
15					0818 EASY DRILLING, APPROXIMATELY 15', GREY MICRITIC LIMESTONE W/ INTERBEDDED SHALE		925
20					0826 APPROXIMATELY 21' LOTS OF BLUE SHALE COMING BACK IN CUTTINGS, NO SIGNS OF WATER YET, EASY DRILLING		920
25							915
					0834 27'6", DRILLERS CHANGE RODS, LITHOLOGY SAME, NO WATER, AVG. .75 Ft./Min.		
30							910
35					0844 HIT SOME WATER AROUND 35', DIESEL SMELL		905
					0850 MORE WATER AT 39' ACCORDING		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BOREHOLE NO.: MW-40D

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	2 OF2	MW-40D
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		BETWEEN BLDG. 14 AND 16	941.4	68.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
						TO DRILLER DELBERT		900
45								895
						0857 ADDING ANOTHER 20' ROD AT 47'6", PLENTY OF WATER RETURNING		
50						0945 BEGIN DRILLING AT 47'6" W/ ANOTHER 20' ROD		890
55								885
60								880
65								875
						1003 DRILLING COMPLETE, BOTTOM OF HOLE AT 67'6", WATER INCREASED DRILLING RATE TO ABOUT 1.25 Ft./Min.		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BOREHOLE NO.: MW-40D

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc. ENGINEERS — GEOLOGIC LOG

7/24/92

PROJECT : LBAD		SHEET	BORING NO.
SITE LOCATION: Lexington Army Depot MW-40D Between Bldg. 16 + 14	JOB NO. 7248.3 LOCATION: Between Bldg. 14+16	1 OF	MW-40D
		GROUND ELEV.	TOTAL DEPTH 67 1/2'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR (RQD)	SAMPLE DESCRIPTION	GRAPHIC LOG
					0745	drillers begin drilling w/ air rotary	
					0748	bedrock at 4'	
					0751	easy drilling ~~thru~~ at 5 1/2', micritic grey limestone w/ interbedded shale	
					0755	adding 20' rod at 7 1/2', 6-8" fracture at about 6 1/2'	
					0809	drilling continues from 7 1/2 feet.	
					0818	easy drilling, ~15' grey micritic limestone w/ interbedded shale	
					0826	~21' lots of blue shale coming back in cuttings, no signs of water yet easy drilling	
					0834	27 1/2', drillers change rods, lithology same, no water, avg. .75'/min	
					0844	hit some water around 35', diesel smell	
					0850	more water at 39' according to driller Desbert	
					0857	adding another 20' rod at 47 1/2' plenty of water returning	
					0905	begin drilling at 47 1/2' w/ another 20' rod	
					1003	drilling complete, bottom of hole at 67 1/2', water increased drilling rate to about 1 1/4'/min.	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-40D

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	1 OF1	MW-41
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
	BETWEEN BLDG. 14 AND 6	936.3	26.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE " RECOVERY BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR ROD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					6" OF ASPHALT, LIMESTONE CUTTINGS, AUGER REFUSAL		935
					1119 BEGIN DRILLING		
5					1125 BEDROCK AT 6'		930
					1129 DRILLERS ADD A 20' ROD, AFTER DRILLING TO 8'		
					1142 BEGIN DRILLING WITH 20' ROD		
10					1147 ABOUT 9'6", GREY MICRITIC LIMESTONE, DRILLING IS HARD		925
15					1152 HIT A DAMP ZONE AT 14'7", GREY MICRITIC LIMESTONE W/ INTERBEDDED SHALE		920
					1155 HIT WATER AT 16' PETROLEUM SMELL, WILL DRILL TO 26' AND SEE IF I CAN SET WELL		
20							915
25					1208 DRILLERS PULL ROD, DRILLED TO 26', PLENTY OF WATER. WILL SET WELL		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BOREHOLE NO.: MW-41

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

7/22/92 1554

PROJECT : LBAD

SITE LOCATION: MW-41 between Bldg. 1496

JOB NO. 7248-3

SHEET 1 OF

BORING NO. MW-41

LOCATION: Between Bldg. 1496

GROUND ELEV.

TOTAL DEPTH

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
~~0-2'~~ 0-2'						6" of asphalt, limestone cuttings auger refusal	
						air drill begins here	
					1119	begin drilling	
					1125	bedrock at 6'0	
					1129	drillers add a 20' rod, after drilling 8'	
					1142	begin drilling with 20' rod	
					1147	about 9½', gry micritic limestone drilling hard	
					1150	hit a damp zone at 14'7", gry micritic limestone w/ interbedded shale	
					1155	hit water at 16' petroleum smell, will drill to 26' and see if I can get well	
					1208	drillers pull rod, drilled to 26' plenty of water. will set well.	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-41

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF1	MW-42
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		SOUTH- WEST END OF CREEK	931.9	25.5

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR ROD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	SS 1	0.0 2.0	17"	1-2 4-6	71			930
	SS 2	2.0 4.0	17"	5-6 10-11	71	1456 DK. BROWN (10YR3/3) SILTY CLAY, GRASS AND ROOTS PRESENT, MINOR IRON STAINING, LOW PLASTICITY, DRY, DENSE, SOFT/STIFF		
5	SS 3	4.0 6.0	3"	50/3"	13	1458 DK. BROWN (10YR3/3) SILTY CLAY, MORE IRON STAINING THAN LAST INTERVAL, SMALL ROUNDED BLACK STAINED PEBBLES, MOIST AT END OF SPOON, DRY REST OF SAMPLE, LOW PLASTICITY 1502 NO RECOVERY TOP OF BEDROCK 4'3", END OF SPOON IS WET		925
10						7/30/92 0829 DRILLERS START DRILLING 0834 HIT BEDROCK AT 4' 0840 DRILLED DOWN TO 8', ADD 20' ROD 0853 DRILLERS RESUME DRILLING		920
▽15						0859 HIT WATER AT 15', PULL RODS AND WAIT 10-15 MINUTES GREY, MICRITIC, FOSSILIFEROUS LIMESTONE W/ INTERBEDDED SHALE 0916 CHECK WATER LEVEL, AT 7', WILL DRILL DOWN TO 25'6" AND SET WELL		915
20								910
25						0934 DRILLING COMPLETE, SET WELL		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BOREHOLE NO.: MW-42

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

M&E

7/22/92 1453

PROJECT: ~~Fort~~ LBAD (T. Smith)

SITE LOCATION: MW-42 West of Creek

JOB NO. 7248.3

SHEET 1 OF 1

BORING NO. MW-42

LOCATION: West of Creek

GROUND ELEV. .

TOTAL DEPTH 4'3"

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
1456 0-2'	SS		17"	1-2-4-6		Dk. Brown (10YR 3/3) silty clay, grass & roots present, minor iron staining, low plasticity dry, loose, soft/stiff	
1468 2-4'	SS		17"	5-6-10-11		Dk. Brown (10YR 3/3) silty clay, more iron staining than last interval, small rounded black stained pebbles, moist at end of spoon, dry rest of sample, low plasticity	
4-6'	SS		10	10-10-50/3"		NO recovery top of bedrock 4'3", end of spoon is wet	
		7/30/92	0829			air rotary drilling starts, Hall driller start drilling	
			0834			hit bedrock at 4', see boring log for MW-42	
			0840			drilled down to 8', see boring log for MW-42	
			0853			driller resumes drilling	
			0859			hit water at 15', gray, micritic, fossiliferous limestone w/ interbedded shale	
			0914			pull rods + wait 10-15 min. Hall check water level @ 7', will drill down to 25½' & set well	
			0934			drilling complete, set well	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: B.R. = 4'3"

BORING NO.: MW-42

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF1	MW-43I
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		NEW LANDFILL FORMER MW-24	991.4	13.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
							990
5					DK. BROWN (10YR4/2) SILTY CLAY, LESS THAN 1% SILT, MOIST/WET, ROUNDED OXIDE STAINED PEBBLES, SOME IRON STAINING, MED. PLASTICITY, DENSE, STIFF/HARD, MICRITIC LIMESTONE AT END OF SPOON, DRILLERS HIT BEDROCK AT 5'6"		985
10					GREY, MICRITIC LIMESTONE W/ THINLY INTERBEDDED SHALE		980

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
MW=-43I IS AN INTERFACE WELL

BOREHOLE NO.:
MW-43I

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

7/20/82 1805

PROJECT: LBA) (T. Smith)

SITE LOCATION: MW-24 New Landfill

JOB NO. 7248-3

SHEET 1 OF 2

BORING NO. MW-24 43I

LOCATION: MW-24

GROUND ELEV.

TOTAL DEPTH 5.6'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
B05 0-2'	SS		12"	2.2.3.4		Dk. Brown (10YR 4/4) silty clay, about 10 to 20% silt, dry, loose, soft, low plasticity, grass + roots present,	
B12 2-4'			5"	2.4.5.6		Dk. Brown (10YR 4/4) silty clay, about 5 to 20% silt, dry, loose/stiff, soft, low plasticity, iron staining vertically, small sub-rounded orange stain pebbles	
B17 4-6'			12"	4.19.50/6"		Dk. Brown (10YR 4/3) silty clay, less than 10% silt, moist/wet, sound orange stained pebbles, some iron staining, med. plasticity, dense, stiff/hard, micritic limestone at end of spoon, driller hit refusal at 5'6"	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: B.R. at 5'6"

BORING NO.: MW-24

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT : LBAD (P.Rojas) 7/21/92

SITE LOCATION:

JOB NO. 7248-3

SHEET 2 OF 2

BORING NO. MW-24 43I

LOCATION:

GROUND ELEV.

TOTAL DEPTH

BIT = 8 3/4"

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR REC.	SAMPLE DESCRIPTION	GRAPHIC LOG
0	4	1427				Soil - See sheet 1	
4	15					Limestone, gray, fossiliferous, appears thinly bedded, not massive, dry	
16						Limestone harder for a couple feet.	
28						Moisture increasing, cuttings stay partially clumped together when squeezed	
41						Hit a hard zone again. Slower advance w/bit, cuttings are smaller, amount of dust increases.	
44						Gas odor noted	
48.5						Cuttings and dust become darker gray.	
50						Gas odor noted again, stronger	
56						Hit a soft zone, cuttings light gray to brownish, larger pieces blown out of hole	
60						No water - Terminate boring @ 60 feet	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-24

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	1 OF1	MW-44I
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
	NEW LANDFILL FORMER MW-26	987.0	15.8

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY = BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					1509 SET UP RIG 1514 BEGAN DRILLING FIRST 8'. FROM 0-5 FEET THE IS A LAYER OF REDDISH BROWN, SILTY CLAY		985
5							980
					1519 HIT A LAYER OF BROWN SHALE FROM 5'-7'3". HIT LIMESTONE AT 7'3" DECIDED TO GO DOWN TO 15'9". CHANGE/ADD ANOTHER 20.5' ROD		
10 ▽					1531 HIT WATER AT 10'6"		975
15					1538 REACHED 15'9", BLOW OUT THE HOLE 1555 FOUND HOLE TO ACTUALLY BE 15'10" 1600 PUT IN WELL CASING AND START ADDING SAND. AFTER 4 BAGS OF SAND, MEASURED 7' 1605 AFTER 1 MORE BAG OF SAND AND MEASURED 4'6" 1606 ADDED 1/2 BUCKET OF BENTONITE PELLETS AND MEASURED 3'5" 1610 PUT CAP ON BUT NEED TO CUT THE RISER DOWN 1615 LEFT MW-44I		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
MW-44I IS AN INTERFACE WELL

BOREHOLE NO.:
MW-44I

DRILLING INSPECTOR: J. JORDAN/C. WURM

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD		SHEET	BORING NO.
SITE LOCATION:	JOB NO. 7248-3	2 OF	MW-44
	LOCATION:	GROUND ELEV.	TOTAL DEPTH 15'10"

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
						1509 Set up rig.	
						1514 Began drilling first 8'. From 0'-5' the soil is a layer of reddish-brown, silty clay.	
						1519 Hit a layer of brown shale from 5'-7'3". Hit limestone at 7'3". Decide to go down to 15'9". Change/add another 20.5' rod.	
						1531 Hit water at 10'6".	
						1538 Reached 15'9". Blow out the hole.	
						1555 Found hole to actually be 15'10".	
						1600 Put in well casing and start adding sand. After 4 bags of sand measured 7'.	
						1605 After 1 more bag of sand and measured 4'6".	
						1606 Added 1/2 bucket of bentonite pellets and measured 3'5".	
						1610 Put cap on but need to cut the riser down.	
						1615 Left MW-44.	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: Bedrock at 7'3".
Water at 10'6".
~~Used 5 1/2 bags of sand.~~
Used 1/2 bucket of bentonite pellets.

BORING NO.: MW-44

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT: USATHAMA	JOB NO.: 007248-0003	1 OF2	MW-45
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
	AREA B ALONG CREEK	951.0	42.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					0850 BEGIN DRILLING		950
5							945
					0857 HIT BEDROCK AT 7'		
					0859 DRILLED TO 8', ADD 20' ROD 0912 RESUME DRILLING 0917 DRILLERS HAVE TO STOP AND CLEAN OUT BLOW HEAD		
10					0921 RESUME DRILLING, GREY MICRITIC LIMESTONE W/ INTERBEDDED BLUE SHALE		940
15							935
					0934 APPROXIMATELY 18', EASY DRILLING, SAME LITHOLOGY		
20							930
25							925
					0951 ADDING 20' ROD, 28'6" TO BOTTOM OF HOLE, NO CHANGE IN		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BOREHOLE NO.: MW-45

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	2 OF2	MW-45
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		AREA B ALONG CREEK	951.0	42.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
						LITHOLOGY		920
						0956 HIT SOME WATER ABOUT 32', PULLED ROD UP TO SEE HOW MUCH WATER IS IN HOLE		
35						1001 WATER ALREADY 6' ABOVE 32' WHERE IT WAS ENCOUNTERED. HAVING DRILLERS DRILL DOWN TO 42' AND SET WELL THERE		915
40						1013 HIT A BOAT LOAD OF WATER AT ABOUT 41'6"		910
						1014 TERMINATE DRILLING AT 42'		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BOREHOLE NO.: MW-45

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG

8/4/92

PROJECT : LBAD | SHEET 1 OF 1 | BORING NO. MW-45

SITE LOCATION: MW-45 | JOB NO. 7248.3

LOCATION: Along Creek AREA B | GROUND ELEV. | TOTAL DEPTH

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR (RQD)	SAMPLE DESCRIPTION	GRAPHIC LOG
			8/5/92		0850	Air hog	
						begin drilling	
					0857	hit bedrock at 7'	
					0859	drilled to 8' add 20½' rod	
					0912	resume drilling	
					0917	driller has to step and clean out	
						new lead	
					0921	resume drilling, gray micritic limestone	
						w/ interbedded thin shale	
					0934	~18', easy drilling, same lithology	
					0951	adding 20½' rod, 28½' to bottom	
						of hole; no change in lithology	
					0956	hit some water about 32', pulled rod	
						up to see how much water is in hole	
					1001	water already 6' above 32' where it was	
						encountered. Having driller drill down	
						to 42' and set well-shed	
					1013	hit a boat load of water at about 41.5'	
					1014	terminate drilling at 42'	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-45

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF2	MW-46
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		IN FRONT OF BLDG. 118	946.0	51.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
	ST 1	0.0 2.3	16"	N/A	53			945
	ST 2	2.3 4.5	27"	N/A	90	1415 DK. BROWN SILTY CLAY, ROOTS AND GRASS PRESENT, V. LOW PLASTICITY LOOSE, DRY, V. SMALL SUB-ROUNDED PEBBLES, MINOR IRON STAINING VERTICALLY		
5	ST 3	4.2 6.8	6.5"	N/A	88			940
						1427 DK. BROWN SILTY CLAY, IRON STAINING VERTICALLY, SLIGHT MOISTURE IN THE CENTER, SMALL ROUNDED PEBBLES PRESENT, BLACK ORGANIC MATERIAL IN		
10						THE CENTER, DRY, DENSE, LOW PLASTICITY 1445 BROWN SILTY CLAY, IRON STAINING, DAMP/WET, BLACK ORGANIC BLOTCHES MINOR MOTTLING, SMALL ROUNDED PEBBLES, RIGHT ON TOP OF BEDROCK,		935
15						DENSE, LOW PLASTICITY, BEDROCK AT 6' 1505 BEGIN DRILLING W/ AIR ROTARY DRILL		930
						1507 HIT ROCK AROUND 7' 1510 DOWN TO 8', ADD 20' ROD, CUTTINGS ARE COMING BACK SMALL ANGULAR		
20						GREY, MICRITIC FOSSILIFEROUS LIMESTONE W/ INTERBEDDED SHALE 1517 RESUME DRILLING 1519 EASY CUTTING SO FAR, CUTTINGS COMING BACK AS BLUE SHALE, DOWN ABOUT 1.5'		925
25						1532 APPROXIMATELY 22', LITHOLOGY IS THE SAME AS BEFORE		920
						1537 ADDING 20' ROD AT ABOUT 28'6" 1545 DRILLING HAS BECOME A LITTLE		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BOREHOLE NO.: MW-46

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	2 OF2	MW-46
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		IN FRONT OF BLDG. 118	946.0	51.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					DIFFICULT, ROD PROBABLY ADVANCING ABOUT 1/2 Ft./Min.		915
35					1559 DRILL BIT HAS ONLY ADVANCED TO ABOUT 3.3' SINCE ADDING SECOND 20' ROD, CUTTINGS ARE COMING BACK IN A POWDER, NO FRAGMENTS VISIBLE AT ALL		910
40					1624 APPROXIMATELY 40', HARD DRILLING, NO ROCK FRAGMENTS, WHITE POWDERY LIMESTONE		905
45					1626 APPROXIMATELY 41', BACK INTO GREY MICRITIC LIMESTONE W/ INTERBEDDED SHALE, MAY HAVE HIT SOME SMALL QUANTITY OF WATER ALONG THE WAY		900
50					1630 DRILLED DOWN TO 48', WILL ADD 20'ROD AND CONTINUE DRILLING CUTTINGS BECAME DAMP AROUND 41'		895
					1637 INSTEAD OF ADDING ANOTHER ROD, I'M HAVING DRILLERS PULL RODS UP TO ABOUT 39' AND ALLOW HOLE TO SIT OVERNIGHT TO SEE IF IT PRODUCES ENOUGH WATER TO SET A WELL 1640 CHANGE: LOTS OF WATER IN HOLE SUDDENLY, DRILLERS PULLED RODS TO SEE WHETHER WATER RISES OR NOT 1659 PLENTY OF WATER, DRILL SAID WATER CAME BACK ABOUT 6', WILL DRILL DOWN TO 51' AND SET WELL THERE!		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BOREHOLE NO.: MW-46

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD		SHEET OF	BORING NO. MW-46
SITE LOCATION: MW-46 Front of Bldg 118	JOB NO. 7248.3		
	LOCATION: Front of Bldg. 118	GROUND ELEV.	TOTAL DEPTH

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT	DRILLING	RECOVERY	SAMPLE DESCRIPTION
[illegible]		18"					Dk. brown silty clay, [illegible] v. low plasticity, [illegible] rounded pebbles, [illegible]
[illegible]		[illegible]					Dk. Brown silty clay [illegible] stiff [illegible] pebbles present [illegible] [illegible], dry, dense, low pl[illegible]
[illegible]		[illegible]					Brown silty clay [illegible] [illegible] organic [illegible] small rounded pebbles [illegible] bedrock [illegible]
							[illegible]
						[illegible]	begin drilling [illegible]
						[illegible]	hit hard drilling [illegible]
						[illegible]	down to 8' [illegible]
							[illegible]
							resume drilling [illegible]

SAMPLE TYPES:
SS-SPLIT SPOON, ST-SHELBY TUBE
R-ROCK CORE, O-OTHER

NOTES:

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG

M&E

PROJECT :

SITE LOCATION: MW-46

JOB NO.

LOCATION:

SHEET 2 OF

BORING NO. MW-46

GROUND ELEV.

TOTAL DEPTH

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
					1537	adding 20½' rod at about 28½'	
					1545	drilling has become a little difficult, rod probably advancing about ½':1 min	
					1559	drill bit has only advanced to about 3.3' since adding 2nd 20½' rod. Cuttings are coming back in a powder, no fragments visible at all	
					1624	~40', hard drilling, no rock fragments, white powdery limestone	
					1626	~41', back into grey micritic limestone w/ interbedded shale; may have hit some small qty. of water along the way	
					1630	drilled down to 48', will add 20½' and continued drilling. cuttings became damp around 41',	
					1637	instead of adding another rod, I'm having driller to pull rods up to about 39' and allow hole to sit overnight to see if it produces enough water to set a well. — T. Smith	
					1640	Change: lots of water in hole suddenly driller pulled rods to see whether water rises or not	
					1659	plenty of water, driller said water came back about 4'; will drill down to 51' and set well ~~stop~~!	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES

BORING NO.: MW-46

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT: LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET 1 OF2	BOREHOLE NO. MW-47
CLIENT: USATHAMA	JOB NO.: 007248-0003		
LOCATION: LEXINGTON, KY. AVON	BOREHOLE LOCATION OLD LANDFILL REPLACED MW-01	GROUND ELEV. 960.0	TOTAL DEPTH 39.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					1407 BEGIN DRILLING		
5							955
					1410 ADDING FIRST 20' ROD, DRILLED DOWN TO ABOUT 8'6", SEE LOGS FROM MW-01 FOR DESCRIPTION		
10					1417 RESUME DRILLING		950
					1420 HIT ROCK AT 11'		
15							945
					1427 APPROXIMATELY 19', GREY MICRITIC LIMESTONE W/		940

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
MW-47 IS A REPLACEMENT WELL FOR MW-01 WHICH HAS BEEN ABANDONED

BOREHOLE NO.: MW-47

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	2 OF2	MW-47
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		OLD LANDFILL REPLACED MW-01	960.0	39.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					INTERBEDDED SHALE, EASY DRILLING 1445 RESUME DRILLING		
25							935
					1459 ADDING SECOND 20' ROD, DOWN TO 29', NO SIGNS OF WATER		
30 ▽					1503 HIT SOME WATER AT 30'6", PULL RODS 1516 TURN RIG ON, BEGIN FLUSHING HOLE TO SEE HOW MUCH WATER 1520 WATER CAME BACK, DRILLER HAS CLEANED OUT HOLE, WE PULLED RODS TO SEE HOW MUCH WATER WILL COME INTO HOLE NOW. DRILLER SAID WATER CAME UP ABOUT A FOOT		930
35					1539 START FLUSHING AGAIN TO CHECK WATER, WATER HAS RISEN 2'6" SINCE RIG WAS RIG SHUT DOWN, WILL DRILL TO 39' AND SET WELL THERE		925
					1550 DRILLING COMPLETE, DOWN TO 39', FLUSH HOLE, SET WELL		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:
MW-47 IS A REPLACEMENT WELL FOR MW-01 WHICH HAS BEEN ABANDONED

BOREHOLE NO.:
MW-47

DRILLING INSPECTOR: T. SMITH

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG

8/6/92

PROJECT: CBAD T. Smith
SITE LOCATION: Lexington, KY
JOB NO. 7248.3
SHEET 1 OF
BORING NO. MW-47
LOCATION: Old Candhill next to MW-01
GROUND ELEV.
TOTAL DEPTH

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
						AIR ROTARY Drill	
					1407	begin drilling	
					1410	adding first 20.5' rod; drilled down to about 8½'; see logs from MW-01 for description	
					1417	resume drilling	
					1420	hit rock at 11'	
					1427	~19', grey micritic limestone w/ interbedded shale, easy drilling	
					1429	stop drilling	
					1445	resume drilling	
					1457	adding 2nd 20.5' rod, down to 29'; no signs of water	
					1503	hit some water at 30.5', pull rods	
					1514	turn rig on, begin flushing hole to see how much water	
					1520	water came back; drill has cleaned out ~~hole~~ we pulled rods to see how much water will come into hole now. Driller said water came up about a foot.	
					1539	start flushing again to check water, water has risen to 3½' since rig has shut down, will drill to 39' and set well ~~there~~	
					1550	drilling complete; down to 39'; flush hole, set well.	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-47

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	1 OF2	MW-19DD
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		OLD LANDFILL ACROSS STREAM	941.9	68.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY " BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
					SEE LOG FOR #19		940
5					BEDROCK INTERBEDDED LIMESTONE AND SHALE		935
10							930
15					INTERBEDDED LIMESTONE AND SHALE. ~~MAYBE A LITTLE MORE SHALE~~		925
20							920
▽					FIRST WATER. INTERBEDDED LIMESTONE AND SHALE. LESS SHALE		
25							915
30							910

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BOREHOLE NO.: MW-19DD

DRILLING INSPECTOR: STEVE HULETT

Metcalf & Eddy, Inc.
CHEMICAL WASTE DIVISION

GEOLOGIC LOG

PROJECT:	LEXINGTON BLUE-GRASS ARMY DEPOT (LBAD)		SHEET	BOREHOLE NO.
CLIENT:	USATHAMA	JOB NO.: 007248-0003	2 OF2	MW-19DD
LOCATION:	LEXINGTON, KY. AVON	BOREHOLE LOCATION	GROUND ELEV.	TOTAL DEPTH
		OLD LANDFILL ACROSS STREAM	941.9	68.0

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY "	BLOW COUNT (per 6 in.) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG	ELEVATION
40								905
						WATER HAS DRIED UP. INTERBEDDED LIMESTONE AND SHALE.		900
▼45						HIT MORE WATER. STILL INTERBEDDED LIMESTONE AND SHALE BUT VERY LITTLE SHALE.		895
50								890
55								885
60								880
65								875
						WILL SET WELL AT 68 FT.		

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BOREHOLE NO.: MW-19DD

DRILLING INSPECTOR: STEVE HULETT

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

8/5/92

PROJECT :		SHEET	BORING NO.
SITE LOCATION: Lexington Avon, KY.	JOB NO. 7248-3	1 OF	MW-19D
	LOCATION: Next to MW-19	GROUND ELEV.	TOTAL DEPTH 68.0'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING RATE (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
					1145	A.R Rotary / begin drilling	
					1154	hit rock at 5'	
						del MW-19 logs	
					1244	~21', grey micritic limestone w/ interbedded shale	
					1248	hit water at 24'	
					1324	adding 20½' rod, drilled down to 29'	
					1350	adding 20½' rod, 49½'	
					1308	down to 68', cease drilling flush out hole, set well	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-19D

PROJECT: CBAD
LOCATION: East of Environmental Building.
JOB NO.: 012308
SHEET 1 OF 1
BORING NO.: MW-48
TOTAL DEPTH: 39 ft
DRILL CONTRACTOR: Faulkner
DRILL RIG: Schram
ENG/GEO: Hewlett
DRILLER: Bennet
STARTED: 9-8-93
FINISHED: 9-8-93
HOLE SIZE: 8 3/4
WEATHER: Clear 65 °F
GROUND WATER (DEPTH/ELEV.): 29 ft
DRILLING METHOD: Air Rotary
SAMPLING: Air
TOP OF ROCK (DEPTH/ELEV.): 5 ft.

SAMPLE DESCRIPTION / STRATIGRAPHIC DESCRIPTION

CLS, silty clay,

5 ft — Top rock
Interbedded limestone and shale. Limestone fine grained Micritic Dark gray. Shale ≈ 20%.

30 ft — Same Hit some H_2O at 29 ft will continue to drill. Will drill to 39 ft.

35 ft — Less shale, Becoming hard to drill. Fracture is making more H_2O.

39 ft — Will set a well!

Metcalf & Eddy, Inc. SOIL BORING LOG

PROJECT: LBAD		SHEET 1 OF 1	BORING NO. MW-48D
SITE LOCATION: East of Environmental Bld.	JOB NO.: 012308 LOCATION:		GROUND ELEV. / TOTAL DEPTH
DRILL CONTRACTOR: Faulkner	ENG/GEO: Hulett		
DRILL RIG: Schramm	DRILLER: Bennett		
HOLE SIZE: 8 3/4	WEATHER: Clear ≃ 80°F		GROUND WATER (DEPTH/ELEV.):
DRILLING METHOD: Air Rotary	DRILLING FLUID: Air	TOP OF ROCK (DEPTH/ELEV.): 5 ft	

Depth	SAMPLE DESCRIPTION	STRATIGRAPHIC DESCRIPTION
	CLM, ~~Clay~~ silty clay,	
5 ft	Limestone with interbedded shale. Limestone micritic, dark gray, shale ≃ 20%	
29 ft	Lithology same, hit H_2O at ≃ 29 ft	
40 ft	Same, Maybe more shale. 25-30%.	
50 ft	Same	
60 ft	Same, No change	
73 ft	TD = 73 ft Will set a well!	

SAMPLE TYPES: SPLIT SPOON, THIN WALL, CORE

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD

SITE LOCATION: South Boundry, Between Bld 6 and 4

JOB NO.: 012308

LOCATION:

SHEET: 1 OF 1

BORING NO.: MW-47

GROUND ELEV. / TOTAL DEPTH:

DRILL CONTRACTOR: Faulkner | ENG/GEO: Hulett | BEG.: 8/28/93

DRILL RIG: Schram | DRILLER: Clarance | FINISHED: 8/28/93

HOLE SIZE: 8" | WEATHER: Clear, Mid 90's °F | GROUND WATER (DEPTH/ELEV.): 30 FT /

DRILLING METHOD: Air Rotary | DRILLING FLUID: Air | TOP OF ROCK (DEPTH/ELEV.): 11 FT

DEPTH	SAMPLE	SAMPLE DESCRIPTION	STRATIGRAPHIC DESCRIPTION
		CLS, Silty Clay, 7.5YR 4/2 Dark Brown Med, Soft, Moist,	
11 ft		Hit BR at 11 ft	
		Set 12 in surface casing at 11 ft. Will drill through. Dark gray 2.5YR 5/0 Micritic Limestone with ≥ 30% shale interbedded	
30 ft		Hit H_2O at 30 ft, will drill to 40 ft and set a well.	

SAMPLE TYPES: SS=SPLIT SPOON, ST=SHELBY TUBE, R=ROCK CORE, O=OTHER

NOTES:

BORING NO.:

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

M&E

PROJECT: LBAD		SHEET 1 OF 1	BORING NO. MW-47D
SITE LOCATION: Between Bldgs 6 and 4	JOB NO. 012308		
	LOCATION:	GROUND ELEV.	TOTAL DEPTH 75ft

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
						CLS, Silty Clay, 7.5YR4/2 Dark Brown. Med, soft, Moist, 3 in asphalt	
45ft						Dark gry Micritic Limestone to depth, 20-30% shale, interbedded, Hit H_2O at ≈ 45 ft will set well at 75 ft. Limestone core to 75 ft.	
75ft							

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: R. Jones

BORING NO.: MW-47D

PROJECT: LBAD

SITE LOCATION: 10 ft ~~So~~ West of MW-32

JOB NO.: 012308

LOCATION: South of ISWL

SHEET 1 OF 1

BORING NO. Pyzo 1

DRILL CONTRACTOR: Faulkner

ENG/GEO: Aulett

DRILL RIG: Schram

DRILLER: Clarance

DATE: 8/25/93

FINISHED: 8/25/93

HOLE SIZE: 6 3/4

WEATHER: Clear 90 °F

DRILLING METHOD: Air Rotary

Air

5 ft 9"

Depth	SAMPLE DESCRIPTION
	CL-S, silty Clay, yellow, 10YR 4/6, Med, Soft, Moist
5 ft 9"	Dark gray Micritic Limestone has interbedded shale, ~30%
24 ft	Same
30 ft	Same Less shale, ~25% 20%
45 ft	1st H_2O
50 ft	More H_2O
60 ft	60 ft TD will use as purging well if purges well.

SAMPLE TYPES

NOTES

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD

SITE LOCATION: 30 ft South of MW-32 and Pyzo I

JOB NO.: 012308

LOCATION:

SHEET 1 OF 1

BORING NO.: Pyzo 2

GRD. ELEV. / TOTAL DEPTH:

DRILL CONTRACTOR: Faulkner

ENG/GEO: Hulett

BEGUN: 8/25/93

DRILL RIG: Schram

DRILLER: Clarance

FINISHED: 8/25/93

HOLE SIZE: 6 3/4

WEATHER: Clear 90's °F

GROUND WATER (DEPTH/ELEV.): /

DRILLING METHOD: Air Rotary

DRILLING FLUID: Air

TOP OF ROCK (DEPTH/ELEV.): 6 ft

DEPTH	SAMPLE INTERVAL	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION				STRATIGRAPHIC DESCRIPTION
						CLS Silty Clay, 7.5YR 4/2 Dark Brown, Med, Soft, Moist, Some FeO_2 Stain.				
6 ft						TOR				
						Dark gray 2.5YR/5/0 Micritic Limestone and interbedded shale, Shale 20-30%				
39 ft						Hit H_2O at 39 ft will drill to 45 ft and set well. Hit more H_2O at 42.5 ft				

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.:

Metcalf & Eddy, Inc. DRILLING LOG

PROJECT: LBAD

SITE LOCATION: South of ISWL

JOB NO.: 107248

SHEET 1 OF 1

BORING NO.: Pyzo 3

LOCATION: 75 ft North of Pyzo 1

GROUND ELEV. | TOTAL DEPTH

DRILL CONTRACTOR: Faulkner

ENG/GEO: Hulett

STARTED: 8/27/93

DRILL RIG: Schram

DRILLER: Clarance

FINISHED: 8/27/93

HOLE SIZE: 6 3/4

WEATHER: Clear, 90s F

GROUND WATER (DEPTH/ELEV.): /

DRILLING METHOD: Air Rotary Tricone

DRILLING FLUID: Air

TOP OF ROCK (DEPTH/ELEV.):

Depth	Sample Description	Stratigraphic Description
	CLS, Silty Clay, 7.5YR 4/2 Dark Brown Med, Soft, Moist;	
10ft	Dark gray 2.5YR 5/0, Micritic Limestone, Interbedded Shale Some fossils, 30-40% shale	
25	D Same, Less Shale 10-20%	
50ft	Hit H_2O at 50 feet will drill to 55 ft.	

SAMPLE TYPES:
SPLIT SPOON, UNDISTURBED TUBE
CORE

BORING LOG

PROJECT: LBAD

SITE LOCATION: Located ≈ Feet West of Pyzo 1

JOB NO.: 007248

LOCATION: S of ISWL

SHEET 1 OF 1

BORING NO.: Pyzo 4

TOTAL DEPTH: 32 FT

DRILL CONTRACTOR: Faulkner

ENG/GEO: Hulett

DRILL RIG: Sahrgm

DRILLER: Clarance

STARTED: 8/27/93

FINISHED: 8/27/93

HOLE SIZE: 6 3/4

WEATHER: 93°F Clear

GROUND WATER (DEPTH/ELEV.): /

DRILLING METHOD: Tricone

DRILLING FLUID: Air

TOP OF ROCK (DEPTH/ELEV.): 8 FT

Depth	SAMPLE DESCRIPTION / STRATIGRAPHIC DESCRIPTION
2 ft	CLS, Silty Clay, 5YR 4/6 yellow red, Low, Loose, Moist, Some FeO_2 staining
8 ft	CLS, Silty clay, 7.5YR 4/2, Dark Brown, Med, Soft, Loose, Moist, Some FeO_2 stain
20 ft	Dark gray 2.5YR 5/0, Micritic Limestone, Interbedded shale 30-40% Shale
25 ft	Same Less shale ≈ 10%-20%
27 ft	Hit H_2O at 27 ft. Will drill to 32 ft.

SAMPLE TYPES: SS = SPLIT SPOON, ST = SHELBY TUBE, C = ROCK CORE

OTHER:

BORING NO.:

APPENDIX F
DRY HOLE BORING LOGS

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG

PROJECT : (BRAD)		SHEET 1 OF	BORING NO. MW-01
SITE LOCATION: Lexington, KY Avon	JOB NO. 7248.3		
	LOCATION: S[illegible]	GROUND ELEV.	TOTAL DEPTH
DRILL CONTRACTOR: LAW	ENG/GEO: STRATTON	BEGUN 13:40	
DRILL RIG: CME 55	DRILLER:	FINISHED:	
HOLE SIZE: 8 1/4"	WEATHER: Overcast, humid, 75°F, Light wind from S-SW.	GROUND WATER (DEPTH/ELEV.): /	
DRILLING METHOD: HSA	DRILLING FLUID/SOURCE:	TOP OF ROCK (DEPTH/ELEV.): 10.5'	

	DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
	0		0-2		3		2" - Topsoil; CLAY (CLM), silty, damp, vegetation, brown (10YR3/2).			
				14"	4	/				
1340 hrs					5		12" - CLAY (CLS), sandy, gravelly, damp, orange-brown (10YR 5/6), laminar bedding			
					8					
2					6					
			2-4	17"	11		17" - CLAY, (CLS), sandy, gravelly, damp, orange brown / hard.			
1350 hrs					13		Color: 7.5YR 4/6			
					15					
4					4		6" - CLAY (CLM), trace sand, hard, dry-damp. yellow brown, little silt.			
1355 hrs			4-6	6"	5		Color: 10YR 6/6			
					7					
					11					
6					7		17" - CLAY (CLM), trace sand & gravel, damp, laminar bedded, yellow-brown, silty.			
1405		SS	6-8	17"	9		Color: 7.5YR 7/6			
					14					
					21		HNU=0 LEL=0			
8					3		6" - CLAY (CLM/CLS), silty, sandy, damp-dry. Laminar bedded clays.			
1412			8-10	12"	6					
					14		2.5YR 5/6			
					25					
10							6": CLAY (CLG), gravelly, sandy, damp-dry, weathered limestone.			

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-01

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT :		SHEET 2 OF 2	BORING NO. MW #1
SITE LOCATION:	JOB NO.		
	LOCATION: SWMU #1	GROUND ELEV.	TOTAL DEPTH
DRILL CONTRACTOR:	ENG/GEO: J. Mayton	BEGUN 13:40	
DRILL RIG: Cme 55	DRILLER:	FINISHED:	
HOLE SIZE: 8 1/4"	WEATHER:	GROUND WATER (DEPTH/ELEV.): /	
DRILLING METHOD: HSA	DRILLING FLUID/SOURCE:	TOP OF ROCK (DEPTH/ELEV.):	

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
0				50/5		Weathered limestone bedrock w/ some clay & sand			
						Auger refusal @ 10.5'			
7.5			HNU=0			LEL: 0.0%			
10									
15									
20									
25									

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-01

yb
1422

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD - LEXINGTON		SHEET 2 OF	BORING NO. SB04 MW1
SITE LOCATION:	JOB NO.	LOCATION:	GROUND ELEV. / TOTAL DEPTH /
DRILL CONTRACTOR:	ENG/GEO: M. Ramona		BEGUN: 11/5/91
DRILL RIG: SCHRAMM T66H-024	DRILLER: B. GIBSON		FINISHED: 11/6/91
HOLE SIZE: 8"	WEATHER: COOL 45°F, BREEZY FROM WEST		GROUND WATER (DEPTH/ELEV.): /
DRILLING METHOD: AIR ROTARY - TRICONE	DRILLING FLUID/SOURCE: AIR		TOP OF ROCK (DEPTH/ELEV.): 10.5 ft BG

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR PACO	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION

13:55 8.5'
HNU=0
O_2 20.9

AVERAGE 0.5 ft/min.

INTERBEDDED OLIVE GRAY LIMESTONE (5Y 6/1) W/ LT GRAY OLIVE GRAY SHALE. LIMESTONE IS FOSSILIFEROUS MICRITE PARTIALLY RECRYSTALLIZED

14:23 29'
HNU=0
O_2 20.9

29 – 39' 0.5 ft/min
39 – 49' 0.75 ft/min

INTERBEDDED OLIVE GRAY (5Y 6/1) FOSSILIFEROUS MICRITE W/ GRAY SHALE.

14:56 49½'

AT START OF DRILL WATER (@ 49') ▽ = 49'

AT BASE OF HOLE HNU READINGS OF 50 ppm IN COLLECTION BARREL BREATHING ZONE: 0.2 ppm = HNU, O_2 = 20.7 ppm

STOPPED DRILL

1600 60'

INTERBEDDED OLIVE GRAY (5Y 6/1) LIMESTONE, FOSSILIFEROUS MICRITE, W/ GRAY SHALE.

TD 60' — ▽ = POTENTIOMETRIC SURFACE 28'

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: STATIC WATER LEVEL @ 28' APPEARS TO HAVE 20' OF HEAD. WELL MUST BE CONFINED / SEMICONFINED CONDITION

BORING NO.: SB04 MW-1

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT :		SHEET	BORING NO.
SITE LOCATION:	JOB NO.	1 OF	MW10
	LOCATION: SWMU 6 / MW 6	GROUND ELEV. 1011.80	TOTAL DE
DRILL CONTRACTOR:	ENG/GEO: J. STRATTON	BEGUN 09:22	
DRILL RIG:	DRILLER: E. Flemings	FINISHED:	
HOLE SIZE: 8 1/4" / 12 1/4"	WEATHER: OVERCAST, 60°F, chance of rain, Light wind from South	GROUND WATER (DEPTH/ELEV.): /	
DRILLING METHOD: HSA	DRILLING FLUID/SOURCE: N.A.	TOP OF ROCK (DEPTH/ELEV.):	

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING RATE (min/ft)	% RECOVERY OR (RQD)	SAMPLE DESCRIPTION	ELEVATION	COLUMN LOG	STRATIGRAPHIC DESCRIPTION
0	SS			2		2": CLAY (CLAY), silty, damp, trace gravel, brown - 7.5YR 3/2, organic & root matter.			
			12"	4		10": CLAY (CL), trace silt, little gravel, damp, light brown - 10YR 5/6			
2				6					
				6		12": 10YR 5/6 CLAY (CLAY) MOTTLE SILT & GRAV damp			
				6					
			24"	13					
				16					
				24		12": CLAY (CLS), SANDY, little gravel & silty, da 10YR 6/4 black staining, orange mottled.			
4				6					
				11		17": CLAY (CLS), sandy, little gravel, damp, black organic staining, orange-brown - 10YR 4/6.			
			17"	16					
				22					
6				10		18": CLAY (CLS), sandy, little gravel, damp, h black organic staining, orange-brown (10YR 5			
				18					
			18"	21					
				27					
8				4		18": CLAY (CLS), sandy, little gravel, damp, hard, black staining, orange-brown - 10YR 5/8			
				13					
			18"	18					
				19					
10				5		24": CLAY (CLS), sandy, little gravel, damp, hard, b staining, orange-brown (10YR 5/8) w/ gray and			
				8					
			24"	10					
				13		Note: TOP 4" of this spoon HNV = 50 ppm, rest of spoon was 0 ppm. No readings at 6			
12									

HNU = 0 ppm 0922 CGA = 0%

0935 HNU = 0 LEL = 0

0947 HNU = 0 LEL = 0

0958 LEL = 0 HNU = 0

HNV = 2 ppm 100% of spoon

1027

SAMPLE TYPES	NOTES:	BORING NO.:
SS=SPLIT SPOON, ST=SHELBY TUBE R=ROCK CORE, O=OTHER		MW10

Metcalf & Eddy, Inc.

GEOLOGIC LOG

PROJECT :		SHEET 2 OF	BORING NO. MW10
SITE LOCATION:	JOB NO.		
	LOCATION: S001MW10	GROUND ELEV.	TOTAL DEP
DRILL CONTRACTOR: LAW	ENG/GEO:	BEGUN 0922	
DRILL RIG: CME55	DRILLER:	FINISHED:	
HOLE SIZE: 7 1/4" / 12 1/4"	WEATHER:	GROUND WATER (DEPTH/ELEV.): /	
DRILLING METHOD: HSA	DRILLING FLUID/SOURCE: N.A.	TOP OF ROCK (DEPTH/ELEV.):	

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
12	SS		36			3": ~~CLAY(~~) gravelly GRAVEL (GC), very clayey, sandy, sat. GRAY - 5YR 3/1			
		12'6"	50/1" 16			3": Weathered gray limestone. REFUSAL AT 13'			
14									
16									
18									
20									
22									
24									

1040 hrs
HNu = 14 ppm
CGI = 0%

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW10

Metcalf & Eddy, Inc. — BORING LOG

PROJECT: LBAD

SITE LOCATION: Lexington Army Depot, Lexington Ky

LOCATION: New Landfill

BORING NO.: MW-10

DRILL CONTRACTOR: Faulkner

ENG/GEO: Hutt

DRILL RIG: Schramm T66

DRILLER: B. Gibson

STARTED: 11/11/91

FINISHED: 11/18/91

HOLE SIZE: 8"

DRILLING METHOD: 8" Tricone, Air Rotary

FLUID: Air

TOP OF ROCK (DEPTH/ELEV.): 13 ft

Depth	Time	Sample Description
13 ft	0840	Start drilling
		Micritic Limestone, some shale, Medium Gray (N5), HNU = 0.0 ppm
28.5 ft	0856	Micritic Limestone, Med Gray (N5) More shale, drills easy, HNU = 0.0 ppm
39 ft	0915	Micritic Limestone, too st becoming fossility Brachiopods, Less shale, L.S. color Med Gray (N5) HNU = 0.0 ppm
49 ft	0930	Micritic Limestone, No fossils, Med. Gray (N5) some shale, HNU = 0.0 ppm
60 ft	0936	Same, Dry TD = 60 ft
11/18/91 BB		Start drill to 112 ft BG x elev. 890'
		fine Micrite Limestone, Medium Gray, (N5) No fossils.
90 ft	1339	Micritic Limestone, Medium Gray (N5) some fossil fragments, Brachiopods

MW-10

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT : LBAD

SITE LOCATION: New Landfill SW side, Lexington Ky

JOB NO. 807248

SHEET 4 OF

BORING NO. MW-10

LOCATION: 5001-MW-10

GROUND ELEV.

TOTAL DEPTH

Hulett /8" Tricone, Air, 11/18/91

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR PENETRATION RATE (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
90 ft 1403						Micritic limestone, Medium Gray, N5, some fossil fragments, Brachiopods. Very little shale.	
110 ft 1428						Micritic limestone, Medium Gray, N5, very few fossil fragments, very little shale.	
1435 112 ft						TD=112 ft. Dry Hole ! Will abandon.	

SAMPLE TYPES
SS-SPLIT SPOON, ST-SHELBY TUBE
R-ROCK CORE, O-OTHER

NOTES:

BORING NO.: MW-10

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: DGAD | SHEET: 1 OF | BORING NO.: 5001-MW11

SITE LOCATION: NEWLAND SMI | JOB NO.: | LOCATION: Lexington, KY | GROUND ELEV.: 1021.860 | TOTAL DEPTH:

DRILL CONTRACTOR: LAW ENV. | ENG/GEO: KAIMONIDE | BEGUN: 10/21/91

DRILL RIG: CME 55 | DRILLER: Wallace | FINISHED:

HOLE SIZE: 3¼ ID/6¼ OD | WEATHER: 65°F Clear Skies | GROUND WATER (DEPTH/ELEV.): /

DRILLING METHOD: HSA | DRILLING FLUID/SOURCE: None-HSA | TOP OF ROCK (DEPTH/ELEV.):

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (Per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
1458 HNU=0ppm	SS	0-2'	16"	2.5.6.7		DK. BROWN (7.5YR 4/2) First 6" GRASS + ROOTS SILT CLAY (CLAY), MINOR SILT (5%), MINOR POROUS GRAIN SAND (2%), DENSE, STIFF, V. LOW PLASTICITY, V. MINOR OXIDE STAINING REDISH/B			
1504 HNU=0ppm	SS	5'-7'	15/24	4.6.9.10		DK. BROWN (7.5YR 4/4) CLAY (W ABUNDANT SAND (10% SAND) (5% SILT) POROUS SAND GRAINS, DENS STIFF, V. LOW PLASTICITY, LOTS OF OXIDE STAI REDISH/BLACK			
1510 HNU=0ppm	SS	10'	16/24	4.6.7.9		BROWN/DK (10YR 6/8) CLAY W/ SILT SAND (10%) CLAY SOME SILT SAND (3%), GRAY/YELLOWISH MOTTLING, DENSE, STIFF, LOW-MED. PLASTICITY, SOME BLACK STAINING			
1518 HNU=0ppm	SS	15'	18"	3.7.9.13		YELLOWISH BROWN (10YR 4/8) CLAY W/ SILT (CL SOME SILT SAND (2%), GRAY/YELLOWISH MOTTLIN DENSE, STIFF, LOW-MED. PLASTICITY, REDISH/ BLACK OXIDE STAINING, DRY			
1528 HNU=0ppm	SS	20'	15"	4.5.6.7		YELLOW BROWN (10YR 6/8) CLAY W/ MINOR SILT (CLAY), GRAY/YELLOWISH MOTTLING, DENSE, ST MED. PLASTICITY, REDISH/BLACK OXIDE STAI DRY-DAMP, FAINT HORIZONTAL LAMINATION			
1536 HNU=0ppm		10-12'	2.50/3"			ORANGE/BROWN (10YR 5/6) CLAY W/ MINOR SIL (17%) (CL), SLIGHT ORANGE W/ BLACKISH RED MOTTLING, MED-HIGH PLASTICITY, REDISH BLACK OXIDE STAINING, DAMP			

SAMPLE TYPES: SS=SPLIT SPOON, ST=SHELBY TUBE, R=ROCK CORE, O=OTHER

NOTES: Note: Auger Refusal @ 12' Drillers over bore w/ 12" OD Hollow Auger

MW-11

Metcalf & Eddy, Inc. ENGINEERS — GEOL... LOG

PROJECT: LBAD

SITE LOCATION: Lexington Army Depot — New Landfill

JOB NO. 007248

LOCATION: New Landfill MW-11 SW-1

SHEET 1 OF

BORING NO. MW-

GROUND ELEV. ≈ 1015

DRILL CONTRACTOR: Faulkner

ENG/GEO: Hulett

BEGUN: 11/19/9

DRILL RIG: Schramm T66

DRILLER: B. Walker

FINISHED: 11/19/91

HOLE SIZE: 8"

WEATHER: Cloudy, Temp. 65°F

GROUND WATER (DEPTH/ELEV.)

DRILLING METHOD: Air Rotary 8" Tricone

DRILLING FLUID: Air

TOP OF ROCK (DEPTH/ELEV.): 10 ft $\pm$ in

Time	Depth	Sample Description
		start drill at ≈10 ft. HNU = 0.0 ppm
1152	?ft	Micritic & Sparitic Limestone, Medium Dark gray (N4). Some fossil fragments Brachiopods, Little shale, Medium Gray (N5) HNU = 0.0 ppm
1207	28.5 ft	Shale & Micritic Limestone, shale is Medium G (N5) Limestone Med. Dark gray (N4) very few fossil frag. HNU = 0.0 ppm
1216	38 ft	Micritic Limestone, Medium Dark Gray (N4), Very Fossiliferous, Fossils replaced with Sparite, Fossils Pinkish gray 5YR 8/1 HNU = 0.0 ppm, Fossils - Brachiopods. Some <5% Pyrite xtals
1233	49.5 ft	Micritic Limestone, Med Dark Gray (N4) few fos Some Shale, Medium Gray, (N5) HNU = 0.0 ppm.
1242	59 ft	Micritic Limestone, Med Dark Gray (N4) Some shale, Medium gray, (N5)
1251	69 ft	

SAMPLE TYPES
SS=SPLIT SPOON ST=SHELBY TUBE
R=ROCK CORE O=OTHER

NOTES:

BORING NO. MW-11

Metcalf & Eddy, Inc. ENGINEERS — GEOLOGIC LOG

PROJECT: LBAD

SITE LOCATION: Lexington Army Depot New Landfill, Lexington Ky

JOB NO. 007248

LOCATION: New Landfill

SHEET 1 OF

BORING NO. MW-11

GROUND ELEV. ≈1015

TOTAL D

DRILL CONTRACTOR: Faulkner

ENG/GEO: [illegible]

BEGUN: 11/19/91

DRILL RIG: Schramm T66

DRILLER: B [illegible]

FINISHED: 11/ /1

HOLE SIZE: 8"

WEATHER: cloudy, Temp ≈65°F

GROUND WATER (DEPTH/ELEV.)

DRILLING METHOD: 8" Tricone, air Rotary

DRILLING [illegible] TOP OF ROCK (DEPTH/ELEV.): 10 ft

DEPTH / SAMPLE NO. / TYPE / etc.	SAMPLE DESCRIPTION	STRATIGRAPHIC DESCRIPTION
	Same. Hnu on fritz, could smell fuel. Hnu being fixed or replaced. Stopped drilling.	
1321 90 ft. / 1356 restart drilling	Hnu = 30.0ppm at flume, 0.0ppm in the B	
	May have a little water at ≈ 94 feet will blow out hole & see. Hnu = 30.ppm at flume, 0ppm in BZ. All personnel stay up wind. Lithology same. Will let sit.	
1410 100 feet. / 1430 start	No water after waiting 20 minutes. Hnu = 40ppm at flume. 0.5ppm at BZ. Drillers going to level C when around rig.	
1446 110 ft	Hnu = 20ppm at flume, 0ppm in BZ, no water. Micrite Limestone, Medium Dark Gray, (N5.) few fossils, very little pyrite Xtals.	
	Same	
1454 120 ft	Hnu = 40ppm at flume, 0.5 at well head & BZ. Driller = level C.	
1501 stop drilling		
	TD = 125 ft will abandon!	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-11

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT :		SHEET 1 OF	BORING NO. MW12
SITE LOCATION:	JOB NO.		
	LOCATION: SOO/MW12	GROUND ELEV.	TOTAL DEPTH
DRILL CONTRACTOR: LAW	ENG/GEO: STRAYTON	BEGUN 09.15	
DRILL RIG: CME 55	DRILLER: FLEMING	FINISHED:	
HOLE SIZE: 8¼"/12¼"	WEATHER: SUNDICY, RAINY, 60°F, light wind from EAST	GROUND WATER (DEPTH/ELEV.): /	
DRILLING METHOD: HSA	DRILLING FLUID/SOURCE: N.A.	TOP OF ROCK (DEPTH/ELEV.):	

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
0	SS	S		3		15": CLAY (CL), silty, trace sand, dry-damp, dark brown 10YR 3/3			
				7					
0915			15"	10					
				15		HNU = 2.1			
2									
				5		3": CLAY (CL), trace sd & gravel, dry-damp			
				7		color 10YR 5/6			
0929			3"	7		Drove on rock HNU = 3.0			
				9					
4									
				23		2": CLAY (CLS), sandy, trace gravel, damp 10YR 5/6			
				29		3": bleached limestone, white-gray			
0931			8"	18		3": CLAY (CLS), sandy, damp 10YR 5/6			
HNU = 2.6				17					
6									
				5		12": CLAY (CL), trace sand & gravel, damp			
				11		10YR 5/6 orange-brown.			
0951				50/5½"		1": Limestone, GRAY (2.5Y 5/0), fossiliferous - brachiopods & reef debris HNU = 3.4			
8									
						Auger refusal @ 7.5'.			
10									
12									

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW12

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: BGAD - LEXINGTON		SHEET 1 OF	BORING NO. SOOI-MW13
SITE LOCATION: NEW LANDFILL - SWMU-01 WEST OF BURMA ROAD	JOB NO.	LOCATION: LEXINGTON, KY	GROUND ELEV. 1016.150 / TOTAL DEPTH
DRILL CONTRACTOR: LAW ENV.	ENG/GEO: RAIMONDE		BEGUN:
DRILL RIG: CME 55	DRILLER: FLEMING		FINISHED:
HOLE SIZE: 3¼ ID / 6¼ OD	WEATHER: WWD?, SWAT, SMOKEY		GROUND WATER (DEPTH/ELEV.): /
DRILLING METHOD: HOLLOW STEM AUGER	DRILLING FLUID/SOURCE: H₂A - NONE		TOP OF ROCK (DEPTH/ELEV.):

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches)	DRILLING TIME (min/ft)	% RECOVERY (SS)	% RQD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
	SS	0-2	15"	2-5-7-8				DK. BROWN (7.5 YR 4/4) Fill + 3" Roots Clay w major silt (60%) (CLAY), Fine grain sand (40%) Dense, Dry, STIFF, Low plasticity			
	SS	2-4	18"	3-6-10-11				DK. BROWN (7.5 YR 5/8) Clay w less silt as you move vertically (5%) (CL-SI), Increasing sand vertically (30%), small-med. size Oxide staining pebbles vertically. Dense, Dry, STIFF, Low-Med plasticity			
10	SS	4-6	6"	3-8-50/6				DK. Brown (7.5 YR 5/8) Clay w some silt (40%), Oxide Sand staining Pebbles (5%), Sample moderate stain w oxide Pebbles, some small limestone pebbles present, Dense, Stiff, Dry, Low-Med. Plasticity Pebble Found w fine grain crystals may be limestone in sample. Lite Color			
15	SS	6-8									
20											
25											

1230 HNU = 0 ppm

1235 HNU = 0 ppm

1248 HNU = 0 ppm

Note: Auger Refusal at 5'6" over bore Hole w 12" OD Auger to Place 10" PVC temporary casing

SAMPLE TYPES: SS-SPLIT SPOON, ST-SHELBY TUBE, R-ROCK CORE, O-OTHER	NOTES:	BORING NO.: MW-13

PROJECT: LBAD-Lexington

SITE LOCATION: New Landfill-SWMU-01 West of Burma Rd

LOCATION: Lex, Ky

SHEET 2 OF

5001-MW-

DRILL CONTRACTOR: Faulkner

ENG/GEO: Hulett

DRILL RIG: Schramm T66HB

DRILLER: Bennett

BEGUN: 11/5/91

FINISHED:

HOLE SIZE: 8"

WEATHER: Clear, 20°F, Windy from EAST

GROUND WATER (DEPTH/ELEV.)

DRILLING METHOD: 8" Tricone Air Rotary

DRILLING FLUID: Air 600 cfm

TOP OF ROCK (DEPTH/ELEV.) 5 6"

Depth / notes	Sample	Sample Description	Stratigraphic Description
5' 6"		Start drilling at 1331	Weathered shale or L.S. & Lt. Brown
≈ 7 ft		Start getting out of weathered zone. Hnu = 0.0ppm	L.S. or shale, Micrite, Some fossil fragments, Brachiopods, Lt. olive gray (5Y 6/1).
14:06 11.5 ft		Getting burlap bag to hold down dust Hnu = 0.0ppm	L.S., Micrite, Brach. fossil frag. Lt. olive gray (5Y 6/1)
HNU = 0 O_2 = 20.9	LS 1Ft/min SHALE 1Ft/1.5min	TARP DEFLECTOR INSTALLED TO REMOVE AND KEEP DUST & CUTTINGS.	INTERBEDDED L.S., MI BRACHIOPOD FRAG, LT. OLIVE GRAY (5Y 6/1) W/ GRAY SHALE.
15:19 30' HNU = 0 O_2 = 20.9	LS 1Ft/min SHALE 0.75Ft/min		INTERBEDDED L.S., MI FOSSILIFEROUS, LT. OLIVE (5Y 6/1) W/ GRAY (5Y SHALE.
15:40 35 Ft HNU = 0	L.S. 0.75Ft/min SHALE 0.65Ft/min		INTERBEDDED L.S. MIC FOSSILIFEROUS, LT. OLIVE (5Y 6/1) W/ GRAY (5Y 6/2) SHALE
16:00 38 ft	LS 1Ft/1.25min SHALE 1Ft/1.5min		INTERBEDDED L.S. MICRITE FOSSILIFEROUS, LT. OLIVE GRAY (5Y 6/1) W/ GRAY. SHALE
16:30 91			

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
RC=ROCK CORE, O=OTHER

MW-13

ENGINEERS

GEOLOGIC LOG

PROJECT :

SITE LOCATION:

SHEET OF	BORING NO. MW-13
JOB NO.	
LOCATION:	GROUND ELEV.	TOTAL DEPTH

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
91'						STAND BY FOR DRILLERS FROM 16:30 – 17:00 DISCUSS W/ RICK RE DEPTH OF HOLE	(5Y 6/ ... olive gray, mica w/ fossil... interbed w/ gray shale.
				25	1 ...		
				Shale	0.75 ft/min		
120'							

SAMPLE TYPES
SS-SPLIT SPOON, ST-SHELBY TUBE
R-ROCK CORE, O-OTHER

NOTES:

BORING NO.: MW-13

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG

PROJECT :		SHEET 1 OF	BORING NO. MW-14
SITE LOCATION:	JOB NO.		
	LOCATION: SDDI MW-14	GROUND ELEV.	TOTAL DEPTH
DRILL CONTRACTOR: LAW	ENG/GEO:	BEGUN: 11/4/92 1319	
DRILL RIG: CME55	DRILLER:	FINISHED:	
HOLE SIZE: 4 7/8 / 12 1/4	WEATHER: Clear, 25°F Light from West	GROUND WATER (DEPTH/ELEV.): /	
DRILLING METHOD: HSA	DRILLING FLUID/SOURCE:	TOP OF ROCK (DEPTH/ELEV.):	

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR ROD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
	SS	5	6	3		15": CLAY (CL), Silty; 5%, damp (Brown 10YR 5/4) Stiff, Dense, NO Bedding, HNV = 0.0 ppm			
			14	8					
			19	8					
				11					
13:25 2	SS			3		15" CLAY, (CL), 10% very fine Sand, DAMP, 10YR 5/6, Stiff, Dense, No bedding, Some FeO_2 staining, mottled, Damp. Powdered limestone in end of spoon HNV = 0.0 ppm			
		15	11	11					
				34					
				66/.5					
1338 4	SS			50/.5		4" CLAY, (CL), 10% Silt, DAMP, 10YR 4/6, Stiff, No bedding, FeO_2 staining, Mottled, Limestone Cobble in end of spoon, Sparry Calcite, No fossils, HNV = 1 ppm at spoon			
		4	4						
1396 6	SS					Auger Refusal at 5 ft B.G.			
8	SS								
10	SS								

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-14

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: (GAI) – Lexington		SHEET 1 OF	BORING NO. MW-15
SITE LOCATION: New Landfill SOOI MW-15	JOB NO. 007248		
	LOCATION: Lexington, KY.	GROUND ELEV.	TOTAL DEPTH
DRILL CONTRACTOR: CH2M HILL	ENG/GEO: RAIMOND	BEGUN: 11/5/91	
DRILL RIG: CME-55	DRILLER: Wallace	FINISHED:	
HOLE SIZE: 3¼" ID / 6¼" OD	WEATHER: Cold, Ptly Cldy – 28°F	GROUND WATER (DEPTH/ELEV.): /	
DRILLING METHOD: HSA	DRILLING FLUID/SOURCE: None / HSA	TOP OF ROCK (DEPTH/ELEV.):	

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OF ROD	SAMPLE DESCRIPTION	ELEVATION	GRAPHIC LOG	STRATIGRAPHIC DESCRIPTION
1421 HNV=0ppm	SS	0-2'	19"	2-5-7-9		VF. BROWN (10YR 4/6) Silty Clay (CLAY) (5% Silt) First 10" consists of grass & roots, last 9" consists of grass & roots & oxide staining From coarse sand grains, Dry, V. Low plasticity, Stiff, Loose			
1426 HNV=0ppm	SS	2-4'	13"	3-9-7-9		DK. Brown (7.5YR 5/6) Clay w/ minor silt (3%) (CLAY), Reddish/Black Iron Oxide pebbles, some roots, minor mottling, Low Plasticity, Stiff, Loose, dry			
1457 HNV=0ppm	SS	4-6'	13"	4-12-12-16		Yellow Brown (7.5YR 7/8) Clay & about (10%) Silt (CL) coarse sand grain & pebbles w/ oxide staining, small-large light gray limestone rock, some of limestones have fossils present, limestones have been recrystalized (sparite), med. plasticity, dense, Stiff, dry			
1508	SS	6-8'	0"	50/0"		No Recovery, large, recrystalized, fossiliferous limestone found in spoon, TD = 6'			
20									
25									

Note: Auger refusal at 6' over bore hole w/ 12" OD Auger to place 10" PVC temporary casing

SAMPLE TYPES SS=SPLIT SPOON, ST=SHELBY TUBE R=ROCK CORE, O=OTHER	NOTES:	BORING NO.: MW-15

PROJECT: LBAD

SITE LOCATION: Lexington Army Depot

JOB #: 007248

LOCATION: Waste Lagoons

BORING NO.: MW-17

GROUND ELEV.: 962.070

DRILL CONTRACTOR: LAW Eng

ENG/GEO: Hr Jeff

START: 11/24/91

DRILL RIG: CME 55

DRILLER: C. Wallace

FINISHED: 11/29/91

HOLE SIZE: 12" ID

WEATHER:

GROUND WATER (DEPTH/ELEV.):

DRILLING METHOD: HSA

WATER LEVEL: N/A

TOTAL DEPTH OF BORING: 12ft 6"

	SAMPLE NO.	SAMPLE INTERVAL	BLOWS PER 6"	SAMPLE RECOVERY	SAMPLE DESCRIPTION	STRATIGRAPHIC DESCRIPTION
	SS 0-2	12"	2,5,7,8		CLAY (CL) (10YR 4/3) 10% Silt (CLM) Low, Soft, Loose, Moist, No Beds; some root fibers, FeO_2 staining, Mottled.	
1020	2-4	12"	10,17,13,15		Clay (CL) 10YR 4/3, 10% Silt (CLM), Low, Soft, Dense, Moist, No texture, some Limestone Pebbles Close to BR?	
1033	4-6	18"	5,7,12,19		Clay (CL) Bromish Yellow (10YR 6/6), Silt (CLM) 10%, Medium, Stiff, Dense, Moist, No beds FeO_2 staining, Mottled.	
1042	6-8	12"	7,14,17,50/3		Clay (CL) Light Gray (10YR 7/2) Silt 15% (CLM) Limestone Pebbles, Low, Stiff, Loose, Moist, No beds.	
1053	8-10	6"	22,50/5		Weathered Limestone, Clay (10YR 7/2) Lt. Gray 10% silt (CLM), 2" remainder Micritic fossil Limestone, Brachiopods	
1103	10-12	0	22,50/1		Limestone Pebbles in end of shoe, Micritic, fossiliferous, Brachiopods, (10YR 6/1)	
1117	12ft	0	50/3		No recovery, Auger refusal 12ft 6"	

12" Auger refusal 7ft 6"

SAMPLE TYPES: SS = SPLIT SPOON, ST = SHELBY TUBE, RC = ROCK CORE, OT = OTHER

MW-17

Lagoons

DRILL CONTRACTOR: Faulkner	INSPECTOR: Hulett	BEGUN: 11/25/91	
DRILL RIG: Schramm T66	DRILLER: Bennet	FINISHED: 11/25/91	
HOLE SIZE: 8"	WEATHER: Cloudy, Temp. 19°F	GROUND WATER (DEPTH/ELEV.): /	
DRILLING METHOD: 8" Tricone/Air	DRILLING FLUID: Air	TOP OF ROCK (DEPTH/ELEV.):	

DEPTH	TIME	SAMPLE DESCRIPTION / STRATIGRAPHIC DESCRIPTION
7'	0951	Start drilling through concrete seal
		Micritic fossiliferous Limestone, Medium Light Gray (N6), some interbedded shale, Medium Da Gray, (N4) Brachiopods, some pyrite X-tals HNU = 0.0ppm
28'	1005	Micritic fossiliferous limestone, Medium Light Gray (N6), some interbedded shale, Med Dark Gray (N4) Brachiopods + some pyrite HNU = 0.0 ppm
30 ft	1016	May have a little H_2O, will wait + see, Lithology same, HNU = 15ppm at flume, 1ppm in BZ. Driller going to Level C. Continue to drill NO. H_2O
38 ft	1028	Lithology same. NO H_2O, HNU = 0.0ppm
49 ft	1042	Lithology Same, HNU = 0.0ppm
65 ft	1101	Lithology Same, HNU = 15ppm at flume, 0.0ppm in BZ.
75 ft	1107	Lithology Same, Will pull tools, Little mr on Tools, No enough water for Well! Will Abandon!

SAMPLE TYPES
CONTINUOUS SPLIT SPOON, STANDARD TUBE, CORE, OTHER

MW-17

[illegible] & [illegible], INC. ENGINEERS — GEOLOGIC LOG

7/20/92 1805

PROJECT: LBAD (T. Smith)		SHEET 1 OF 2	BORING NO. MW-24
SITE LOCATION: MW-24 New Landfill	JOB NO. 7248-3		
	LOCATION: MW-24	GROUND ELEV.	TOTAL DEPTH 5.6'

	DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
1805	0-2'	SS		12"	2.2.3.4		DK. Brown (10YR 4/4) silty clay, about 10% silt, dry, loose, soft, low plasticity, grass & roots present,	
1812	2-4'			5"	2.4.5.6		DK. Brown (10YR 4/4) silty clay, about 5% silt, dry, loose/stiff, soft, low plasticity, iron staining vertically small sub-rounded oxide stain pebbles	
1817	4-6'			12"	4.19.50/6"		DK. Brown (10YR 4/3) silty clay, less than 1% silt, moist/wet, round oxide stained pebbles, some iron staining, med. plasticity, dense, stiff/hard, micritic limestone at end of spoon; driller hit bedrock at 5'6"	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: B.R. @ 5'6"

BORING NO.: MW-24

ENGINEERS

BORING LOG

PROJECT : LBAD (P. Rojas) 7/21/92		SHEET 2 OF 2	BORING NO. MW-24
SITE LOCATION:	JOB NO 7248-3		
	LOCATION:	GROUND ELEV.	TOTAL DEPTH

BIT = 8 3/4"

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
0	4	1427				Soil - See Sheet 1	
4	15					Limestone, gray, fossiliferous, appears thinly bedded, not massive, dry	
16						Limestone harder for a couple feet.	
28						Moisture increasing, cuttings stay partially clumped together when squeezed	
41						Hit a hard zone again. Slower advance w/bit, cuttings are smaller, amount of dust increases.	
44						Gas odor noted	
48.5						Cuttings and dust become darker gray	
50						Gas odor noted again, stronger	
56						Hit a soft zone, cuttings light gray to brownish, larger pieces blown out of hole	
60						No water - Terminate boring @ 60 feet	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-24

McCOSH & EDDY, INC. ENGINEERS — GEOLOGIC LOG

#121192

PROJECT : LBAD

SITE LOCATION: MW-25 New Landfill

JOB NO. 7248-3 | SHEET 1 OF 1 | BORING NO. MW-25

LOCATION: N. L.

GROUND ELEV. | TOTAL DEPTH 10'1"

	DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
0804	0-2'	SS		9"	2·5·6·10		Dk. Brown (10YR 4/6) silty clay, some roots & glass present, small sub-rounded oxide pebbles, dry, stiff, low plasticity, dense,	
0808	2-4'			18"	7·9·16·14		Dk. Brown (10YR 3/2) silty clay, about 10% silt, small oxide stained pebbles, dry, stiff/hard, dense, low plasticity, iron staining vertically	
0814	4-6'			18"	8·6·7·9		Dk. Brown (7.5YR 3/2) clay w/ minor silty, about 3%, dry, dense, low/med. plasticity, iron staining, stiff	
0816	6-8'			6"	5·8·10·9		Yellowish Brown (10YR 7/6) clay w/ minor silt, about 3%, low/med. plasticity, iron staining, mottling, small oxide pebbles, dense, dry	
0819	8-10'			10"	6·6·5·4		Brownish becoming lighter vertically, 0-5" Reddish Brown (10YR 4/4), 5"-10" Yellowish Brown (10YR 5/6), last 3" moist w/ silt >10%, mottled, oxide pebbles, stiff, dense, moist at end of spoon	
0825	10-12'			8"	13·50/1"		Yellowish Brown (10YR 5/6) silty clay, dense, moist becoming dry at end of sample, angular grey limestone rocks at end of spoon, mottling, top of bedrock 10'1"	

SAMPLE TYPES
SS-SPLIT SPOON, ST-SHELBY TUBE
R-ROCK CORE, O-OTHER

NOTES: 10'1" = B.R.

BORING NO.: MW-25

ENGINEERS

PROJECT : LBAD		SHEET	BORING NO.
SITE LOCATION: MW-25	JOB NO: 7248-3	2 OF	MW-25
	LOCATION:	GROUND ELEV.	TOTAL DEPTH

Air Rotary Drilling · Bit 8 3/4" O.D. Paul/Bob 7/22/92

DEPTH	SAMPLE TYPE/NO.	SAMPLE TIME	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
0	9.5					Soil - See Geologic Log Sheet # 1 For MW-25	
						Air Rotary Drilling	
9.5		0807				Soft, gray shaly limestone, gray, dry	
						Noted pieces of shale in cuttings.	
28		0820				Note Larger pieces of shale in cuttings.	
						Advancing bit FAST.	
41						Shale - Begin, dry	
43						Petroleum odor Begin	
46						Thin limestone layer, then shale again, dry	
49		0833				Limestone again, fossils in cuttings, noted petroleum odor again.	
60		0845				No WATER. STOP Drilling, remove stem.	
						Terminate Drilling @ 60 Feet below grade.	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-25

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

7/21/92 938

PROJECT: BAD (T. Smith)

SITE LOCATION: MW-26 New Landfill

JOB NO. 7348-3

SHEET 1 OF 1

BORING NO. MW-26

LOCATION: New Landfill

GROUND ELEV.

TOTAL DEPTH 7'8"

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6" interval) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
0936		0-2'55	12"	2-3-5-6		Reddish Brown (10YR 3/3) silty clay, grass and roots present, dense, soft, dry, low plasticity, small rounded oxide stained pebbles, some iron staining	
0938		2-4'	2"	2-6-8-9		Reddish Brown (10YR 3/3) silty clay, poor recovery, dense, soft/stiff, dry, low plasticity	
0941		4-6'	18"	6-7-9-12		Brownish Yellow (10YR 5/6) clay w/ minor silt, iron staining, small sub-rounded oxide pebbles, stiff, dry, dense, low/med. plasticity, some iron staining, rock present small angular limestone pebbles end of spoon	
0945		6-8'	15"	6-9-16-50/2"		Brownish Yellow (7.5YR 5/6) Clay w/ minor silt, 1 inch lift sand/silt between 6-8", dense, stiff/becoming hard, dry, dense, low/med. plasticity, angular med. limestone at end of spoon, mottling, oxide stained pebbles, Bedrock at 7'8"	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: B.R. = 7'8"

BORING NO.: MW-26

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: LBAD		SHEET 2 OF 2	BORING NO. MW-26
SITE LOCATION:	JOB NO. 7248-3		
	LOCATION:	GROUND ELEV.	TOTAL DEPTH 60'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
						0806 Begin drilling through dark brown, silty clay (7.5 YR 4/4), stiff, medium plastic. From 0'-5'. Drilling rate = .93 ft/min. From 5'-7.5' is a light brown shale.	
						0814 Hit bedrock at 7.5'. Light grey limestone.	
						0817 OVA reading = nondetectable.	
						0842 OVA reading = 4000 ppm in the dust.	
						0845 Stopped drilling at 28.5'. Very soft shale and limestone from 15'-25'.	
						0847 OVA reading = 60 ppm in the settled dust of the tub.	
						0848 HNU reading = 2-6 ppm.	
						0850 Decide to let dust cloud settle and take a reading in 20 minutes	
						0907 Begin drilling again.	
						0910 OVA reading = 40 ppm in the dust.	
						0915 OVA reading = 60 ppm in the dust as the drill cuttings are drummed.	
						0920 Continue drilling at 37.5'. Encounter harder limestone and shale.	
						0938 At 49.0'. Drilling rate = .63 ft./min.	
						0955 Hit 60'. No water. Abandoned well.	
						* Limestone and shale was moist at 19.0' but we kept drilling because there wasn't enough water to set a well.	
						DRY HOLE	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-26

METCALF & EDDY, INC.
ENGINEERS

GEOLOGIC LOG

6

7/21/92 1030

PROJECT: LBAD		SHEET 1 OF 1	BORING NO. MW-27
SITE LOCATION: MW-27 New Landfill	JOB NO. 2248-3		
	LOCATION: New Landfill	GROUND ELEV.	TOTAL DEPTH 11'

	DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
1030	0-2'	SS		14"	2-5-7-10		yellowish Brown (10YR 4/6) silty clay, about 10% silt, loose, dry, stiff, v. low plasticity, roots and grass present,	
1033	2-4'			8"	7-9-10-13		yellowish Brown (10YR 5/8) silty clay, mottling, stiff/hard, oxide stained pebbles, iron staining, low plasticity, dense, dry roots present	
1036	4-6'			16"	3-4-4-6		yellowish Brown (7.5YR 5/6) clay w/ silt, mottling, some iron staining, soft, dense, low/med. plasticity, about 1%-3% silt	
1038	6-8'			19"	6-9-11-13		yellowish Brown (7.5YR 4/6) clay w/ silt, mottling, oxide staining, stiff/hard, dense, dry, low plasticity, about 3% silt,	
1042	8-10'			18"	8-10-18-16		same as last interval but harder	
1048	10-12'			10"	6-50/6"		yellowish Brown (10YR 5/6) clay w/ silt, 8-9" moist patch of silty clay, dry, stiff, med. plasticity, mottling iron staining small angular limestone pebble present, angular med-size limestone rocks at end of spoon and moist. Bedrock at 11'	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE,
R=ROCK CORE, O=OTHER

NOTES: B.R. = 11

BORING NO.: MW-27

ENGINEERS

GEOLOGICAL LOG

PROJECT: LBAD		SHEET 2 OF 2	BORING NO. MW-27
SITE LOCATION: MW-27	JOB NO.		
	LOCATION:	GROUND ELEV.	TOTAL DEPTH

Air Rotary, 8 3/4" Bit O.D. / 7/22/92 Bob Paul

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH Time	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
0	10	1025				Soil - SEE PAGE 1. For soil Log.	
10		1047				Hard gray, limestone, dry, dust is white.	
17		1100				Note shale in cuttings. Rate of drilling increases.	
27.5		1103				Same as 17 feet. Degree or percentage of shale in cuttings varies.	
35		1108				Limestone grades to shale, dust turns darker, dirty gray color. Thickness of shale layers increases in this zone.	
39		1112				Thin limestone bed. Fossiliferous. Petroleum odor.	
40						Shale and limestone interbedded Numerous fossils, little shale pieces ↓	
60						Same as 40'. Dry hole Terminate Boring @ 60 feet.	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-27

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

7/21/92 1130

PROJECT: (BAI) (T. Smith)

SITE LOCATION: MW-28 Area C

JOB NO. 7248-3

SHEET 1 OF 1

BORING NO. MW-28

LOCATION: Area C

GROUND ELEV.

TOTAL DEPTH 11'6"

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
1131	0-2	SS 1	12"	2-2-5-8		DK. Brown (10YR3/3) silty clay, roots present throughout, dry, soft becoming stiff, V. low plasticity, brittle, about 5-10% silt,	
1133	2-4'		18	7-9-12-14		Reddish Brown (7.5YR5/8) clay w/ silt, stiff, dry, dense, oxide stained pebbles, minor mottling, some iron staining, low-low med. plasticity	
1139	4-6'		14"	5-7-12-13		Reddish Tan Brown (10YR5/6) clay w/ silt, oxide stained pebbles, stiff becoming hard, mottling, low plasticity, dense, dry	
1141	6-8'		16"	9-11-12-14		same as above (last interval) low/med plasticity, small micaceous limestone rock, end of spoon, (10YR5/8)	
1144	8-10'		11"	9-11-10-13		yellowish clay w/ silt and small micaceous, angular limestone rocks, med. plasticity, dense, dry, mottling, 7.5YR 5/8	
1150	10-12		11½"	14-21-16	50/½"	Tannish (10YR5/8) silty, weathered clay, small-lg angular limestone rocks, dense, V. low plasticity, refusal at 11'6"	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: B.L. = 11'6"

BORING NO.: MW-28

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT : LBAD		SHEET 2 OF	BORING NO. MW-28
SITE LOCATION: FAR NORTH SIDE OF THE PROPERTY BY THE FENCE.	JOB NO. 7218-3		
	LOCATION:	GROUND ELEV.	TOTAL DEPTH 60'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
						1218 Begin drilling. Reddish-brown, silty clay (10 YR 4/4) From 0'-8'.	
						1237 Drill from 8'-9.8' of brown shale Hit light grey limestone at 11'.	
						1241 OVA reading = nondetectable.	
						1243 Stopped drilling briefly.	
						1244 Resumed drilling at 11.5' Limestone here has very little shale and is very hard. Drilling going very slowly.	
						1259 OVA reading = nondetectable.	
						1301 Reached 28.5'. Drilling rate = 1 ft./min	
						1304 Resumed drilling at 28.5'	
						1326 Reached 49'. Drilling rate = .93 ft./min.	
						1329 Resumed drilling at 49'	
						1338 Reached 60'. Drilling rate = 2.27 ft./min. Very soft interbedded limestone and shale. No water. Abandoned well	
						1425 Rig down, cuttings drummed, and leave site.	
						DRY HOLE	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-28

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

7/21/92 1325

PROJECT: (BAT) (T. Smith)		SHEET	BORING NO.
SITE LOCATION: MW-29 Old Landfill (Bldg 117)	JOB NO 7248-3	1 OF	MW-29
	LOCATION: Old Landfill	GROUND ELEV.	TOTAL DEPTH 5.5'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
1325 0-2'	SS		14"	4·4·5·6		yellowish tan (10YR 6/4) silty clay, small angular, weathered limestone gravel, stiff, dense, low plasticity, some iron staining, dry, about 8-10% silt	
1327 2-4'			0"	5·5·6·6		No recovery, clayey micritic limestone	
1331 4-6			2½"	6·16·30/4"		Weathered micritic limestone Bedrock at 5'6"	
			7/21/92			Begin air rotary drilling here	
				1611		begin drilling	
				1618		hit bedrock at 14"	
				1617		7½', fossiliferous, gray micritic LS w/ interbedded shale	
				1620		driller feeling more soil around 8', adding 20' rod	
				1633		resume drilling	
				1639		hit rock at 11½'	
				1643		petroleum odor around 16', gray, fossiliferous micritic limestone w/ interbedded shale	
				1654		driller adding 20' rod at 28', gray micritic LS w/ interbedded shale, fossils present, avg. ~1'/min drill rate	
				1718		about 47', gray micritic limestone w/ interbedded shale, petroleum odor, no signs of water	
				1732		drilled to 60'; no water call it a day..	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: B.R. = 5'6"

BORING NO.: MW-29

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

s664

7/21/92 1325

PROJECT: (BAD) (T. Smith)		SHEET	BORING NO.
SITE LOCATION: MW-29 Old Landfill (Bldg 117)	JOB NO 7048-3	1 OF	MW-29
	LOCATION: Old Landfill	GROUND ELEV.	TOTAL DEPTH 5.5'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
1325 0-2'	SS		14"	4-4-5-6		yellowish tan (10YR 4/2) silty clay, small angular, weathered limestone gravel, stiff, dense, low plasticity, some iron staining, dry, about 8-10% silt	
1327 2-4'			0"	5-5-6-6		No recovery, clayey micritic limestone	
1331 4-6			2½"	16-16-30/4"		Weathered micritic limestone Bedrock at 5'6"	
			7/28/92			Begin air rotary drilling here	
					1611	began drilling	
					1618	hit bedrock at 14"	
					1617	7½', possibly fissile, gray micritic LS w/ interbedded shale	
					1620	drillers pulling rods, soil around 8', adding 20' rod	
					1633	resume drilling	
					1639	hit rock at 11½"	
					1643	petroleum odor around 16', gray, possibly micritic limestone w/ interbedded shale	
					1654	drillers adding 20' rod at 28', gray micritic LS w/ interbedded shale, fossils present, avg. ~1'/min drill rate	
					1718	about 47', gray micritic limestone & interbedded shale, petroleum odor, no sign of water	
					1732	drilled to 40', no water call it a day..	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: B.R. = 5'6"

BORING NO.: MW-29

ENSINEERS

7/21/92 1355

PROJECT : LBAD (T. Smith)

SITE LOCATION: MW-30 Old Landfill

JOB NO. 224F-3

SHEET 1 OF 1

BORING NO. MW-30

LOCATION:

GROUND ELEV.

TOTAL DEPTH 7'3"

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY (1st) (2nd)	SAMPLE DESCRIPTION	GRAPHIC LOG
1355 0-2	SS		14"	3-5-6-9		0-3" Dk. Brown (10YR3/2) Silty Clay, glass & rocks present, dry stiff, dense low plasticity	
						3-14" Yellowish Brown (10YR5/4) silty weathered clay w/ lots weathered angular limestone rocks	
1357 2-4'				4-6-7-16			
						Weathered clay w/ fractured angular limestone, low plasticity, loose, dry Brown (10YR3/2), fill	
1359 4-6'			12"	4-5-5-6		Dk. Brown silty clay, small limestone fragments, dry/moist, dense, stiff 10YR3/1, some iron staining, low plasticity	
1402 6'-8'-5"			9.5"/3"	9-50/3"		Dk. Brown (10YR4/1) Clay w/ silt, small angular limestone pebbles, low/med. plasticity, dry/moist, hard, dense, stiff becoming hard. Bedrock at 7'3"	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: P.R. 7'3"

BORING NO.: MW-30

PROJECT : LBAD

SITE LOCATION:

JOB NO 7249-3 | SHEET 1 OF 1 | BORING NO. MW-30

LOCATION: | GROUND ELEV.: | TOTAL DEPTH 60 ft.

DEPTH	SAMPLE TYPE	SAMPLE NO.	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR PENETRATION RESISTANCE (blows/ft)	HNu READING (ppm)	SAMPLE DESCRIPTION	GRAPHIC LOG

1055 set up rig
1100 encounter brown, silty clay.
1104 hit bedrock at 6'4".
1107 HNu reading: nondetectable
1142 stop drilling to shovel cuttings
1147 begin drilling again.
1222 smelled odor → HNu reading: 5ppm
1225 HNu reading (in tub) → 7ppm.
1229 HNu → in tub: 5ppm
→ at well: 2ppm
1247 hit 60 ft.
DRY HOLE

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

BORING NO.: MW-30

Sp(7

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

7/21/82 1430

PROJECT: GAD (T. Smith)		SHEET	BORING NO.
SITE LOCATION: MW-31 Bldg 139	JOB NO. 7248-3	1 OF 2	MW-31
	LOCATION: Bldg 139	GROUND ELEV.	TOTAL DEPTH

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
1430 0-2	1SS		21"	2.5.6.8		0-80" Dk. Brown (10YR3/3) silty clay, grass & roots present, dry, low plasticity, iron staining 10-21" Reddish brown (2.5YR5/3) clay w/ some silt, very stiff, low/med. plasticity, mottling	
1431 2-4			(	4.7.8.11		No recovery.	
1435 6-8'			18"	4.11.16.21		Reddish (10YR5/6) brown clay w/ minor silt, oxide black blotches, mottling, some iron staining, hard/dense, low/med plasticity	
1437 8-12'			10"	7.11.9.18		Yellowish Brn (10YR4/6) clay w/ minor silt, some mottling, iron staining, black oxide blotches, dry, stiff, dense, low/med plasticity	
1441 10-12'			13"	9.13.16.19		Yellowish Brn (10YR5/6) clay w/ minor silt, iron staining, small-med. size angular limestone rocks, dry, stiff/hard, low/med. plasticity	
1448 12-14'			24"	13.17.18.21		0-8" Yellowish Brn (10YR5/3) clay w/ silt, some moistic limestone, hard, dense, low plasticity 8-24" weathered clay w/ various moistic rock/stone, dry, iron staining	
1453 14-16			18"	9.18.22.21		Tannish yellow 2.5YR3 weathered clay angular limestone rocks	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-31

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

7/21/92

PROJECT : MW-31

SITE LOCATION: Bldg. 139

JOB NO. 7248-3 | SHEET 2 OF 2 | BORING NO. MW-31

LOCATION: Bldg. 139 | GROUND ELEV. | TOTAL DEPTH 17.5'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR (RQD)	SAMPLE DESCRIPTION	GRAPHIC LOG
15		16-18'	10"	13-18-21	3%	Weathered Clay w/ angular T.S. angular limestone rocks	
						Bedrock at 17'6"	
				7/28/92		air rotary drill starts here	
				1349		Drillers begin drilling at MW-31	
				1352		Drill to 8', add 20' rod (see attached p. 4)	
					1403	Started drilling	
					1405	Hit bedrock at 12.5'	
					1410	Shale interbedded	
					1415	added 2nd 20' rod.	
					1430	drilling hard, cuttings all coming back grey micritic limestone w/ interbedded shale, ~45'	
					1435	petroleum odor around 48 1/2', adding 20' rod, drilling rate about .66'/min	
					1542	about 54', no signs of water	
					1548	dry hole at 60', move to next location	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: B.L. = 17.5'

BORING NO.: MW-31

Metcalf & Eddy, Inc. ENGINEERS — GEOLOGIC LOG

7/22/92 0739

PROJECT: CBPD (T. Smith)		SHEET	BORING NO.
SITE LOCATION: MW-34 west of Creek from MW-1124	JOB NO. 7248-3	1 OF	MW-34
	LOCATION: Across Creek From MW-1124	GROUND ELEV.	TOTAL DEPTH 7'7"

	DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
0741	0-2'	SS		17"	2·3·4·5		Dk. Brown (10YR3/3) Clay w/ silt, iron staining, grass & roots present, soft, dense, dry, low plasticity, black stained subrounded pebbles, trace of silt	
0744	2-4'			17"	5·6·6·7		0-8" Dk. Brown (10YR3/3) Clay w/ silt, iron staining, dry, dense, low plasticity. 8-17" Lt. Brown (10YR6/6)	
0746	4-6'			17"	6·8·16·15		Lt. Brown (10YR7/6) Clay w/ silt, iron staining, small rounded black stained pebbles, dry, few, low plasticity, mottled	
0750	6-8'			4½"	16·20·50/1"		Lt. Brown ( ) clay w/ silt, a lot of staining from iron and small [illegible] rounded pebbles, dry, [illegible], low plasticity, dense, top of bedrock at 7'7"	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: B.R. = 7'7"

BORING NO.: MW-34

Metcalf & Eddy, Inc.
ENGINEERS

GEOLOGIC LOG

7/27/92 Ø940

PROJECT:	SHEET	BORING NO.
SITE LOCATION: MW-36 Area C	JOB NO.:	1 OF	MW-36
LOCATION: Area C	GROUND ELEV.	TOTAL DEPTH 8'8"

	DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
Ø940	0-2'	SS		18"	1-3-4-6		Brown (10YR 4/6) Clay w/ silt, about 10%, dense, soft, dry, low plasticity, staining, some black pebbles, glass & roots present, minor iron staining	
Ø942	2-4'			12"	6-8-9-13		Yellowish Brown (10YR 5/8) Clay w/ silt, about 5% silt, stiff becoming hard, dry, low plasticity, dense, small black stained pebbles	
Ø945	4-6'			13"	7-10-13-14		Yellowish Brown (10YR 5/8) Clay w/ silt, little iron staining, small rounded black pebbles, dry, stiff becoming hard, dense, low plasticity	
Ø948	6-8'			8"	10-14-15-24		Yellowish Brown (10YR 5/8) Clay w/ silt, iron staining, small black pebbles, dense, dry, hard, low plasticity, more iron staining	
Ø952	8-10'			0	10-50/2"		Lost interval. Close to bedrock acc. to Drill. No recovery, hit bedrock at 8'8"	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE,
R=ROCK CORE, O=OTHER

NOTES: B.R. at 8'8"

BORING NO.: MW-36

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT : LBAD		SHEET	BORING NO.
SITE LOCATION:	JOB NO. 7248-3	2 OF	MW-36
	LOCATION:	GROUND ELEV.	TOTAL DEPTH 60'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (no. & interval) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG

1520 Leave decon pad for mw-36.

1538 Arrive at MW-36 and set up for drilling.

1552 Start drilling. Down to 6.5' it is a strong brown, silty clay (7.5YR 4/6) Hit bedrock at 6.5'.

1601 Stopped at 8'. Added the next 20.5' drill bit and set up the tub

1617 Begin drilling again at 8'.

1620 OVA reading = nondetectable.

1621 Stopped to readjust tub.

1624 started again at ~10'.

1638 Reached 28.5' Drilling rate = 1.32 ft./min. Added another 20.5' of drill bit.

1640 Begin drilling again.

1708 Reached 49' Drilling rate = .59 ft./min.

1709 Resume drilling at 49'.

1714 OVA reading = 90 ppm in the dust. Petroleum-like odor.

1726 Reached 60' Drilling rate = 1.2 ft./min. No water. Abandoned well. Drillers break down rig and drum cuttings

1800 Leave mw-36 site.

DRY HOLE

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-36

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

7/22/92 1035

PROJECT : (BAT) (T. Smith)

SITE LOCATION: MW-37 Area C west of MW-1009

JOB NO. 7848-5 | SHEET 1 OF | BORING NO. MW-37

LOCATION: Area C | GROUND ELEV. | TOTAL DEPTH 6'5"

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
1036 0-2'	SS		10"	2.4.66		Brown (10YR 4/3) Clay w/ silt, iron staining, black stained pebbles, dense, dry, low plasticity, soft/stiff, mottling	
1036 2-4'			5"	2.3.5.6		Brown (2.5YR 4/3) Clay w/ silt, iron staining, low/med. plasticity, small black stained pebbles, dry, dense, soft/stiff, moist at spoon	
1040 4-6'			24"	6.7.10.21		Brown (2.5YR 4/3) clay w/ minor silt, iron staining, mottling, black stain pebbles, dry, dense, med. plasticity, mottling may be grey clay	
1043 6-8'			22.50			about 8" of mud & weathered limestone, top of bedrock at 6'5"	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: 6'5" - B.R.

BORING NO.: MW-37

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT : LBAD

SITE LOCATION: MW-37 N.E. Corner of Property

JOB NO.

LOCATION:

SHEET 2 OF 2

BORING NO. MW-37

GROUND ELEV.

TOTAL DEPTH

7/22/92

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
0	5					Soil → See log Page 1.	
5						Gray, Fossiliferous limestone, shale fragments in cuttings as well, Soft rock	
13		1421				Limestone w/ thin shale layers.	
48		1422				Limestone, gray, still dry borehole.	
52		1427				Limestone	
59		1435				Petroleum Odor.	
60						→ Terminate Boring @ 60 feet	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-37

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

SO18
SO19

7/22/82

PROJECT: LBAD (T. Smith)

SITE LOCATION: MW-38 Parking Lot of Bldg 139

JOB NO.

SHEET 1 OF 2

BORING NO. MW-38

LOCATION: Parking Lot

GROUND ELEV.

TOTAL DEPTH

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
1300 0-2	SS		8"	1-2-4-5		Yellow-brown (10YR5/8) clay w/silt, dense, asphalt bits present, staining from black pebbles, iron staining, low plasticity	
1306 2-4			12"	6-11-13-21		Yellow-brown (10YR5/8) clay w/silt, dense, mottling, staining from black pebbles, stiff becoming hard, dry, low plasticity,	
1311 4-6			14"	9-16-24-50+		Olive-brown (2.5Y4/3) clay w/silt, dense, mottling, low plasticity, dry, lt. green coloration possibly ~~copper~~ Chromium bedrock at 6'6" driller started 10" below asphalt Begin dri drill bit	
					0816	Using an 8 3/4" bit drilling begins at 0809 hours bedrock encountered at 6'6"	
					0818	angular limestone, grey, micrite 1½'/2 min, some interbedded shale (blue)	
					0836	hit water at 9½', not enough for well, keep drilling, just damp according to driller	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES: Start about 10" below asphalt surface. B.R.: 6'6"

BORING NO.: MW-38

Metcalf & Eddy, Inc. ENGINEERS

GEOLOGIC LOG

PROJECT: (BAI) (T. Smith & J. Jordan) | SHEET 2 OF 2 | BORING NO. Air Rig MW-38

SITE LOCATION: MW-38 Pkg. Lot Bldg. 135 | JOB NO. 7248-3 | LOCATION: | GROUND ELEV. | TOTAL DEPTH 60'

DEPTH	SAMPLE TYPE/NO.	SAMPLE DEPTH	SAMPLE RECOVERY	BLOW COUNT (per 6 inches) OR DRILLING TIME (min/ft)	% RECOVERY OR RQD	SAMPLE DESCRIPTION	GRAPHIC LOG
						0844 rock becoming harder 16 feet grey micritic limestone	
						0857 about 26' seem to have some fissure or interbedded shale layer	
						0900 adding another 20' rod completed 28' of drilling	
						0915 about 36', grey micritic limestone w/ interbedded shale	
						0921 beginning to smell something around 40 feet	
						0926 petroleum smell about 44½ feet, no sign of water, cuttings coming back dry.	
						0934 adding another 30' rod, no water sign, same material, limestone (grey) w/ interbedded shale, diesel smell coming back w/ cuttings. avg. about .75 ft/min	
						0948 ~58½, micritic grey limestone w/ interbedded shale, no water	
						0953 60 ft. driller pull rods, no water	

SAMPLE TYPES
SS=SPLIT SPOON, ST=SHELBY TUBE
R=ROCK CORE, O=OTHER

NOTES:

BORING NO.: MW-38

APPENDIX G
WELL DEVELOPMENT LOGS

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW-2D

Date: 8/05/92

Logged By: JORDAN

Method of Development: GRUNDFOS 2"

Static Water Level: 22.86'

	Sample No.	Time	PARAMETERS: Temp (°C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
8/5/92	1	1638	17	7.6	1300		6 gpm	18		clear, just a bit cloudy
	2	1712	18	7.8	1250		4 gpm	38		cloudy, grey
	1720 Ran dry at 40 gallons									
8/6/92	Hand bailed another 5 gallons to bring total to 45 gallons.									

Total Development Time: _____

Total Volume Purged: _____

Comments: _____

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: SD4 - MW - 08

Date: 12/3/91

Logged By: Terry T. Smith

Method of Development: Pump

Static Water Level: 16'

Sample No.	Time	PARAMETERS Temp (° C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
	1619	Pump Start							
1	1624	17°	7.7	600 ppm	900 µMhos				dirty
2	1629	16°	7.6	550 ppm	825 µMhos				dirty
3	1634	16°	7.6	550 ppm	825 µMhos				dirty
4	1644	16°	7.5	600 ppm	900 µMhos				dirty / cloudy
5	1654	16°	7.5	600 ppm	900 µMhos				clean
6	1700	15½°	7.5	600 ppm	900 µMhos				clean
7	1705	15½°	7.5	600 ppm	900 µMhos				clean
8	1710	16°	7.5	600 ppm	900 µMhos				clean
9	1715	16°	7.5	600 ppm	900 µMhos				clean
									development land 95 gallons of water pumped out

Total Development Time: _____

Volume Purged: _____

Comments: TD 23'

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: 5003 MW-06

Date: 12/4/91

Logged By: Terry T. Smith

Method of Development: Pump

Static Water Level: 13'

Sample No.	Time	PARAMETERS: Temp (°C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
	0955		Pump Started						
1	1005	14½°	8.1	800 ppm	1200 µMhos				dirty
2	1010	15°	7.9	1050 ppm	1575 µMhos				Clear/cloudy
3	1015	15°	7.9	1000 ppm	1500 µMhos				Clear/cloudy
4	1020	15°	7.8	1000 ppm	1500 µMhos				Clear
5	1025	15°	7.8	1000 ppm	1500 µMhos				Clear
6	1035	15°	7.8	1000 ppm	1500 µMhos				Clear

Total Development Time:

Volume Purged:

Comments: TD = 35'

110 gallons pumped from well

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW-6D

Date: 8/06/92

Logged By: JORDAN

Method of Development: GRUNDFOS 2"

Static Water Level: 55.79'

Sample No.	Time	PARAMETERS: Temp (° C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
8/6/92 1	1350	18.5	7.5	1580		.75gpm	20		cloudy, grey, odor (natu ga
	Ran dry after approx. 21 gallons.								
8/11/92 2							7		Dry

Total Development Time: _____

Total Volume Purged: _____

Comments: _____

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW-07

Date: 11-21-91

Logged By: Rick Jones

Method of Development: 4" Submersible

Static Water Level: 57.3 TD 82.3 @ TOC

Sample No.	Time	Temp (°C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
	1527		Pump	on		Pump	@ 72'		
	1530	15	7.6	770					
	1535	15	7.6	760					
	15[illegible]	14	7.6	740			55 gal		Drop pump to 76
	15[illegible]			[illegible]					
	1547	15	7.7	[illegible]			110 gal		
	1550						[illegible]		
									83-57 = 26
									26.0 x .65 = 16.9
									16.9 x 5 =

Total Development Time: ______

Total Volume Purged: ______

Comments: ______

26
.65
130
156
16.90
84.5

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: 52567-MW08

Date: 12/3/91

Logged By: Terry T. Smith

Method of Development: Pump

Static Water Level: 5'6" (24'6")

Sample No.	Time	PARAMETERS Temp (° C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
	1200	Start Pumping							
1	1206	15°	9.8	800ppm		1200 μMhos			Clear
~~2~~	~~1225~~								well dry - allow to recover
2	1330	15°	7.4	1100ppm		1650 μMhos			Clear/cloudy well dry; allow to recharge
3	1396	15°	7.1	950ppm		1425 μMhos			Clear; well dry allow to recharge
4	1440	15°	7.0	900ppm		1350 μMhos			Clear-cloudy; well pumped dry

Total Development Time: _____

Volume Purged: _____

Comments: TD 30'; start 5s gallons well pumped out

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW-8D

Date: 8/11/92

Logged By: JORDAN

Method of Development: GRUNDFOS 2"

Static Water Level: 12.91'

Sample No.	Time	PARAMETERS				Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
		Temp (° C)	pH	Cond'y (umhos)	Turbidity (NTU)				
1	1437	17	7.2	270		1.5gpm	20		Brown, cloudy
2	1448	16	7.1	290			40		Clear, tiny bit cloudy
3	1502	16	7.0	300		1.5gpm	60		Clear, " " "
4	1517	16.5	7.1	300			90		clear, sulfur odor
5	1546	17	7.1	310		1.5gpm	110		clear
6	1557	16	7.0	300		2.0gpm	140		clear
7	1608	16	7.1	300		2.0gpm	165		clear
8	1618	17	7.0	310		2.0gpm	185		clear, slight sulpher odi
9	1633	16.5	7.0	310			220		" " " "

Total Development Time:

Total Volume Purged:

Comments:

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: 52567 MW09

Date: 12/3/91

Logged By: T. Smith

Method of Development: Pump

Static Water Level: 30'

Sample No.	Time	PARAMETERS: Temp (°C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
	1545		Pump Started						
1	~~1550~~	15°	7.9	600ppm	900 umhos				very cloudy, well dry, allow to recharge
2	1725	15°	7.6	600ppm	900 umhos				Clear to cloudy, will not dry allow to recharge

Total Development Time:

Volume Purged:

Comments: TD 69'
70 gallons of water pumped from well

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW-18D

Date: 8/05/92

Logged By: JORDAN

Method of Development: GRUNDFOS 2"

Static Water Level: 44.92 ft.

Sample No.	Time	PARAMETERS: Temp (° C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
8/5/92 1	1455	18.5	7.8	1390		5 gpm	20		Cloudy, smells of sulphur
8/6/92 Hand Bailed							25		Dry
Start									
8/6/92 water level at 66.32' Begin pumping at							1535.		
2	1553	19.5	7.5	1590		1 gpm	35		Strong cloudy, smells of sulphur
3	1613	19	7.3	1730			50		very cloudy, strong odor
Went dry at 1615, at approximately 54 gallons.									

Total Development Time:

Total Volume Purged:

Comments: Very strong sulphur odor.

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW-19

Date: 5/14/92

Logged By: T. Smith

Method of Development: Submer. Pump

Static Water Level: 11.4'

Sample No.	Time	PARAMETERS: Temp (°F)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
1	1610	60°F	7.5	1220 MS		22.7 gpm	20		very cloudy
2	1620	59°F	7.6	195 MS			55		clear
3	1630	59°F	7.6	195 MS			76		slightly cloudy
4	1635	59°F	7.6	191 MS			96		slightly cloudy, gas smell
5	1640	59°F	7.6	186 MS			110 gal		cloudy / clear
6	1645	59°F	7.6	185 MS			130		"
7	1650	59°F	7.6	185 MS			150		"
8	1655	58.5°	7.6	183 MS			165		clear then last sample

Total Development Time: 1 hour

Volume Purged: 165 total gallons removed

Comments: Well went dry in about 1 minute. Recovered in about 5 minutes. Well went dry and allowed to recharge during entire development.

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW-19D

Date: 8/07/92

Logged By: JORDAN

Method of Development: GRUNDFOS 2"

Static Water Level: 12.55'

	Sample No.	Time	PARAMETERS: Temp (° C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
8/7/92	1	1138	16.5	7.7	1220		2.5gpm	20		slightly cloudy clear, slight odor
	Ran dry at 1142 at 30 gallons. Start at 1156.									
	2	1203	18.0	7.6	1380		2.5gpm	40		cloudy, grey.
	Ran dry at 1206 at 47 gallons. start again at 1215.									
	Ran dry at 1219. Only got about 3 more gallons.									
8/11	3	1430	18	7.4	1490			8		Dry
								58		

Total Development Time: _____

Total Volume Purged: _____

Comments: _____

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW-22

Date: 7/28/92 - 7/29/92

Method of Development: Grundfos 2"

Logged By: _____

Static Water Level: 14.6'

Sample No.	Time	PARAMETERS: Temp (°C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
1	1016	18	7.7	1340			1 gal		slightly muddy
2	1020	17	7.8	198			15		Muddy
	1030	Shut off (recharge)							
	1406	Start pumping again							
3	1421	27	7.9	138			16		slightly muddy
	0915 Start pumping again (7-29)								
~~4~~	~~0915~~								
4	0920 Stop						18		
8/5	Start	bailing at 1145 to 1206					20		2 gal (Dry)
8/6	Start	bailing at 0830 to 0838					.5		.5 gal (Dry)
8/7	Start	bailing at 0843 to 0845					—		Dry
8/11	~~0755~~								dry

Total Development Time: _____

Volume Purged: _____

Comments: _____

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW 22D

Date: 7/25/92

Logged By:

Method of Development: Grundfos 2"

Static Water Level: 21.10'

Sample No.	Time	PARAMETERS: Temp (°C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
1	1013	16	8.1	1220			25		Muddy
	Pump		again						
2	1728	23	8.0	1230			26		"
3	1731	20	8.1	1230			27		"
4		20	8.0	1240			28		"
5		18	8.0	1250			29		"
6		17	8.0	1250			30		"
	1447 Stop	pumping			dry		50 gal		Clearing up
8/5	1208 - 1236						5		Dry
8/6	0952 - 1005						1		Dry
8/7	0929 - 0942						.5		Dry
8/11	0625								Dry

Total Development Time:

Total Volume Purged:

Comments:

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW 23

Date: 7/28/92 / 8/4/92

Logged By: _____

Method of Development: Grundfos 2"

Static Water Level: 8.09'

	Sample No.	Time	PARAMETERS: Temp (°C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
7/28/92	1	1224	21	8.5	146			1		Grey & silty
	2	1228	18	8.0	2800			10		Slightly grey & turbid
	3	1230	18	7.8	3800			20		" " "
	4	1240	18	7.8	3500			30		slightly cloudy
	5	1243	16	7.8	3400			40		" "
	6	1248	16	7.8	3500			45		" "
8/4/92	7	1306	17	7.8	1300			60		" "
	8	1309	16	7.8	1320			65		"
	9	1314	16	7.8	1320			75		"
	10	1320	16	7.8	1310			85		"

Total Development Time: _____

Volume Purged: _____

Comments: _____

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW 23 D

Date: 8/4/92

Logged By:

Method of Development: Grundfos 2"

Static Water Level: 40.08'

Sample No.	Time	PARAMETERS: Temp (°C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
1	0907	16	8.0	1330			30		Cloudy
8/4/92	SL	pump	off	at	1107		55		Dry
8/5/92	1636	to	1656				3		Dry
8/6/92	1225	to	1233				1.5		Dry
8/7/92	0917	to	0923				.5		Dry
8/11/92	0845								dry

Total Development Time:

Volume Purged:

Comments:

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW 32

Date: 7/29/92 / 8/4/92

Logged By:

Method of Development: Grundfos 2"

Static Water Level: 35.05'

Sample No.	Time	PARAMETERS: Temp (° C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
7/29/92 1	1357	19	7.5	1380			15		muddy
2	1400	17	7.4	1400			30		Sl. Lt. " muddy
3	1409	18	7.4	1390			45		" "
4	1418	17	7.4	1390			60		" "
5	1430	18	7.4	1380			75		" "
8/4/92 6	1414	17	7.5	1360			85		" "
7	1420	17	7.4	1370			110		" "

Total Development Time:

Total Volume Purged: 110 gallons

Comments:

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: 3MW-32D

Date: 8/11/92

Logged By: A. CAMPBELL / G. TEDROW

Method of Development: GRUNDFOS 2"

Static Water Level: 38.51'

Sample No.	Time	PARAMETERS: Temp (°C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
1	1040	18	8.0	1400	~~Slightly~~	4	8		Slightly cloudy
2	1045	17	8.0	1400		3	23		Clear heater
3	1048	17	8.1	1400		1.5	30		Clear
4	1053	17	7.6	1400		1.5	37		Cloudy
5	1058	18	7.5	1600		1.5	45		Cloudy
6	1105	18	7.4	1800		1	50		4
7	1113	18	7.4	1900		4	55		Cloudy
8/12	0845	Lo	6981				#5		Dry

Total Development Time: _____

Total Volume Purged: _____

Comments: _____

Pg. _____ of _____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW-33

Date: 8/05/92

Logged By: JORDAN

Method of Development: 1st 6 gallons - bailing The rest - Grundfos 2"

Static Water Level: 28.08'

Sample No.	Time	PARAMETERS				Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
		Temp (° C)	pH	Cond'y (umhos)	Turbidity (NTU)				
1	1131	17	7.5	1320		8 gpm	20		cloudy
2	1143	17	7.5	1320		6 gpm	40		clear
3	1154	17	7.4	1320			60		very clear
4	1207	17	7.4	1320		6 gpm	80		very clear
5	1215	17	7.4	1310			100		very clear
6	1226	17	7.4	1310			120		very clear
7	1242	17	7.4	1310		6 gpm	150		very clear

Total Development Time: 1123 – 1250

Total Volume Purged: 150 gallons

Comments: First 6 gallons were hand bailed.

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW-39D

Date: 8/06/92

Logged By: JORDAN

Method of Development: GRUNDFOS 2"

Static Water Level: 23.10'

	Sample No.	Time	PARAMETERS: Temp (°C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
8/6/92	1	1110	17.5	7.6	1350		1 1/2 gpm	20		very clear
	2	1128	19	7.6	1380		.75 gpm	40		Cloudy
	3	1148	19	7.4	1460			55		cloudy
		Ran	dry	at	55	gallons.				
8/11/92	4	1608	20	7.4	1250		1	56		~~Cloudy~~ Slightly Cloudy
	5	1612	19	7.4	800		1	58		"
		PUMP	DRY	AT		1630		163		DRY

Total Development Time: _____

Total Volume Purged: _____

Comments: _____

_____

_____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW 40

Date: 7/28/92 & 8/04/92

Method of Development: Grundfos 2"

Logged By:

Static Water Level: 15.7'

Sample No.	Time	PARAMETERS: Temp (° C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
7/28/92 1	1536	24	7.8	185			1		Cloudy
2	1538	12	7.7	1260			10		"
3	1542	17	7.7	1260			20		Clear
4	1547	17	7.7	1270			30		Clear w/ little mud
5	1555	17	7.6	1260			45		" "
6	1603	17	7.7	1260			55		" "
8/04/92 7	1641	17	7.7	1250			65		Clear
8	1645	16	7.8	1260			75		Slightly cloudy
9	1648	17	7.8	1260			85		" "
10	1713	18	7.8	1260			95		" "
11	1717	17	7.8	1260			105		Clear

Total Development Time:

Total Volume Purged: 105 gallons

Comments:

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW 40D

Date: 7/28/92 - 7/29/92 - 8/4/92 Method of Development: Grundfos 2"

Logged By: _____ Static Water Level: 16.22'

Sample No.	Time	PARAMETERS: Temp (° C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
7/28/92 1	1637	20	7.7	1290			30		Clear
2	1715	14	7.6	1470			60		Slightly turbid
3	0739 start pumping again								
3	0741	16	7.4	1470			90		Clear
4	0827	18	8.1	1540			115		Slightly turbid
	7/29/92						"		
5	1510	17	7.4	1440			130		Clear
6	1526	18	7.4	1440			145		"
7	1552	18	7.5	1450			170		"
8/04/92							~~185~~		
8	1808	17	7.8	1430			185		"
9	1810	17	7.8	1420			200		"
10	1816	17	7.8	1420			215		"
11	1821	17	7.7	1420			225		"

Total Development Time: _____

Volume Purged: 225 gallons

Comments: _____

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW 41

Date: 7/28/92 / 8/4/92

Method of Development: Grundfos 2"

Logged By:

Static Water Level: 10.81

Sample No.	Time	PARAMETERS: Temp (° C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
7/28/92 1	1803	19	7.9	154			10		Slightly turbid
2	1807	18	7.6	166			20		Cloudy
3	1812	18	7.6	167			30		Slightly cloudy
4	1818	14	7.6	168			40		Clear
5	1822	19	7.6	169			57		"
8/04/92									
6	1540	20	7.8	174			63		Slightly turbid
7	1544	19	7.8	168			73		" "
8	1547	19	7.8	175			83		" "
9	1550	19	7.8	177			93		Clear

Total Development Time:

Total Volume Purged: 93 gallons

Comments:

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW-44

Date: 8/5/92 - 8/7/92

Method of Development: Bailer

Logged By: _____

Static Water Level: _____

Sample No.	Time	PARAMETERS: Temp (° C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
1	1530	19	8.7	6000			5		
2	1532	17	8.8	7000			7		
3	1536	17	8.9	7000			10		
4	1541	17	8.9	7000			13		
8/6/92									
5	1030	17	8.5	10000			7		
6	1034	17	8.8	7000			5		
7	1038	17	9.1	7000			7		
8	1042	16	9.2	8000			10		
8/7/92									
Start Pumping at 0810 to 0821 10 gal (dry)									

Total Development Time: _____

Volume Purged: _____

Comments: _____

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW-45

Date: 8/07/92

Logged By: JORDAN

Method of Development: GRUNDFOS 2"

Static Water Level: 15.06'

Sample No.	Time	PARAMETERS: Temp (° C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
8/7/92 1	0840	15	7.5	1300		3gpm	20		very clear, sulpher smell
2	0847	15	7.5	1290		3gpm	40		very clear, sulpher smell
3	0854	15	7.4	1290		3gpm	60		" "
4	0903	15	7.5	1280		3gpm	80		" "
5	0911	15	7.5	1280		3gpm	100		" "
6	0919	15	7.5	1270		3gpm	120		" "
	Stopped pumping after 130 gallons								

Total Development Time: Start 0830 - Finish - 0923

Total Volume Purged: 130 gallons

Comments:

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW-46

Date: 8/11/92

Logged By: JORDAN

Method of Development: GRUNDFOS 2"

Static Water Level: 12.41'

Sample No.	Time	PARAMETERS: Temp (°C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
1	0850	18	7.8	1220		1.5gpm	10		slightly cloudy
2	0901	19	7.6	1220		1.0gpm	36		slightly cloudy, sulphur odor
	Ran dry at 0910. Approximately 41 gallons.								
	Start up pump at 0924.								
3	0930	17.5	7.5	190		1.5gpm	50		cloudy, slight sulphur smell
	Ran dry at 0931. Approximately 51 gallons.								
	Start up at 0946 and get another 10 gallons for ~ 60 gallons.								
	Start up at 1009.								
4	1012	18	7.8	191		1.5gpm	65		cloudy, sulphur smell
	Ran dry at 1015. at ~ 68 gallons. Start up at 1030.								
	Ran dry at 1042 at ~ 78 gallons. Start up at 1102.								
5	1108	18	7.6	195			85		practically clear, sulphur odor
	Ran dry at 1113 at ~ 92 gallons. Start up at 1131.								
6	1140	18	7.7	195			105		quite clear, sulphur odor
	Ran dry at 1141 at ~ 106 gallons. Start at 1156.								
	Ran dry at 1205 at ~ 120 gallons. Start at 1220.								
7	1225	19	7.7	196			125		very clear, sulphur
	Ran dry at 1228 at ~ 130 gallons. Start up at 1245.								
	Ran dry at 1255 at ~ 142 gallons. Start up at 1312.								
8	1318	19	7.7	197			145		very clear, sulphur
	Ran dry at 1322 at ~ 150 gallons.								

Total Development Time: 0730 – 1330

Total Volume Purged: 150 gallons

Comments:

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW-47

Date: 8/12/92

Logged By: CAMPBELL/TEISLOW

Method of Development: GRUNDFOS 2"

Static Water Level: 26

Sample No.	Time	PARAMETERS: Temp (°C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
1	0930	16	8.6	800		3	7		cloudy
2	0934	15	9.2	700		2	7		"
3	0937	15	9.5	700		2	14		clearing some
4	0941	15	9.5	700		2	20		"
5	0946	15	9.5	700		2	30		"
6	0951	15	9.6	700		2	40		MILKY
7	0957	15	9.6	700		2.5	55		"
8	1005	15	9.8	700		"	68		"
9	1010	15	9.8	700		"	80		"
10	1015	15	9.7	700		2	90		"

Total Development Time: _____

Total Volume Purged: _____

Comments: _____

Pg. ____ of ____

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW-47D

Date: 8/31/93

Logged By: T. Smith, S. Hulett

Method of Development: 2" Grundfos Pump

~~Static Water Level:~~ 46.5 gal = 1 Vol.

Sample No.	Time	PARAMETERS				Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
		Temp (° C)	pH	Cond'y (umhos)	Turbidity (NTU)				
		No Parameters Collected							Developed to Clarity.

~~Total Development Time:~~

Volume Purged: 165 gal Purged

Comments: Developed to Clarity.

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW-47

Date: 8/31/93

Logged By: T. Smith / S. Hulett

Method of Development: 2" Grundfos Pump

~~Static Water Level~~: 25.7 gal = 1 vol.

Sample No.	Time	PARAMETERS: Temp (° C)	pH	Cond'y (umhos)	Turbidity (NTU)	Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
~~1~~					Clear				
1.			Parameters	not	collected,				Developed to clarity. 110 gal purged

Total ~~Development~~ Time:

Volume Purged: 110 gal purged

~~Comments~~: Pumped to clarity

Pg. 1 of 1

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW-48D

Date: 9/10/93

Logged By: Tedrow/Campbell

Method of Development: 2" Grundfos Pump

Static Water Level: 50 gal = 1 Vol.

Sample No.	Time	PARAMETERS				Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
		Temp (° C)	pH	Cond'y (umhos)	Turbidity (NTU)				
1		18	8.3	1100	Turb	~~x23 gal~~	0		
2		17	8.3	1100	Turb		50		Sulfide smell
3		18	8.3	1100	<Turb		100		
4		18	8.2	1100	Clr		150		
5		18	8.2	1100	Clr		200		
6		18	8.2	1100	Clr		250		

Total Development Time: ~~———~~

Volume Purged: 5 vol purged to clear

Comments: Sulfide Smell developed to clear.

Metcalf & Eddy

MONITORING WELL DEVELOPMENT

Well I.D. No.: MW-48

Date: 9/10/93

Logged By: Tedrow/Campbell

Method of Development: 2" Grundfos pump

Static Water Level: 30gal = 1 Vol.

Sample No.	Time	PARAMETERS				Pumping Rate (gpm)	Volume Pumped (gal)	Photo Taken	OBSERVATIONS
		Temp (° C)	pH	Cond'y (umhos)	Turbidity (NTU)				
1		17°	8.7	1100	Tur	≈3Gpm	0		
2		17°	8.7	1000	Tur		30		
3		17°	8.6	1000	<TUR		60		
4		17°	8.6	1000	<TUR		90		
5		17°	8.6	1000	Clear		120		
6		17°	8.6	1000	Clear		150		
7		17°	8.4	1000	"		180		
8		17°	8.4	1000	"	↓	220		

Total Development Time: ———

Total Volume Purged: ———

Comments: ———

Metcalf & Eddy

FIELD LOG BOOK SAMPLING DATA:
WELL SAMPLING WORK SHEET

Job Name LBAD — Sampled by Tedrow/Campbell

Well ID MW-47 — Date Sampled 9/9/93 — Time Start ____ End ____

Casing Diameter (d) ____ inches ÷ 12 = ____ ft. — Well secured upon arrival? Y/N

Depth of water from T.O.C. ____ ft. — Standing water (gal.) = ____

Depth of well from T.O.C. ____ ft. — 1 x 30 gal = well volumes

Feet of standing water (h) ____ ft. — = 165 gal gallons to purge

Standing Water Volume = $\pi [(d)^2 \div 4] (h)$

= 3.14 [(____ ft)^2 ÷ 4] (____ ft) x 7.48 gal/ft^3 = ____ gallons

			pH	Conductivity	Temperature (C)
Int	-0-				
1 well volume =	30	gal.	3.7 2.6	600	17°
2 well volume =	60	gal.	3.3	600	17°
3 well volume =	90	gal.	3.8	600	17°
4 well volume =	120	gal.	3.2	600	17°
Final	165		3.3	600	17°

Purging method 2" Grundfos Pump, coupled with 2" Stainless steel bailer.

Sample Characteristics. (Circle all applicable)

Describe odor:	petroleum	sulfide	fishy	musty	____
Describe color: brown	black	colorless	orange	red	____
Describe appearance:	turbid	silty	sand	clay	____
	floaters	sheen	clear	multi-phased	____
	foaming	slimy	algae	____	____

Samples preserved? (Y)/N

Comments: ____

Metcalf & Eddy

FIELD LOG BOOK SAMPLING DATA:
WELL SAMPLING WORK SHEET

Job Name LBAD — Sampled by Tedrow / Campbell

Well ID MW-47D — Date Sampled 9/9/93 — Time Start ____ End ____

Casing Diameter (d) ____ inches ÷ 12 = ____ ft. — Well secured upon arrival? Y/N

Depth of water from T.O.C. ____ ft. — Standing water (gal.) = ____

Depth of well from T.O.C. ____ ft. — 1 x 66 gal well volumes

Feet of standing water (h) ____ ft. — = 330 gal gallons to purge

Standing Water Volume = $\pi [(d)^2 \div 4] (h)$

= 3.14 [(____ ft)^2 ÷ 4] (____ ft) x 7.48 gal/ft^3 = ____ gallons

			pH	Conductivity	Temperature. (C)
1 well volume =	~0~	gal.	7.4	700	15
1/2 well volume =	66	gal.	7.8	600	16
2/3 well volume =	130	gal.	6.0	500	16
3/4 well volume =	220 / 275	gal.	5.7 / 4.4	500 / 500	16 / 17
Final	330		4.8	500	17

Purging method # 2" Grundfos Pump. ~~+ Surge~~ then sampled with 2 inch Stainless Steel bailer.

Sample Characteristics. (Circle all applicable)

Describe odor:	petroleum	sulfide	fishy	musty	None
Describe color: brown	black	(colorless)	orange	red	
Describe appearance:	turbid	silty	sand	clay	
	floaters	sheen	(clear)	multi-phased	
	foaming	slimy	algae		

Samples preserved? (Y)/N

Comments: ____

APPENDIX H
SLUG TEST DATA

SI-2.WK1

MW-2 SLUG IN TEST

Well Diameter(Rc) =	4	inch			
Screen Length(Le) =	10	FT			
Hole Size =	8	inch	Hole Radius(Rw) =	0.333	FT
Water to Bottom of Well(Lw) =	11.8	FT			
LN(Yo) =	-2.00				
LN(Yt) =	-4.30				
t =	20	sec			
t =	0.33	min			
Le/Rw =	30				
C =	2.0	from Bouwer and Rice Slug Test - An Update			

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 2.66614

LN(Lw/Rw) = 3.567

K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 2.555E-02 ft/min

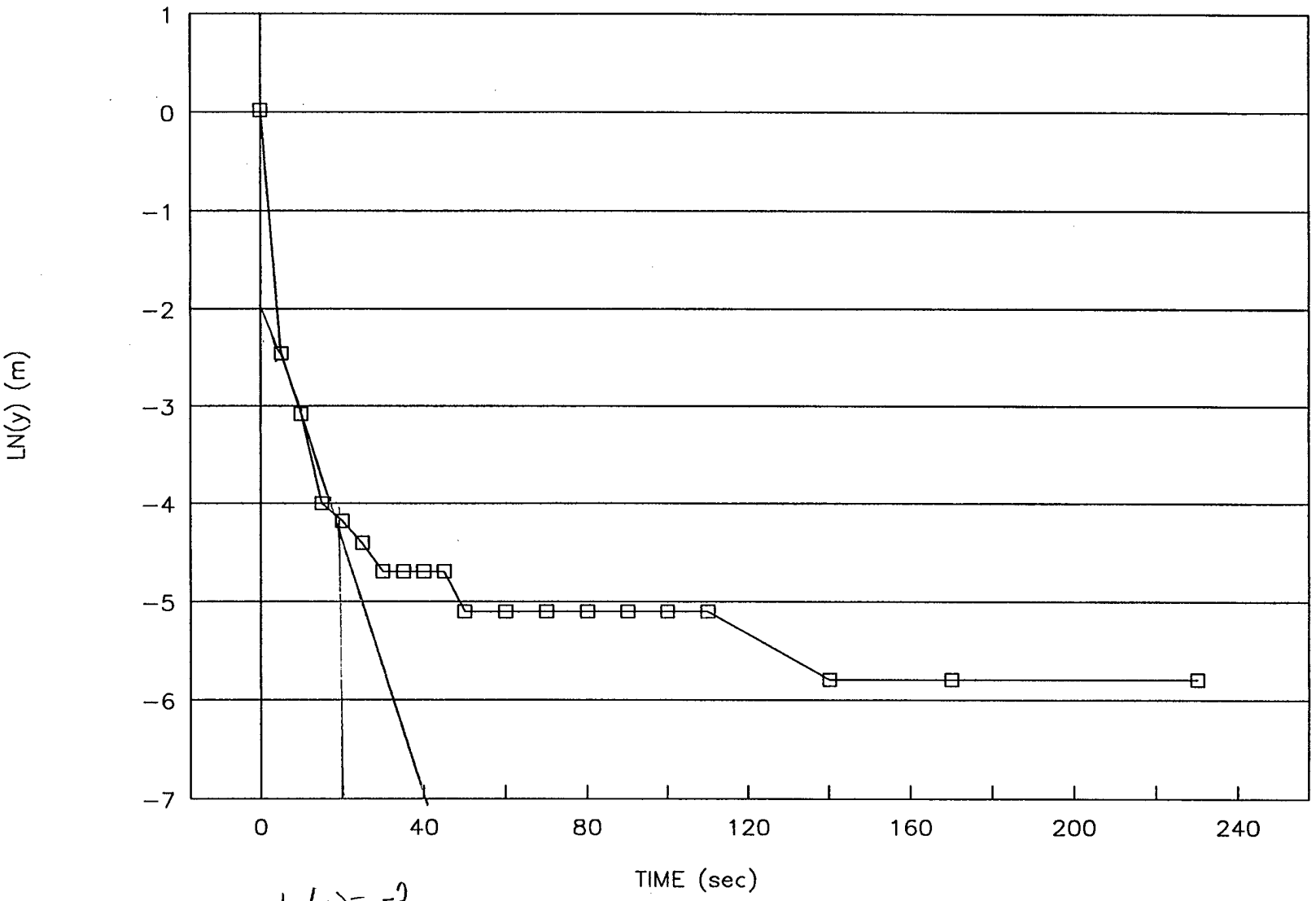
K = 1.298E-02 cm/sec

rph

02-Feb-92

SLUG IN TEST

MW-2



$Ln(y_0) = -2$

$Ln(y_{20}) = -4.3$

SO-2.WK1

MW-2 SLUG OUT TEST

Well Diameter(Rc) =	4	inch		
Screen Length(Le) =	10	FT		
Hole Size =	8	inch	Hole Radius(Rw) =	0.333 FT
Water to Bottom of Well(Lw) =	11.8	FT		
LN(Yo) =	-0.70			
LN(Yt) =	-4.00			
t =	25	sec		
t =	0.42	min		
Le/Rw =	30			
C =	2.0	from Bouwer and Rice Slug Test - An Update		

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 2.66614

LN(Lw/Rw) = 3.567

K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 2.933E-02 ft/min

K = 1.490E-02 cm/sec

SO-2.WK1

MW-2 SLUG OUT TEST

Well Diameter(Rc) =	4	inch		
Screen Length(Le) =	10	FT		
Hole Size =	8	inch	Hole Radius(Rw) =	0.333 FT
Water to Bottom of Well(Lw) =	11.8	FT		
LN(Yo) =	-0.70			
LN(Yt) =	-4.00			
t =	25	sec		
t =	0.42	min		
Le/Rw =	30			
C =	2.0	from Bouwer and Rice Slug Test - An Update		

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 2.66614

LN(Lw/Rw) = 3.567

K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 2.933E-02 ft/min

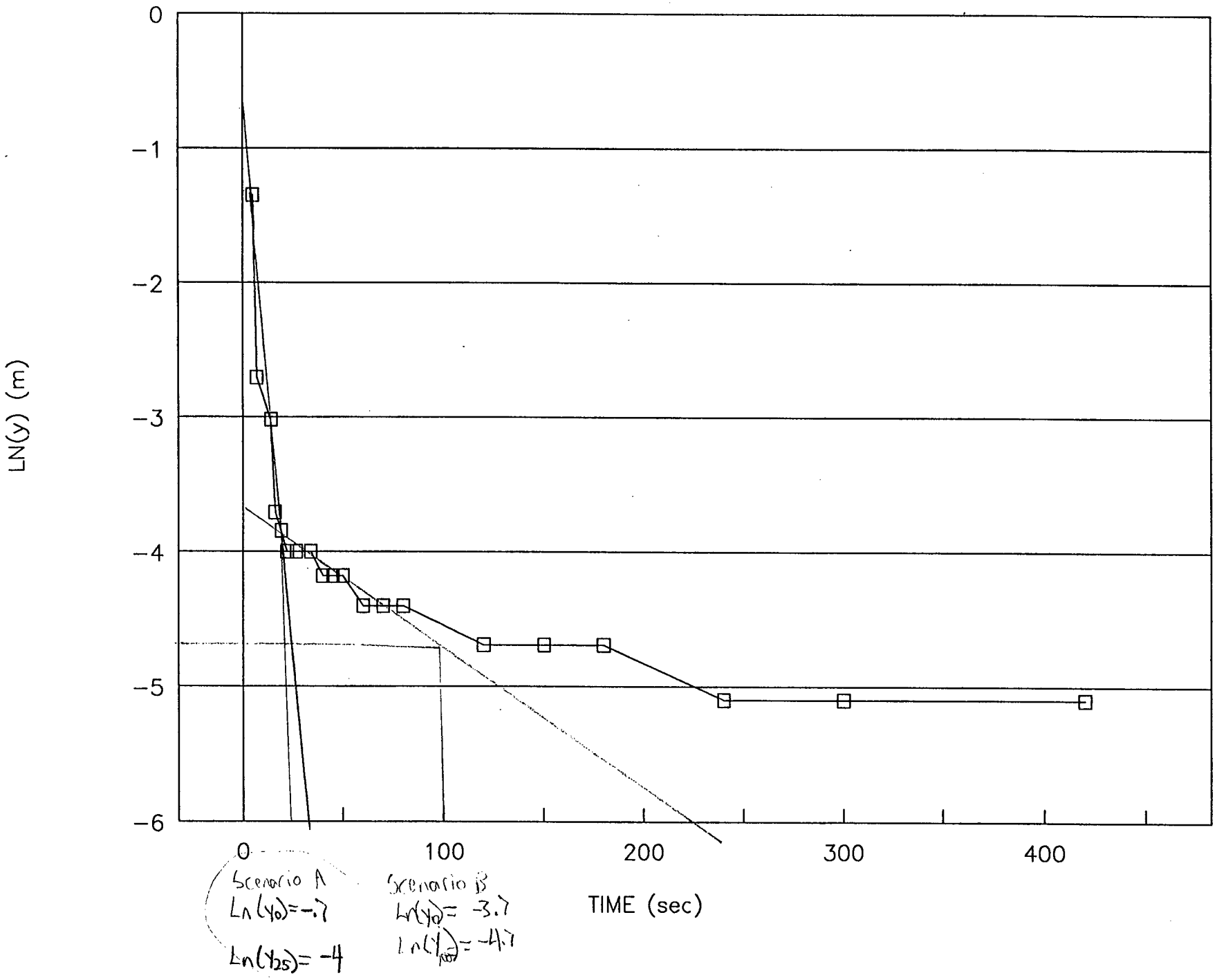
K = 1.490E-02 cm/sec

rph

03-Feb-92

SLUG OUT TEST

MW-2



SI-3.WK1

MW-3 SLUG IN TEST

Well Diameter(Rc) =	4	inch			
Screen Length(Le) =	10	FT			
Hole Size =	8	inch	Hole Radius(Rw) =	0.333	FT
Water to Bottom of Well(Lw) =	12.43	FT			
LN(Yo) =	-0.80				
LN(Yt) =	-2.45				
t =	200	sec			
t =	3.33	min			
Le/Rw =	30				
C =	2.0	from Bouwer and Rice Slug Test - An Update			

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 2.69803

LN(Lw/Rw) = 3.619

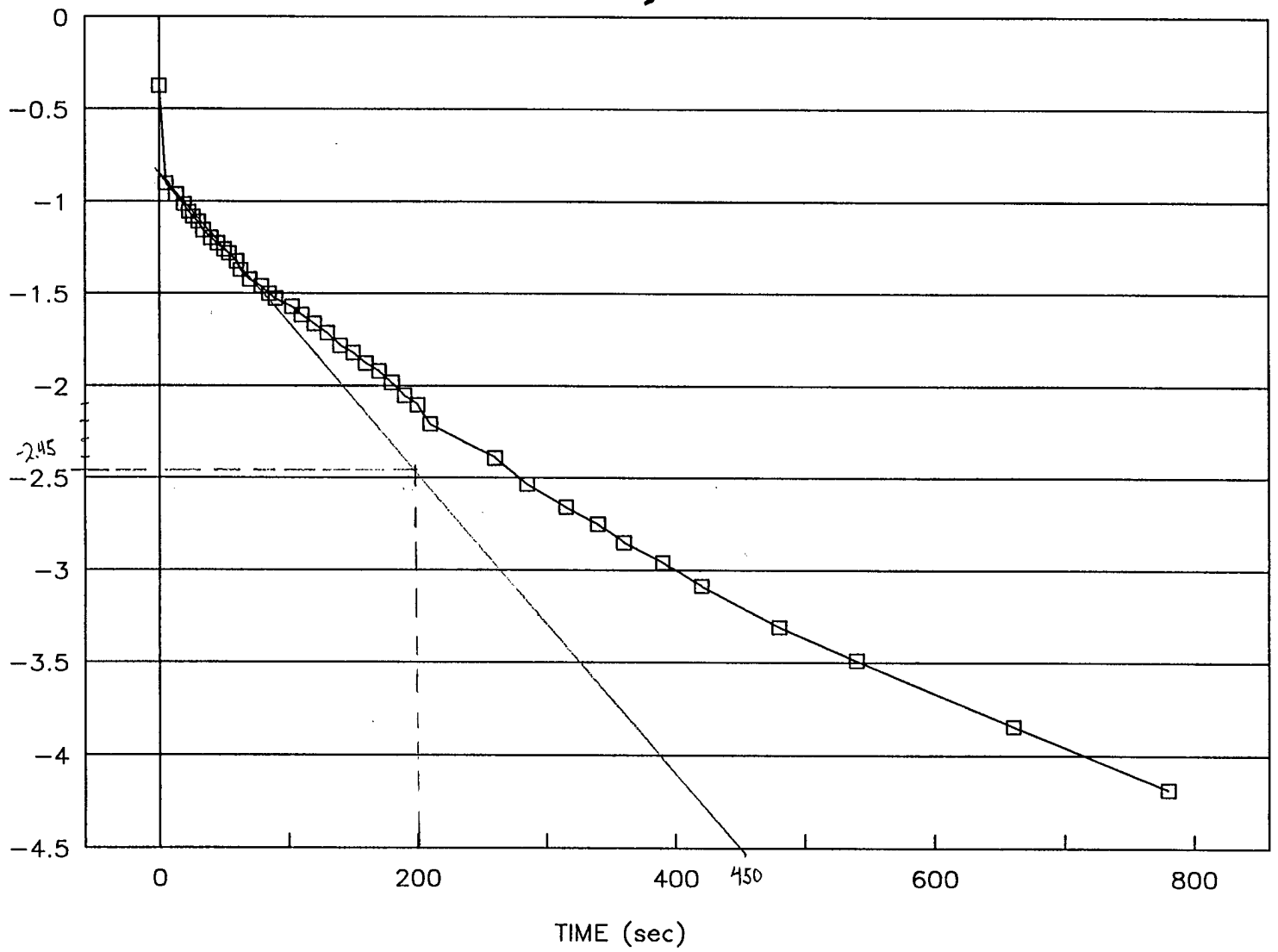
K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 1.855E-03 ft/min

K = 9.423E-04 cm/sec

SLUG IN TEST

MW-3



$Ln(Y_{200}) = -2.45$

$Ln(Y_0) = -8$

SO-3.WK1

MW-3 SLUG OUT TEST

Well Diameter(Rc) =	4	inch			
Screen Length(Le) =	10	FT			
Hole Size =	8	inch	Hole Radius(Rw) =	0.333	FT
Water to Bottom of Well(Lw) =	12.43	FT			
LN(Yo) =	-0.80				
LN(Yt) =	-2.00				
t =	250				
t =	4.17	min			
Le/Rw =	30				
C =	2.0	from Bouwer and Rice Slug Test – An Update			

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 2.69803

LN(Lw/Rw) = 3.619

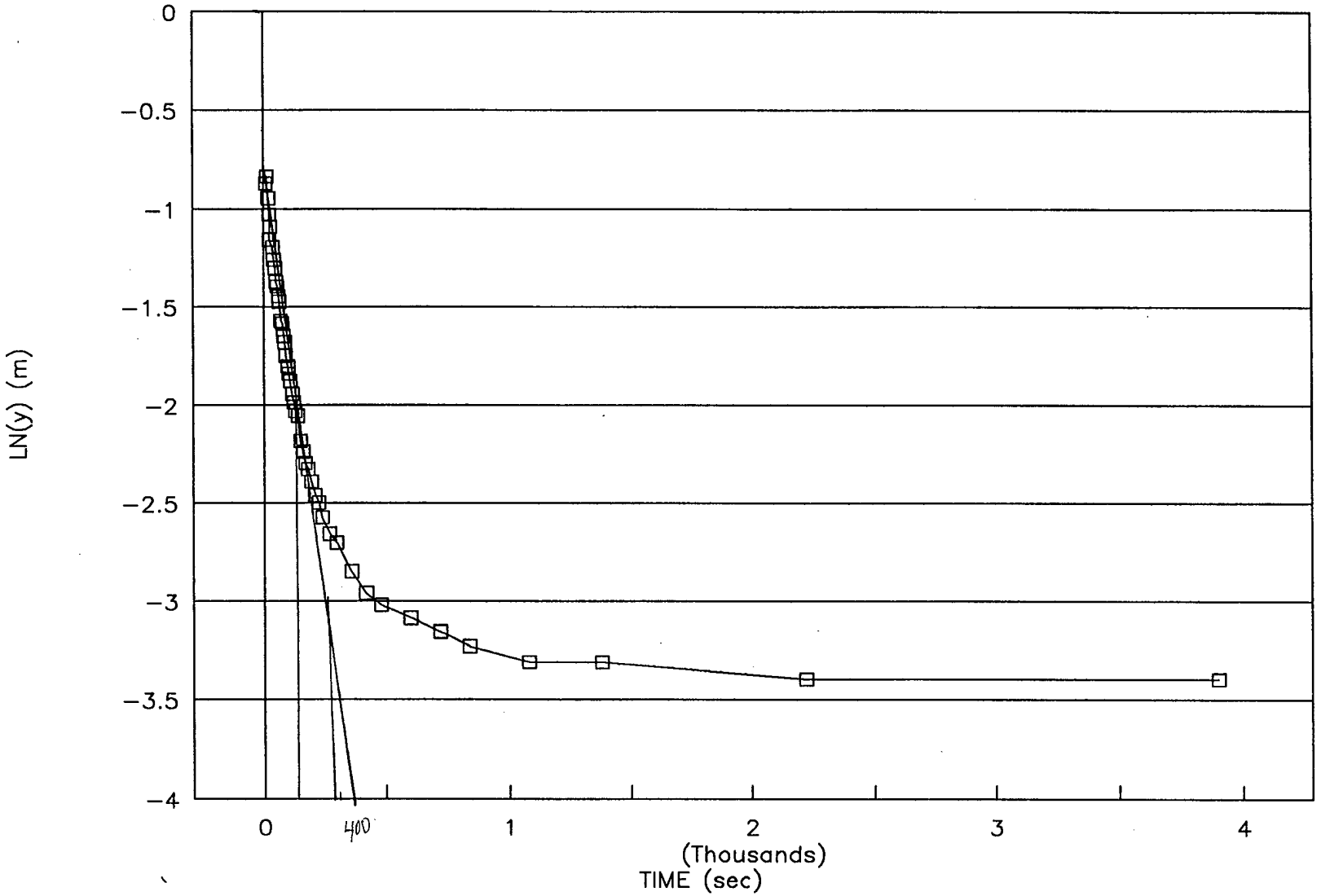
K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 1.079E-03 ft/min

K = 5.482E-04 cm/sec

SLUG OUT TEST

MW-3



$Ln(y_0) = -.8$

$Ln(y_{250}) = -2$

$Ln(y_{550}) = -3$

SI-4.WK1

MW-4 SLUG IN TEST

Well Diameter(Rc) =	4	inch			
Screen Length(Le) =	10	FT			
Hole Size =	8	inch	Hole Radius(Rw) =	0.333	FT
Water to Bottom of Well(Lw) =	26.65	FT			
LN(Yo) =	-0.62				
LN(Yt) =	-1.50				
t =	100	sec			
t =	1.67	min			
Le/Rw =	30				
C =	2.0	from Bouwer and Rice Slug Test - An Update			

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 3.14735

LN(Lw/Rw) = 4.381

K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 2.308E-03 ft/min

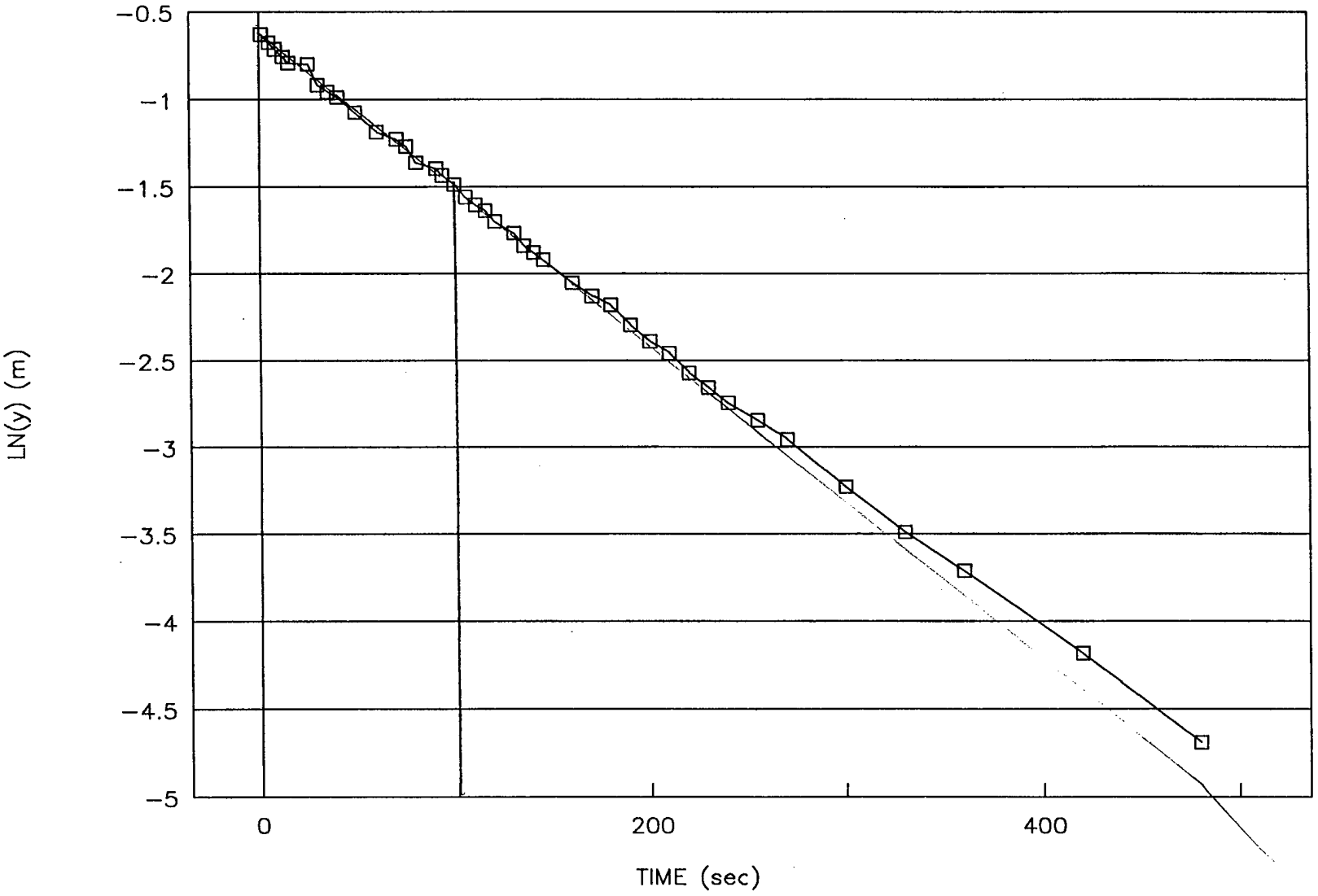
K = 1.172E-03 cm/sec

rph

03-Feb-92

SLUG IN TEST

MW-4



$Ln(y_0) = -.62$

$Ln(y_{100}) = -1.5$

SO-4.WK1

MW-4 SLUG OUT TEST

Well Diameter(Rc) =	4	inch			
Screen Length(Le) =	10	FT			
Hole Size =	8	inch	Hole Radius(Rw) =	0.333	FT
Water to Bottom of Well(Lw) =	26.65	FT			
LN(Yo) =	-0.58				
LN(Yt) =	-3.60				
t =	400	sec			
t =	6.67	min			
Le/Rw =	30				
C =	2.0	from Bouwer and Rice Slug Test - An Update			

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 3.14735

LN(Lw/Rw) = 4.381

K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 1.983E-03 ft/min

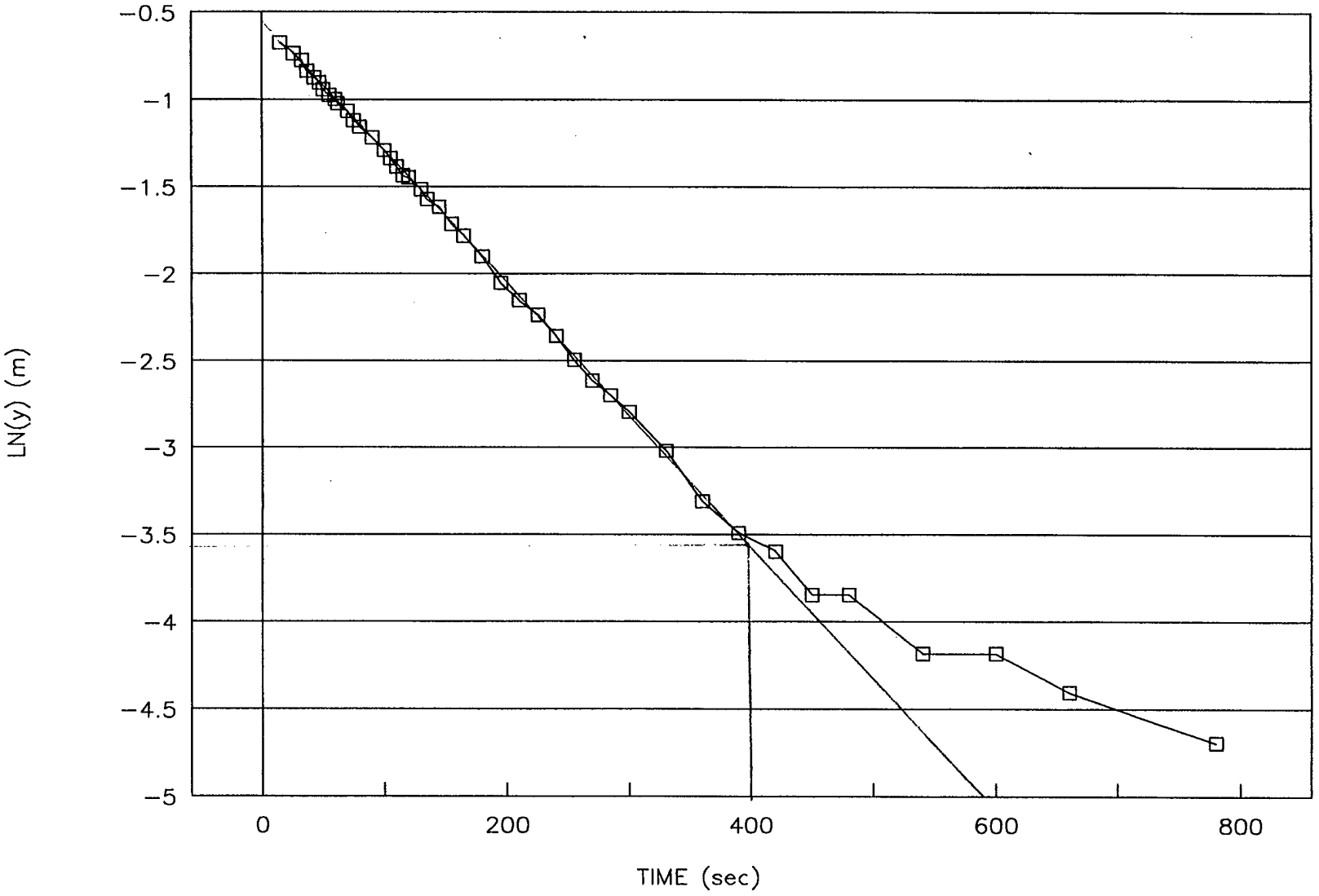
K = 1.008E-03 cm/sec

rph

03-Feb-92

SLUG OUT TEST

MW-4



$Ln(y_0) = -.575$

$Ln(y_{400}) = -3.6$

SI-5.WK1

MW-5 SLUG IN TEST

Well Diameter(Rc) =	4	inch		
Screen Length(Le) =	10	FT		
Hole Size =	8	inch	Hole Radius(Rw) =	0.333 FT
Water to Bottom of Well(Lw) =	22.95	FT		
LN(Yo) =	-1.50			
LN(Yt) =	-4.00			
t =	135	sec		
t =	2.25	min		
Le/Rw =	30			
C =	2.0	from Bouwer and Rice Slug Test - An Update		

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 3.06189

LN(Lw/Rw) = 4.232

K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 4.725E-03 ft/min

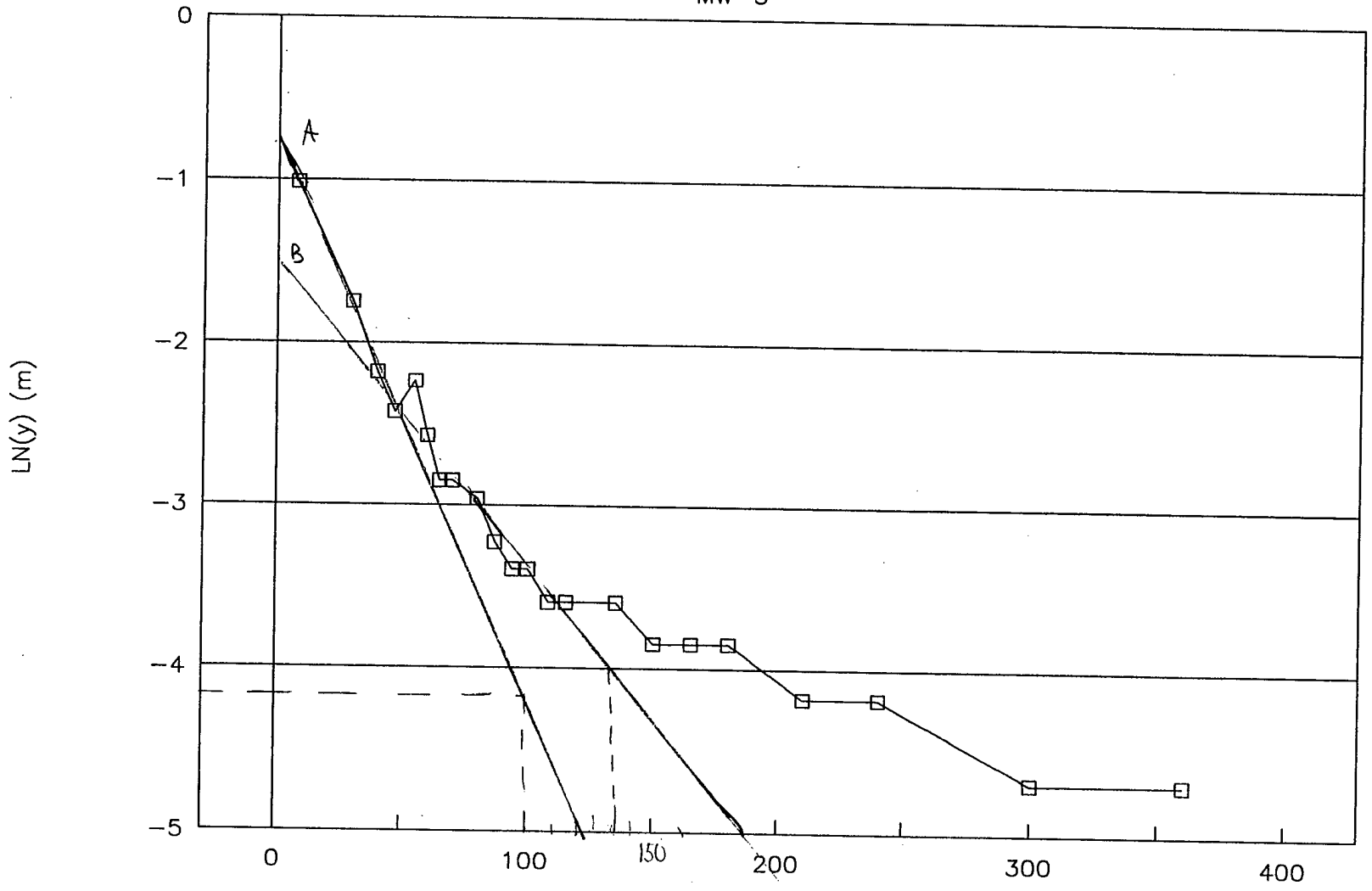
K = 2.400E-03 cm/sec

rph

03-Feb-92

SLUG IN TEST

MW-5



SCENARIO A

$Ln(y_0) = -.75$

$Ln(y_{100}) = -4.15$

SCENARIO B

$Ln(y_0) = -1.5$

$Ln(y_{135}) = -4.0$

SO-5.WK1

MW-5 SLUG OUT TEST

Well Diameter(Rc) =	4	inch			
Screen Length(Le) =	10	FT			
Hole Size =	8	inch	Hole Radius(Rw) =	0.333	FT
Water to Bottom of Well(Lw) =	22.95	FT			
LN(Yo) =	-0.88				
LN(Yt) =	-4.05				
t =	100	sec			
t =	1.67	min			
Le/Rw =	30				
C =	2.0	from Bouwer and Rice Slug Test - An Update			

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 3.06189

LN(Lw/Rw) = 4.232

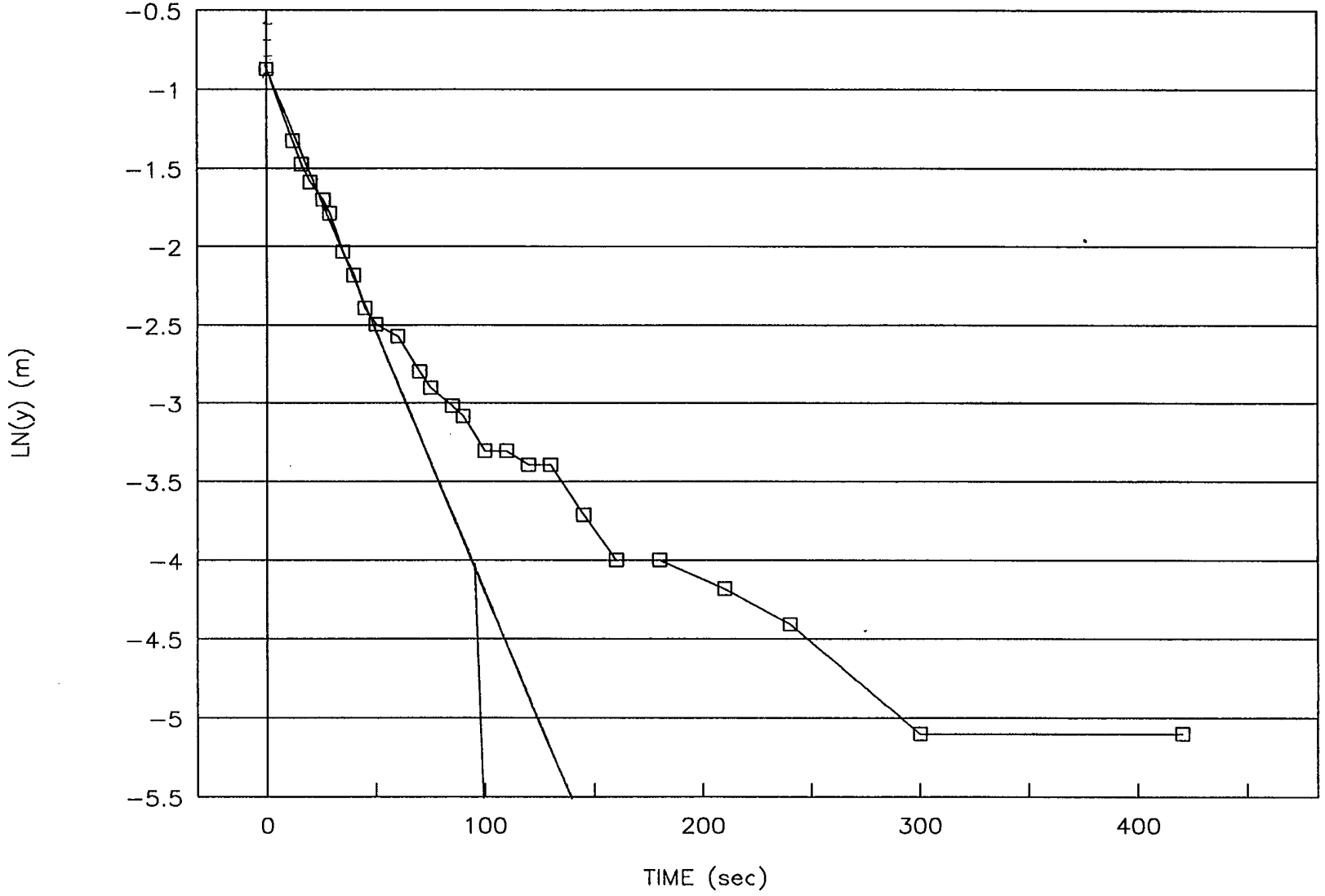
K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 8.089E-03 ft/min

K = 4.109E-03 cm/sec

SLUG OUT TEST

MW-5



$Ln(y_0) = -.88$

$Ln(y_{100}) = -4.05$

SO-6.WK1

MW-6 SLUG OUT TEST

Well Diameter(Rc) =	4	inch			
Screen Length(Le) =	10	FT			
Hole Size =	8	inch	Hole Radius(Rw) =	0.333	FT
Water to Bottom of Well(Lw) =	10.98	FT			
LN(Yo) =	-0.35				
LN(Yt) =	-2.45				
t =	60	sec			
t =	1.00	min			
Le/Rw =	30				
C =	2.0	from Bouwer and Rice Slug Test - An Update			

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 2.62171

LN(Lw/Rw) = 3.495

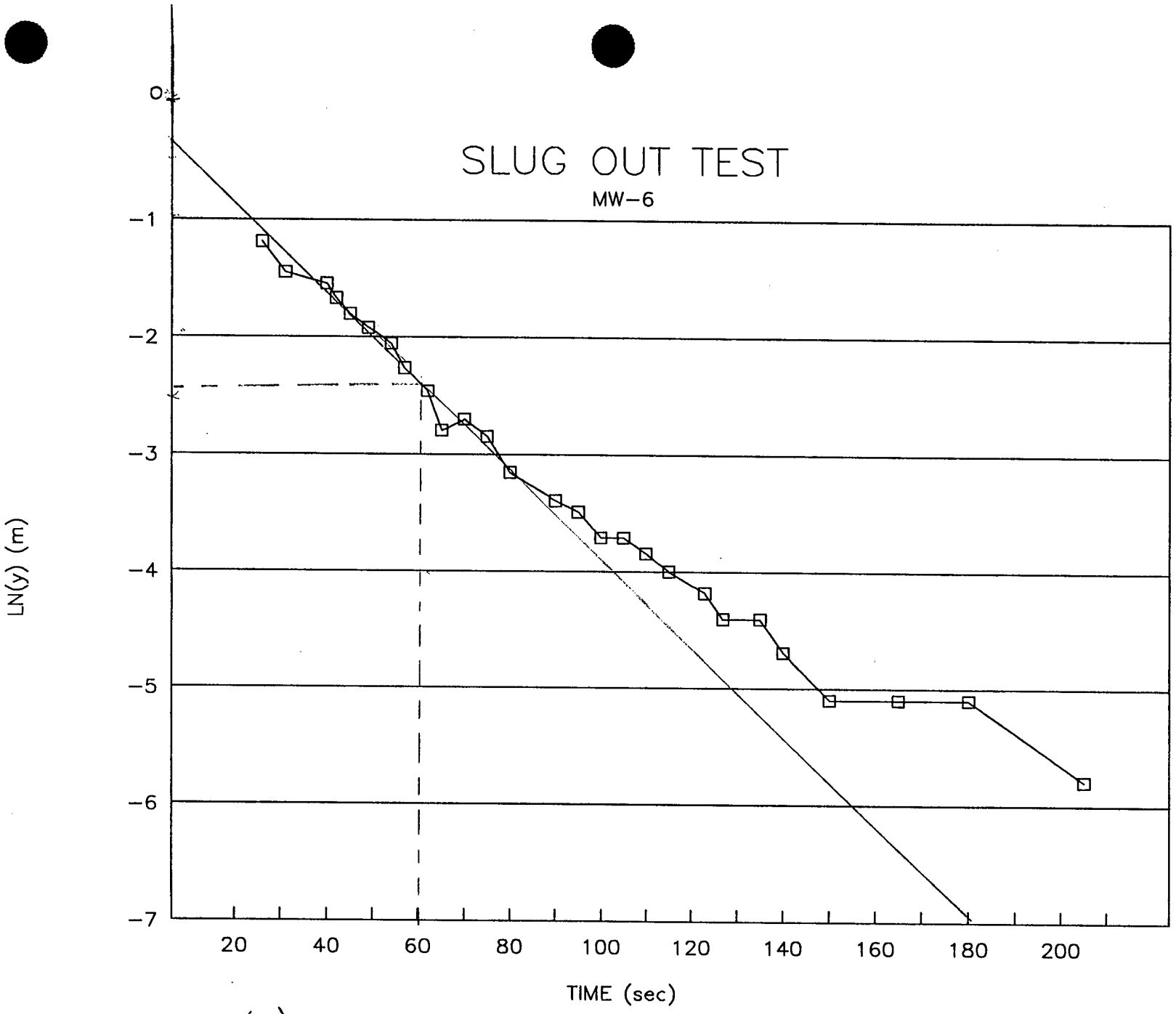
K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 7.647E-03 ft/min

K = 3.885E-03 cm/sec

rph

03-Feb-92



Ln (y0) = -.35

Ln (y60) = -2.45

SI-6.WK1

MW-6 SLUG IN TEST

Well Diameter(Rc) =	4	inch			
Screen Length(Le) =	10	FT			
Hole Size =	8	inch	Hole Radius(Rw) =	0.333	FT
Water to Bottom of Well(Lw) =	10.98	FT			
LN(Yo) =	-0.40				
LN(Yt) =	-3.75				
t =	100	sec			
t =	1.67	min			
Le/Rw =	30				
C =	2.0	from Bouwer and Rice Slug Test - An Update			

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 2.62171

LN(Lw/Rw) = 3.495

K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 7.319E-03 ft/min

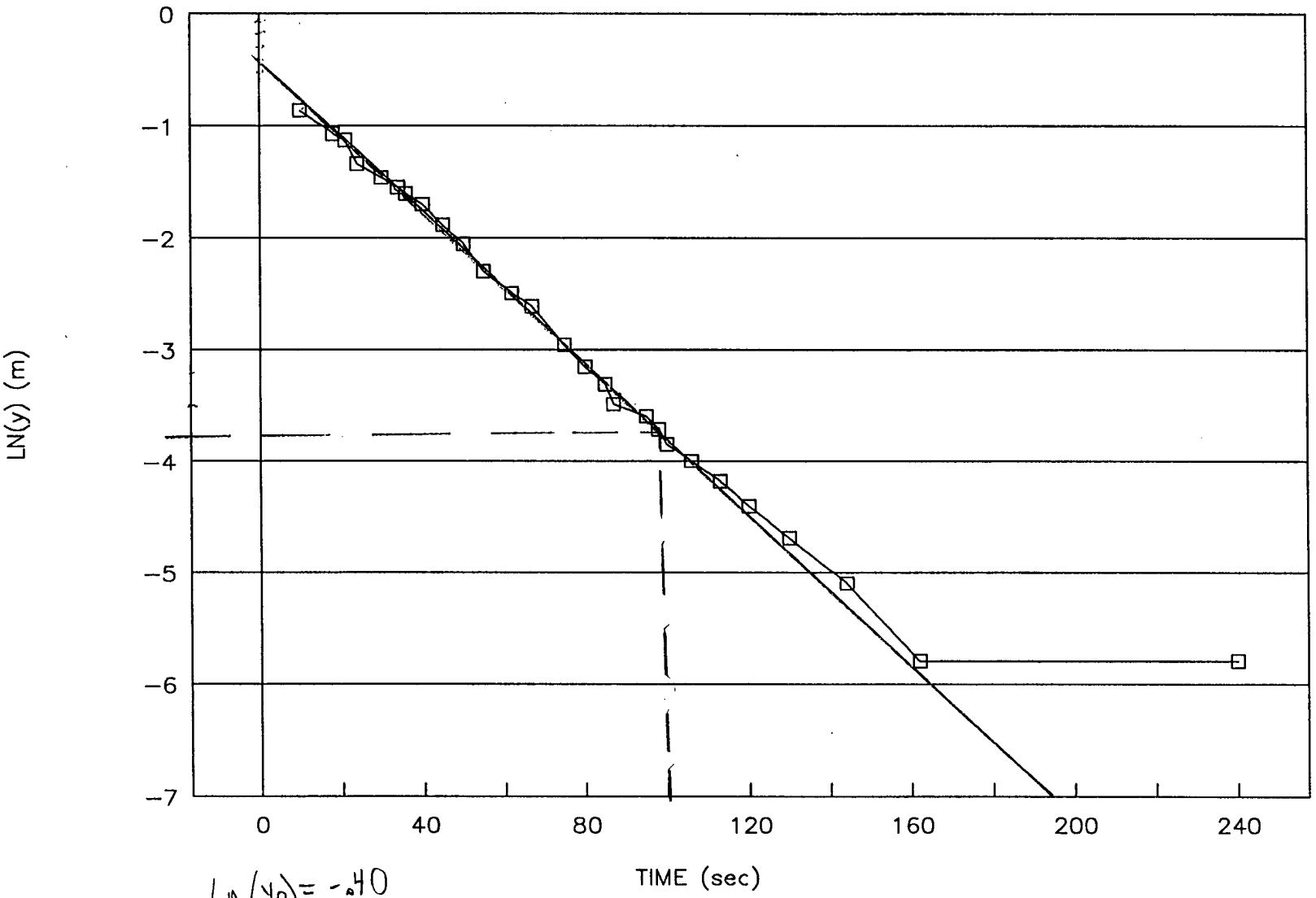
K = 3.718E-03 cm/sec

rph

03-Feb-92

SLUG IN TEST

MW-6



$Ln(y_0) = -.40$

$Ln(y_{100}) = -3.75$

SI-7.WK1

MW-7 SLUG IN TEST

Well Diameter(Rc) =	4	inch			
Screen Length(Le) =	10	FT			
Hole Size =	8	inch	Hole Radius(Rw) =	0.333	FT
Water to Bottom of Well(Lw) =	24.78	FT			
LN(Yo) =	-2.40				
LN(Yt) =	-4.00				
t =	55	sec			
t =	0.92	min			
Le/Rw =	30				
C =	2.0	from Bouwer and Rice Slug Test - An Update			

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 3.10591

LN(Lw/Rw) = 4.309

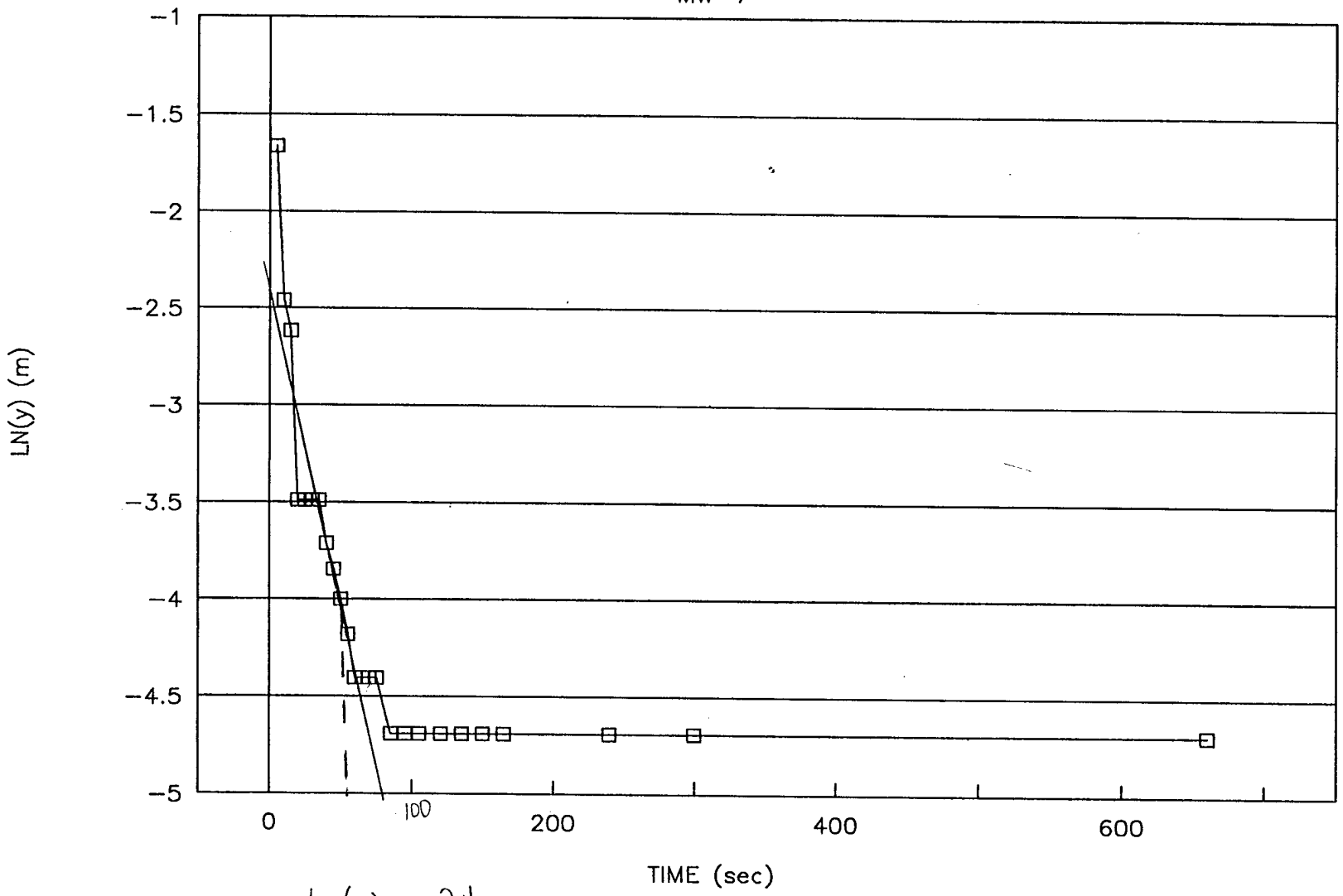
K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 7.529E-03 ft/min

K = 3.825E-03 cm/sec

SLUG IN TEST

MW-7



$Ln(y_0) = -2.4$

$Ln(y_{55}) = -4$

SO-7.WK1

MW-7 SLUG OUT TEST

Well Diameter(Rc) =	4	inch			
Screen Length(Le) =	10	FT			
Hole Size =	8	inch	Hole Radius(Rw) =	0.333	FT
Water to Bottom of Well(Lw) =	24.78	FT			
LN(Yo) =	-2.10				
LN(Yt) =	-4.55				
t =	70	sec			
t =	1.17	min			
Le/Rw =	30				
C =	2.0	from Bouwer and Rice Slug Test - An Update			

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 3.10591

LN(Lw/Rw) = 4.309

K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 9.059E-03 ft/min

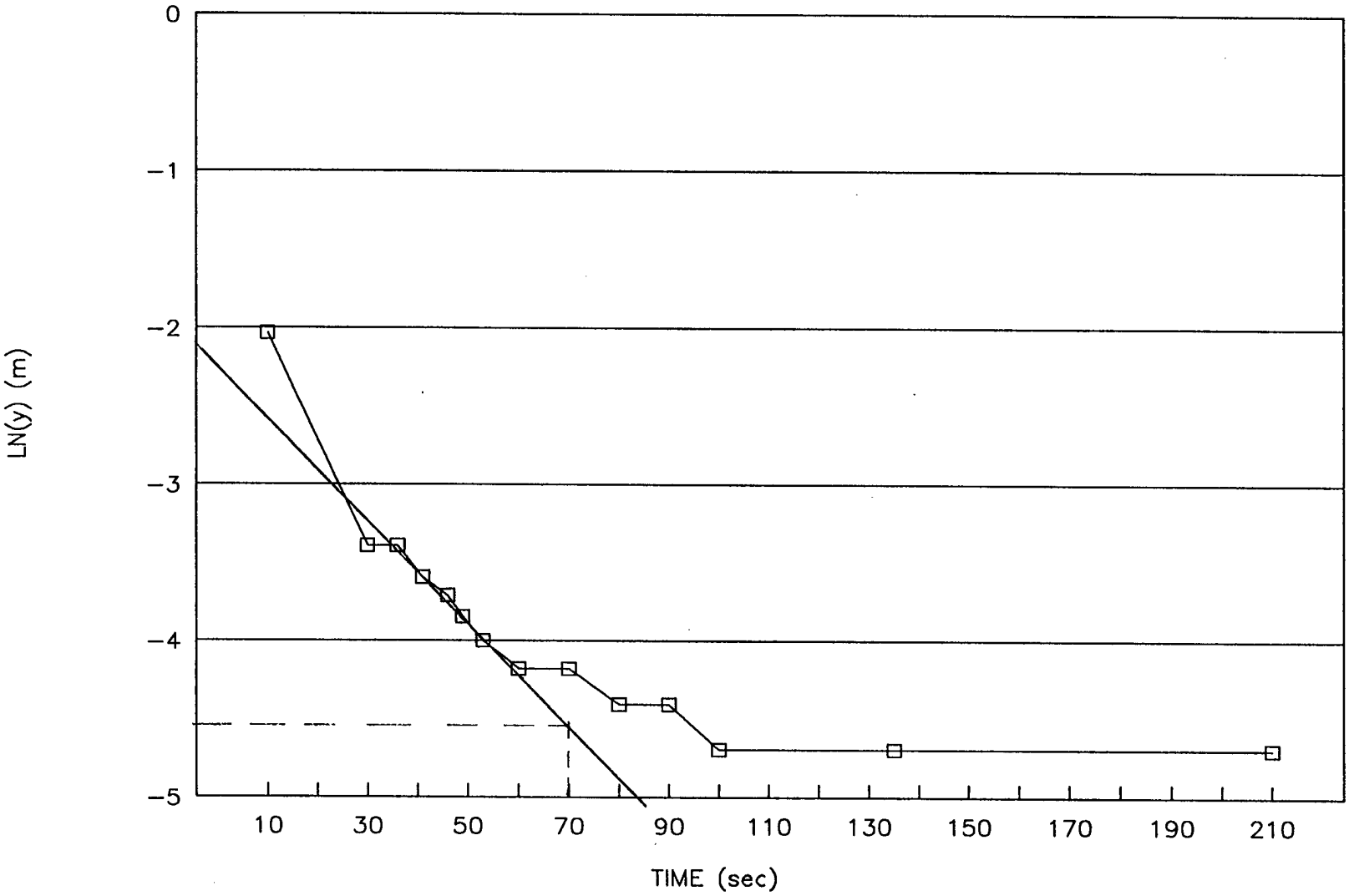
K = 4.602E-03 cm/sec

rph

03-Feb-92

SLUG OUT TEST

MW-7



$Ln(y_0) = -2.1$

$Ln(y_{70}) = -4.55$

SO-8.WK1

MW-8 SLUG IN TEST

Well Diameter(Rc) =	4	inch			
Screen Length(Le) =	10	FT			
Hole Size =	8	inch	Hole Radius(Rw) =	0.333	FT
Water to Bottom of Well(Lw) =	22.17	FT			
LN(Yo) =	-0.61				
LN(Yt) =	-1.30				
t =	100	sec			
t =	1.67	min			
Le/Rw =	30				
C =	2.0	from Bouwer and Rice Slug Test - An Update			

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 3.04195

LN(Lw/Rw) = 4.197

K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 1.749E-03 ft/min

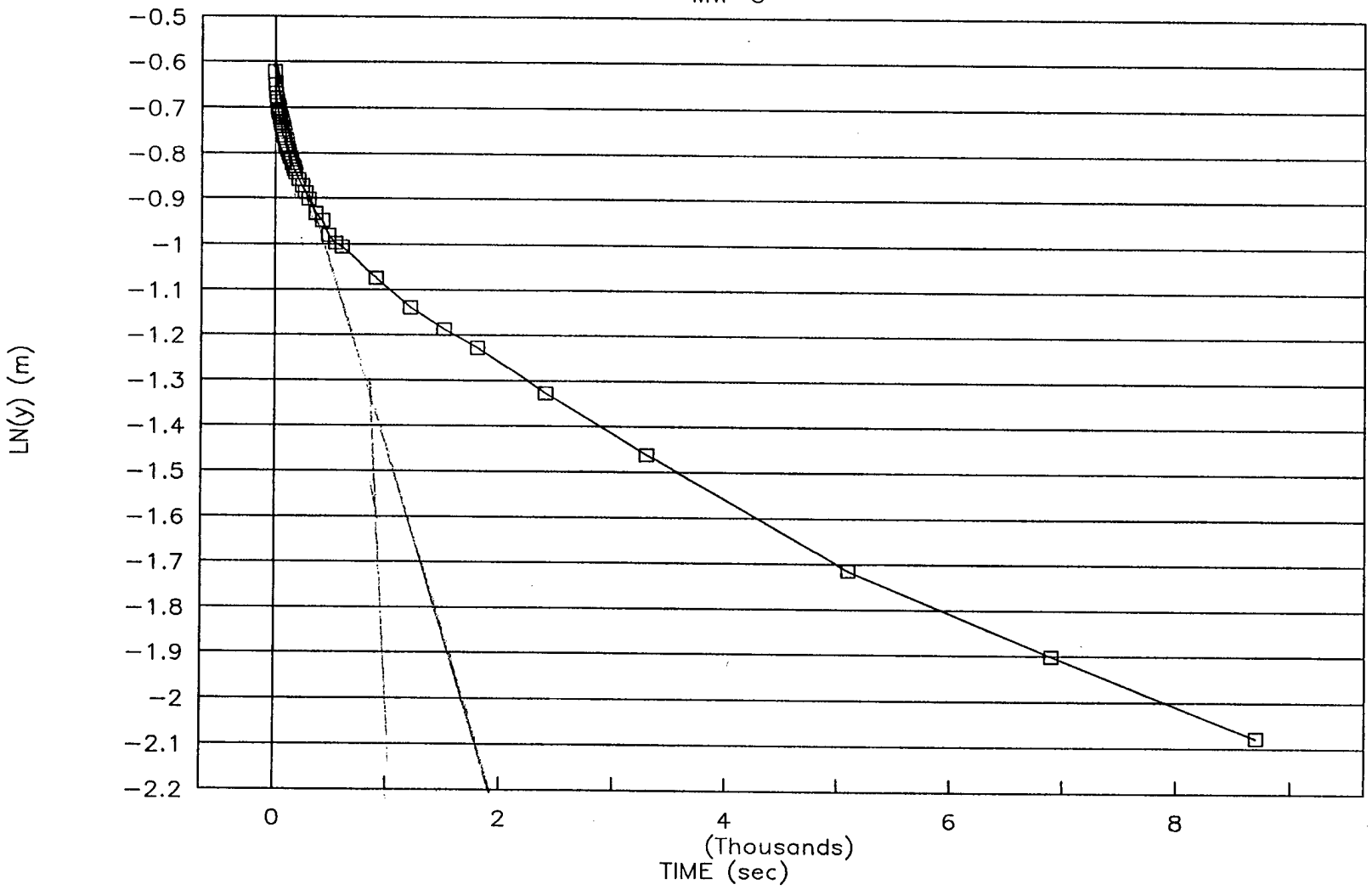
K = 8.886E-04 cm/sec

rph

05-Feb-92

SLUG IN TEST

MW-8



$Ln(y_0) = -.61$

$Ln(y_{100}) = -1.3$

SI-9.WK1

MW-9 SLUG IN TEST

Well Diameter(Rc) =	4	inch		
Screen Length(Le) =	10	FT		
Hole Size =	8	inch	Hole Radius(Rw) =	0.333 FT
Water to Bottom of Well(Lw) =	30.72	FT		
LN(Yo) =	-0.60			
LN(Yt) =	-2.50			
t =	1100	sec		
t =	18.33	min		
Le/Rw =	30			
C =	2.0	from Bouwer and Rice Slug Test - An Update		

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 3.22747

LN(Lw/Rw) = 4.524

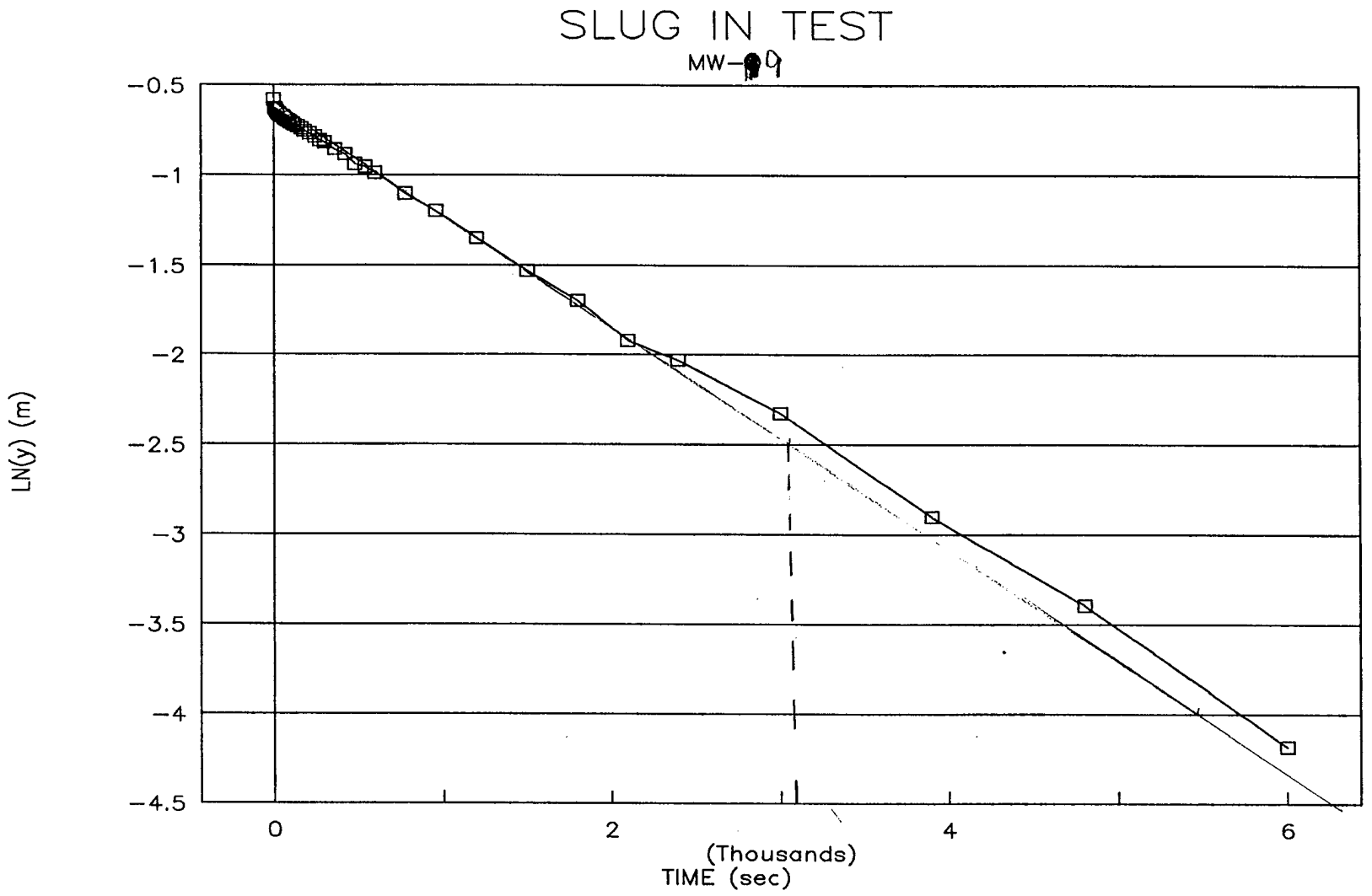
K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 4.646E-04 ft/min

K = 2.360E-04 cm/sec

rph

05-Feb-92



$Ln(y_0) = -.6$

$Ln(y_{1100}) = -2.5$

SI-16.WK1

MW-16 SLUG IN TEST

Well Diameter(Rc) =	4	inch			
Screen Length(Le) =	10	FT			
Hole Size =	8	inch	Hole Radius(Rw) =	0.333	FT
Water to Bottom of Well(Lw) =	10.69	FT			
LN(Yo) =	-1.00				
LN(Yt) =	-3.00				
t =	100	sec			
t =	1.67	min			
Le/Rw =	30				
C =	2.0	from Bouwer and Rice Slug Test - An Update			

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 2.60512

LN(Lw/Rw) = 3.468

K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 4.342E-03 ft/min

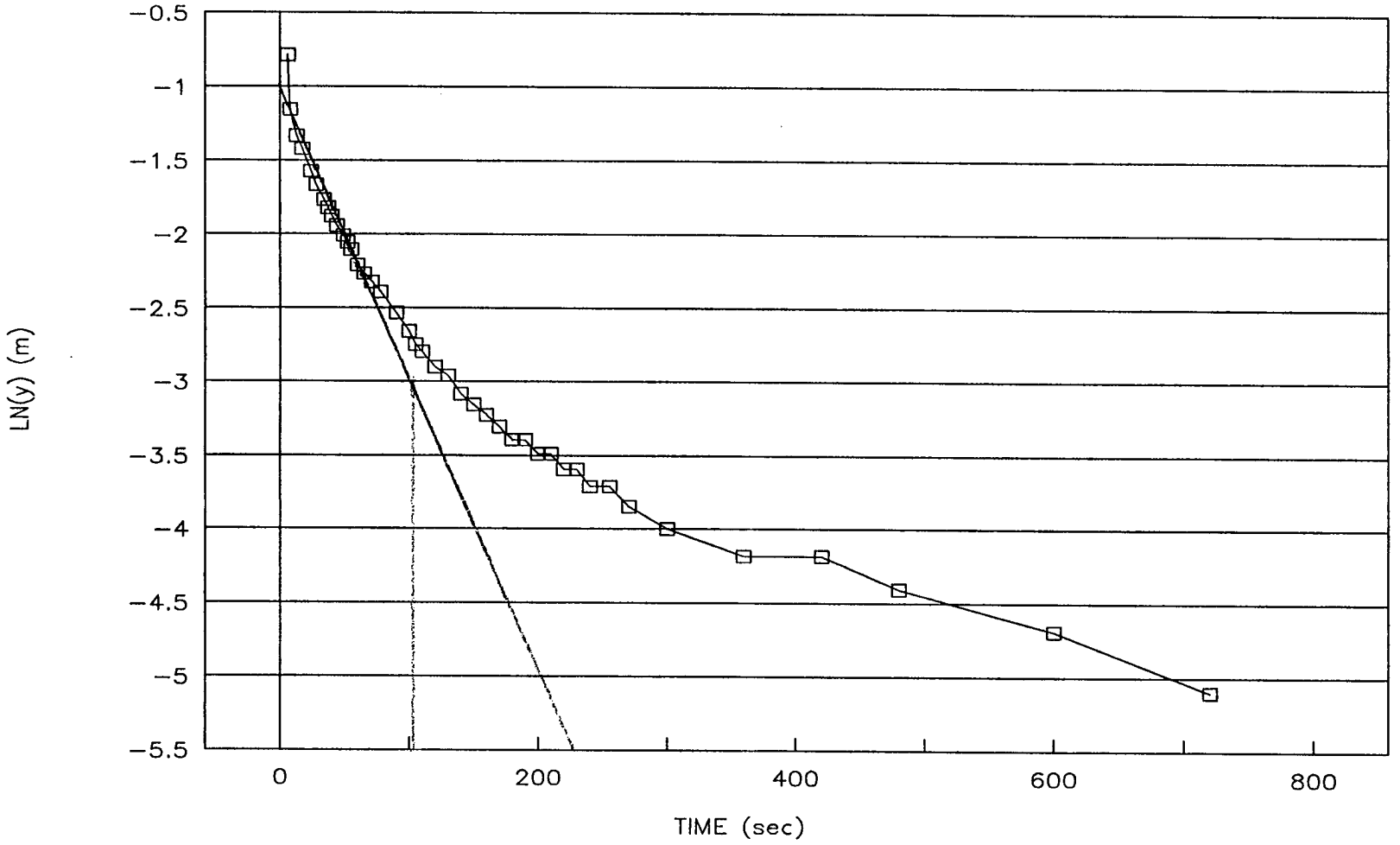
K = 2.206E-03 cm/sec

rph

05-Feb-92

SLUG IN TEST

MW-16



$Ln(y_0) = -1$

$Ln(y_{100}) = -3$

SO-16.WK1

MW-16 SLUG OUT TEST

Well Diameter(Rc) =	4	inch			
Screen Length(Le) =	10	FT			
Hole Size =	8	inch	Hole Radius(Rw) =	0.333	FT
Water to Bottom of Well(Lw) =	10.69	FT			
LN(Yo) =	-1.10				
LN(Yt) =	-2.72				
t =	100	sec			
t =	1.67	min			
Le/Rw =	30				
C =	2.0	from Bouwer and Rice Slug Test – An Update			

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 2.60512

LN(Lw/Rw) = 3.468

K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 3.517E-03 ft/min

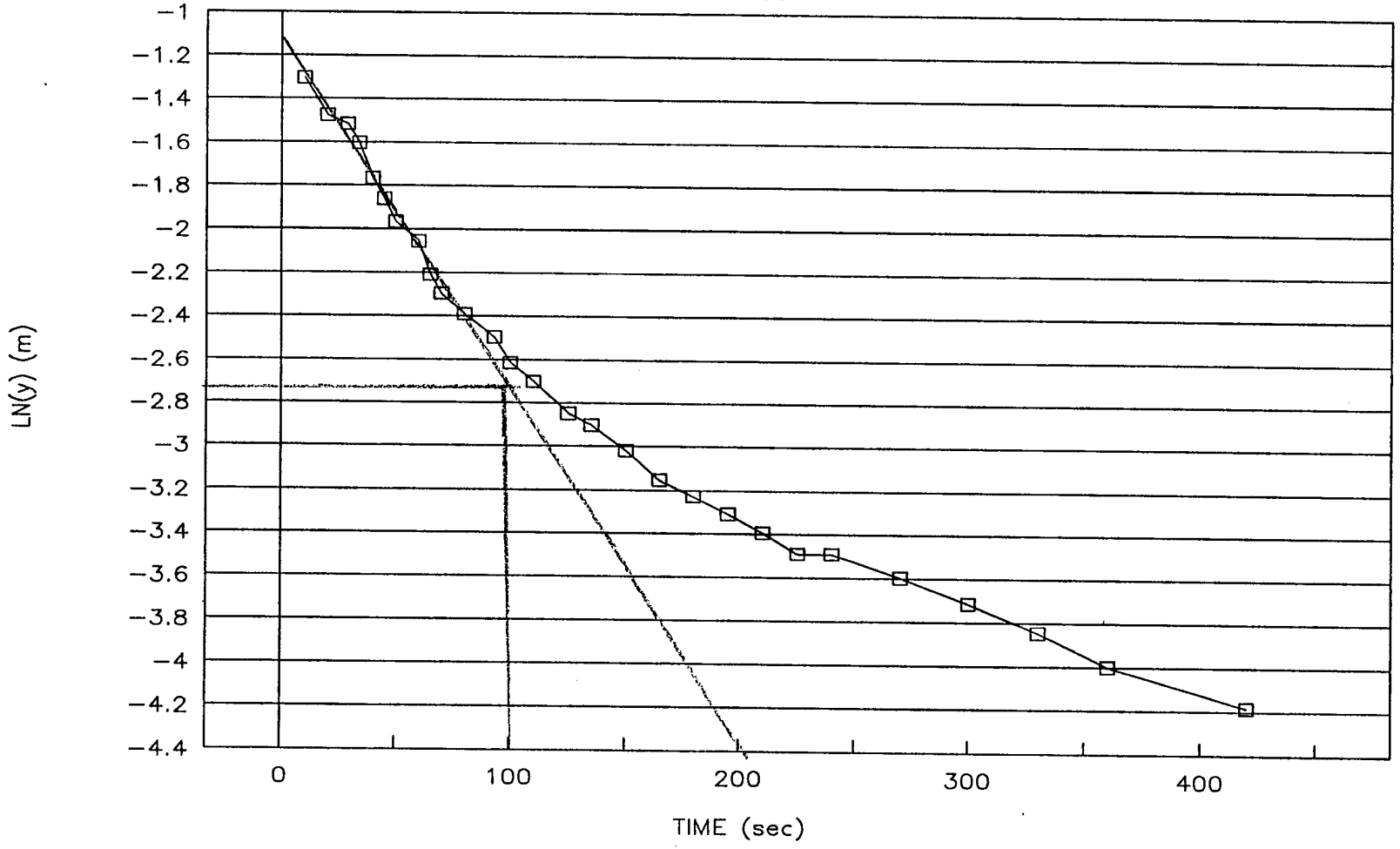
K = 1.787E-03 cm/sec

rph

05-Feb-92

SLUG OUT TEST

MW-16



$Ln(y_0) = -1.1$

$Ln(y_{100}) = -2.12$

SO-18.WK1

MW-18 SLUG OUT TEST

Well Diameter(Rc) =	4	inch			
Screen Length(Le) =	10	FT			
Hole Size =	8	inch	Hole Radius(Rw) =	0.333	FT
Water to Bottom of Well(Lw) =	29.97	FT			
LN(Yo) =	-1.56				
LN(Yt) =	-2.60				
t =	100	sec			
t =	1.67	min			
Le/Rw =	30				
C =	2.0	from Bouwer and Rice Slug Test - An Update			

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 3.21362

LN(Lw/Rw) = 4.499

K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 2.785E-03 ft/min

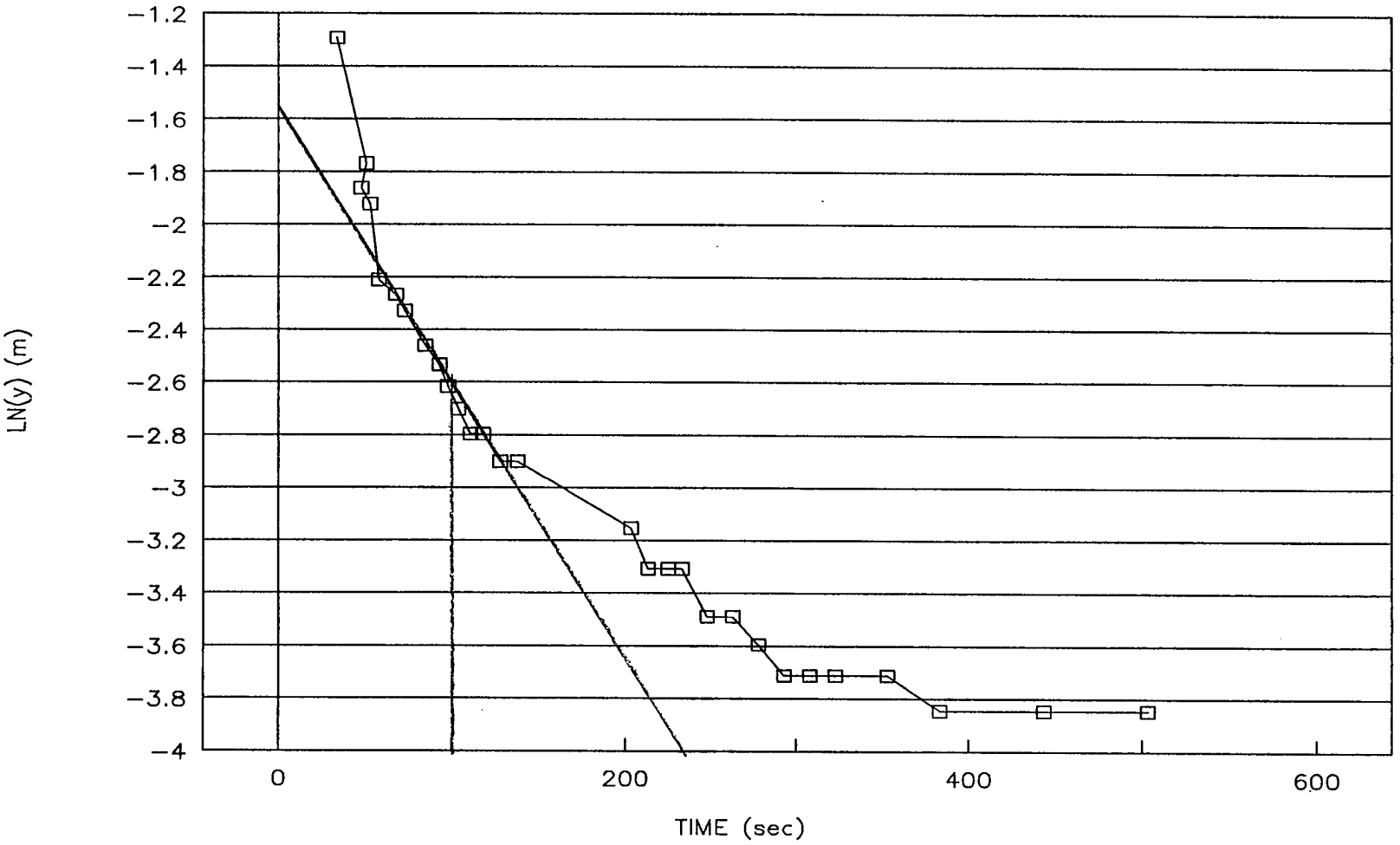
K = 1.415E-03 cm/sec

rph

05-Feb-92

SLUG OUT TEST

MW-18



$Ln(y_0) = -1.56$

$Ln(y_{100}) = -2.6$

SI-18.WK1

MW-18 SLUG IN TEST

Well Diameter(Rc) =	4	inch			
Screen Length(Le) =	10	FT			
Hole Size =	8	inch	Hole Radius(Rw) =	0.333	FT
Water to Bottom of Well(Lw) =	29.97	FT			
LN(Yo) =	-1.00				
LN(Yt) =	-3.30				
t =	100	sec			
t =	1.67	min			
Le/Rw =	30				
C =	2.0	from Bouwer and Rice Slug Test - An Update			

ln(Re/Rw) = (1.1/ln(Lw/Rw)+(C/(Le/Rw))^-1

ln(Re/Rw) = 3.21362

LN(Lw/Rw) = 4.499

K = (Rc^2*LN(Re/Rw))/2Le/t*LN(Yo/Yt)

K = 6.159E-03 ft/min

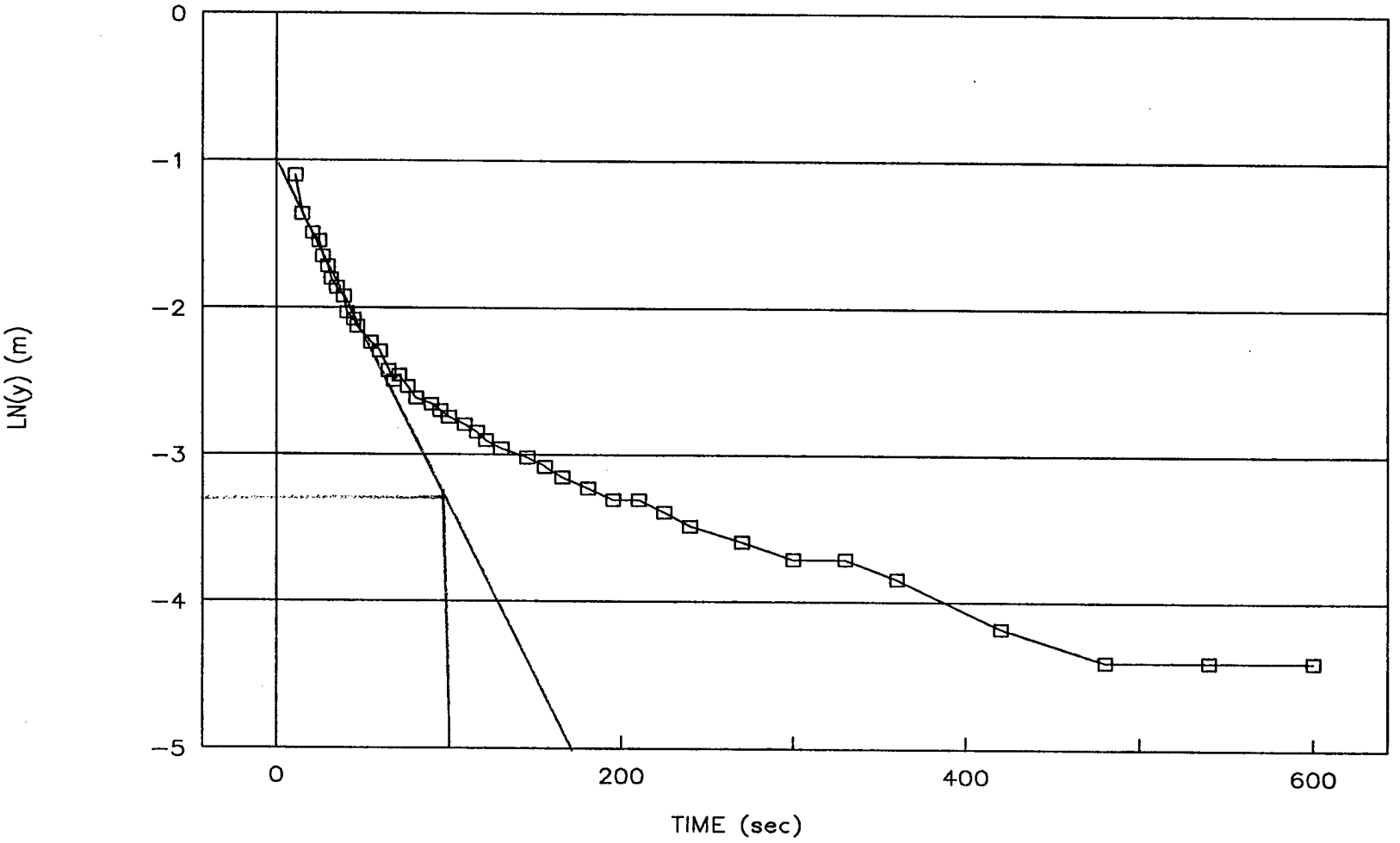
K = 3.129E-03 cm/sec

rph

05-Feb-92

SLUG IN TEST

MW-18



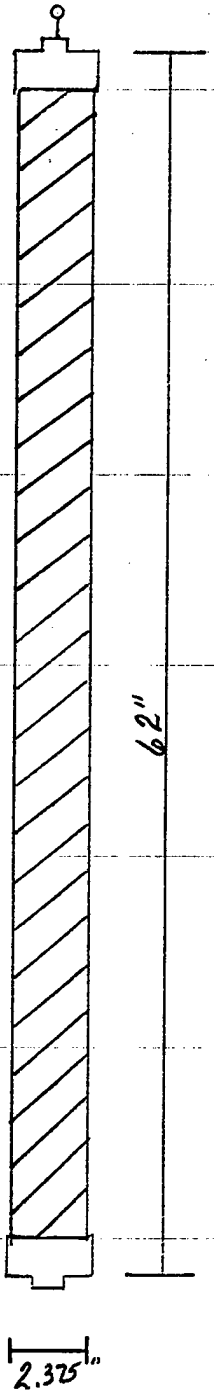
$Ln(y_0) = -1$

$Ln(y_{100}) = -3.3$

Project LBAD | Acct. No. | Page 1 of 1

Subject WATER DISPLACEMENT FOR | Comptd. By RICK JONES | Date 17 DEC 91

Detail SLUG TESTS | Ck'd. By | Date



$V = \pi r^2 h$

$V = 3.14 (1.19^2) h$

$V = 3.14 (1.42) 62$

$V = 276.45 \text{ in}^3$

1 CUBIC FOOT = 1728 in^3

$276.45 \div 1728 = 0.15998 \text{ ft}^3$

$7.48 \text{ gal} / 1 \text{ ft}^3$

$7.48 \times 0.15998 = 1.197 \text{ gal}$

ROUNDED TO 1.2 gal

4" CASING HAS 0.6528 GAL/FT

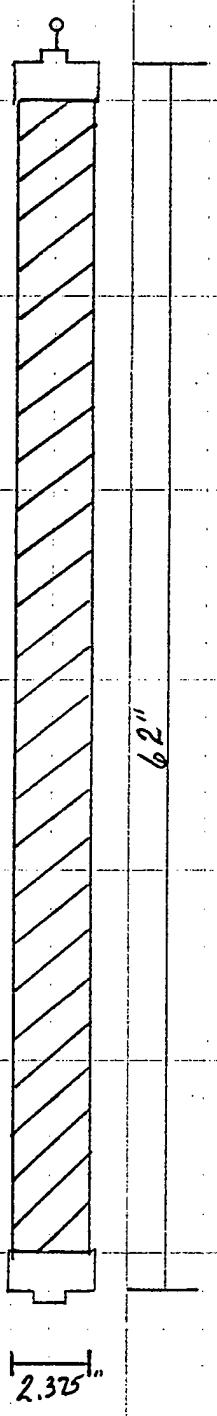
DISPLACEMENT OF SLUG WILL CHANGE STATIC WATER LEVEL BY 1.8 FEET

SLUG IS CONSTRUCTED OF 2" SCH. 40 PVC, TEFLON TAPE, 3" BOLTS, EYE BOLT AND FILLED WITH SAND.

Project LBAD | Acct. No. | Page 1 of 1

Subject WATER DISPLACEMENT FOR | Comptd. By RICK JONES | Date 17 DEC 91

Detail SLUG TESTS | Ck'd. By | Date



$V = \pi r^2 h$

$V = 3.14 (1.19^2) h$

$V = 3.14 (1.42) 62$

$V = 276.45 \text{ in}^3$

1 CUBIC FOOT = 1728 in^3

$276.45 \div 1728 = 0.15998 \text{ ft}^3$

7.48 gal / 1 ft^3

$7.48 \times 0.15998 = 1.197$ gal

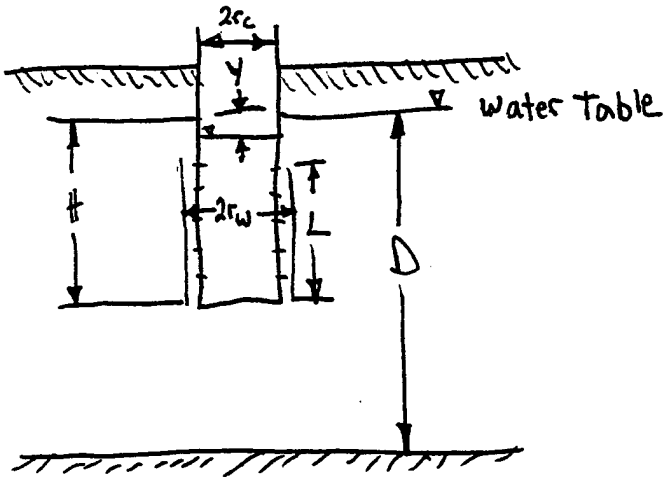
ROUNDED TO 1.2 gal

4" CASING HAS 0.6528 GAL/FT

DISPLACEMENT OF SLUG WILL CHANGE STATIC WATER LEVEL BY 1.84 FEET

SLUG IS CONSTRUCTED OF 2" SCH. 40 PVC, TEFLON TAPE, 3" BOLTS, EYE BOLT AND FILLED WITH SAND.

Example



$R_c = 4in$

$R_w = 8in$

$L_e = 10ft$

$D = 80m$
$H = 5.5m$
$L = 4.56m$
$r_c = .076m$
$r_w = .12m$

Volume = .32m placed below the water level

$y_0 = .29m$

① $t = 20s$ $y = .0025m$

$\frac{1}{t} \ln \frac{y_0}{y_t} = \frac{1}{20} \ln \frac{.29}{.0025} = .238$

$L/r_w = 4.56m/.12m = 38$

$A = 2.6$ + $B = .42$ From Fig 3

$$\ln \frac{Re}{r_w} = \left[\frac{1.1}{\ln(H/r_w)} + \frac{A + B \ln [D-H]/r_w}{L/r_w} \right]^{-1}$$

$\ln [D-H]/r_w = \ln [80-5.5]/.12 = 36 \Rightarrow 6$

$$\ln \frac{Re}{r_w} = \left[\frac{1.1}{\ln(5.5/.12)} + \frac{2.6 + .42(6)}{38} \right]^{-1} =$$

$$\ln \frac{Re}{r_w} = (.42)^{-1} = 2.37$$

$$K = \frac{1}{t} \ln \left(\frac{y_0}{y_t}\right) \frac{r_c^2}{2L} \ln \left(\frac{Re}{R_w}\right) = \frac{1}{20} \ln \left(\frac{.29}{.0025}\right) \frac{.076^2}{2(4.56)} (2.37) =$$

$$= .238 \; (2.37) \left(\frac{.076^2}{2(4.56)}\right) = .00086 \; m/s$$

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-1

Date: DEC 19, 1991

Logged By: JONES

SLUG IN ___ SLUG OUT ___

SLUG DISPLACEMENT

Static Water Level:

SLUG IN					SLUG OUT					
WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
		NO SLUG TEST PERFORMED.								
		THIS WELL IS PLUGGED @ SAND								
		PACK & SCREEN. IT HAS NOT								
		BEEN DEVELOPED YET.								

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-2

Date: DEC 17, 1991

Logged By: LOWRY / SMITH

SLUG IN ~~X~~ SLUG OUT ___

SLUG DISPLACEMENT ___

Static Water Level: 31.19' TOC

WATER LEVEL	SLUG IN Time	Δ TIME		~~SLUG OUT~~ TIME	Δ TIME				OBSERVATIONS
22.75	0.0								
30.82	:05								
30.95	:10								
31.04	:15								
31.05	:20								
31.06	:25								
31.07	:30								
31.07	:35								
31.07	:40								
31.07	:45								
31.08	:50								
31.08	1:00								
31.08	1:10								
31.08	1:20								
31.08	1:30								
31.08	1:40								
31.08	1:50								
31.09	2:20								
31.09	2:50								
31.09	3:50								
31.10	4:50								
31.10	5:50								

Comments:

F2-035

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-2

Date: DEC 17, 1991

Logged By:

SLUG IN — SLUG OUT X

SLUG DISPLACEMENT

Static Water Level:

SLUG IN

WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME
31.10	0			1450
31.95	5			
31.32	7			
31.26	14			
31.18	16			
31.17	19			
31.16	22			
31.16	27			
31.16	34			
31.15	40			
31.15	45			
31.15	50			
31.14	1:00			
31.14	1:10			
31.14	1:20			
31.13	2:00			

SLUG OUT

WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
					TOC

Comments:

D1 -- D71

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-2

Date: DEC 17, 1991

Logged By:

SLUG IN — SLUG OUT X

SLUG DISPLACEMENT

Static Water Level:

SLUG IN					SLUG OUT					
WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
					31.13	2:30				
					31,13	3:00				
					31.12	4:00				
					31:12	5:00				
					31.12	7:00				
					END OF TEST					

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-03

Date: DEC 18, 1991

Logged By: James Smith Lowry

SLUG IN X SLUG OUT X

SLUG DISPLACEMENT 1.2 gal

Static Water Level: 10.57

SLUG IN					SLUG OUT					
WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
10.57	~~0903~~			0903	10.53	STATIC			0937	
	0	SLUG IN		0910		0	SLUG OUT		0937	
9.31	05				11.90	:10				
9.24	13				11.95	:15				
9.32	19				11.80	:19				
9.38	23				11.70	:24				
9.43	26				11.63	:27				
9.46	30				11.56	:33				
9.49	34				11.52	:37				
9.54	40				11.46	:41				
9.58	45				11.42	:46				
9.61	50				11.36	:50				
9.64	54				11.34	:55				
9.66	1:00				11.30	1:00				
9.70	103				11.28	1:05				

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-03

Date: DEC 18, 1991

Logged By: James Smith Lowry

SLUG IN X SLUG OUT X

SLUG DISPLACEMENT 1.2 gal

Static Water Level: 10.57

SLUG IN					SLUG OUT					
WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
					11.21	1:10				
9.74	110									
					11.20	1:17				
9.78	119									
					11.16	1:21				
9.81	125									
					11.14	1:25				
9.84	130									
					11.10	1:30				
9.86	1:35									
					11.07	1:38				
9.89	143									
					11.05	1:42				
9.92	1:50									
					11.03	1:48				
9.95	200									
	~~2:10~~				11.00	1:56				
9.98	210									
					10.98	2:04				
10.02	220									
					10.96	2:08				
10.04	2:30									
					10.95	2:20				
10.07	240									
					10.90	2:30				
10.09	2:50									
					10.88	2:40				
10.12	3:00									
					10.86	2:50				

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-03

Date: DEC 18, 1991

Logged By: Jones Smith Lowry

SLUG IN X SLUG OUT X

SLUG DISPLACEMENT 1.2 gal

Static Water Level: 10.57

SLUG IN

WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME
~~10.15~~	3:10			
10.17	3:20			
10.21	3:30			
10.27	4:20			
10.31	4:45			
10.34	5:15			
10.36	5:40			
10.38	6:00			
10.40	6:30			
10.42	7:00			
10.45	8:00			
10.47	9:00			
10.50	11:00			0920
10.52	13:00			

END OF TEST

SLUG OUT

WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
10.85	3:00			0940	
10.83	3:15				
10.81	3:30				
10.80	3:45				
10.78	4:00				
10.76	4:30				
10.75	5:00				
10.72	6:00				
10.70	7:00			0944	
10.69	8:00			~~09~~ 0945	
10.68	10:00			~~09~~ 0947	
10.67	12.00				
10.66	14.00				
10.65	18.00				
10.65	23.00				
10.64	37:00				
10.64	65:00				

END OF TEST

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-4

Date: DEC 17, 1991

Logged By: JONES Smith Lowry

SLUG IN X SLUG OUT X

SLUG DISPLACEMENT 1.2 gal

Static Water Level: 2.35

SLUG IN

WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME
2.35	STATIC			1541
	0			1543
.60				
.68	5			
.74	8			
.81	12			
.86	15			
.97	25			
1.04	30			
				1
1.09	35			
1.13	40			
1.23	49			
1.35	60			
1.39	1:10			
43	115			
51	120			

SLUG OUT

WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
2.35	STATIC			1600	
4.02	:15				
3.82	26				
86	33				
77	37				
72	43				
68	47				
63	50				
59	55				
56	60				
53	1:07				
48	1:10				
42	1:15				
38	1:20				
32	1:30				

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-4

Date: DEC 17, 1991

Logged By: Jones Smith Lowry

SLUG IN X SLUG OUT X

SLUG DISPLACEMENT

Static Water Level:

SLUG IN

WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME
54	130			
57	133			
61	139			
66	1:45			
69	150			
1.71	155			
75	2:00			
79	210			
83	2:15			
95	220			
87	225			
1.93	240			
96	250			
	~~3:00~~			
98	300			

SLUG OUT

WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
25	1:40				
21	145				
17	1:30				
13	155				
	~~2:00~~				
12	200				
07	2:10				
03	2:15				
3.00	225				
2.94	2:35				
2.90	245				
2.84	3:00				
2.77	3:15				
2.73	330				
2.70	3:45				
266	4:00			4:04	

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-

Date: DEC , 1991

Logged By:

SLUG IN ___ SLUG OUT ___

SLUG DISPLACEMENT

Static Water Level:

SLUG IN

WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME
2.02	3:10			
2.05	320			
2.07	330			
2.10	340			
2.12	350			
2.14	4:00			
2.16	4.15			
2.18	430			
2.22	5:00			
2.25	5:30			
2.27	6:00			1550
2.30	7:00			
2.32	8:00			
END OF TEST				

SLUG OUT

WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
2.62	4:15				
		15			
2.59	4:30				
		15			
2.57	445				
		15			
2.55	5:00				
		30			
2.51	5:30				
2.47	6:00				
2:45	6:30				
2.44	7:00				
2.42	7:30				
2.42	8:00				
2H0	9:00			1610	
2.40	10:00				
2.38	11.00				
2.38	13:00				
END OF TEST					

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-5

Date: DEC 17, 1991

Logged By: Jones Smith Lowry

SLUG IN X SLUG OUT K

SLUG DISPLACEMENT 1.2 gal

Static Water Level: 8.55

SLUG IN

WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME
8.55	STATIC			
	0			1510
7.34	:08			
7.98	30			
8.18	40			
8.26	47			
8 20	55			
8 30	1:00			
36	105			
36	1:10			
38	115			
38	120			
42	1:27			
8.44	134			
44	140			
46	148			

SLUG OUT

WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
9					
892	0	~~0~~		1525	
842	12	~~12~~			
830	16	~~16~~			
822	20				
815	26				
810	25				
858	35				
812	40				
885	45				
82	50				
80	60				
75	1:10				
73	115				
71	125				
70	130				

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-5

Date: DEC 17, 1991

Logged By:

SLUG IN X SLUG OUT X

SLUG DISPLACEMENT

Static Water Level:

SLUG IN					SLUG OUT					
WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
8.46	155				8.67	140	1			
8.46	2:15				8.67	150				
8.48	2:30				8.66	2:00				
8.48	2:45				8.66	210				
8.48	3:00				8.63	225				
8.50	3:30				8.61	240				
8.50	4:00				8.61	3:00			1528	
8.52	5:00			1515	8.60	3:30				
8.52	6:00			1516	8.59	4:00				
END OF TEST					8.57	5:00				
					8.57	7:00			1532	

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-06

Date: DEC 18, 1991

Logged By: JONES SMITH LOWRY

SLUG IN X SLUG OUT X

SLUG DISPLACEMENT 1.2 gal

Static Water Level: 24.52 TOC

SLUG IN

WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME
24.52	STATIC			1305
	0	SLUG IN		1306
23.14	:10			
23.40	:18			
23.46	:21			
23.66	:24			
23.76	:30			
23.82	:34			
23.86	:36			
23.92	:40			
24.02	:45			
24.10	:50			
24.19	:55			
24.25	1:02			
24.28	1:07			

SLUG OUT

WATER LEVEL	TIME	TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
24.52	STATIC			1314	
	0		ACTUAL TIME		
25.52	:11	+15sec =	:26		Forgot to start watch
25.29	:20		:31		
25.22	:25		:40		
25.14	27		:42		
25.06	30		:45		
25.01	34		:49		
24.94	39		:54		
24.86	42		:57		
24.80	47		1:02		
24.77	50		1:05		
24.74	55		1:10		
24.71	1:00		1:15		
24.66	105		1:20		

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-06

Date: DEC 18, 1991

Logged By: JONES SMITH Lowry

SLUG IN X SLUG OUT X

SLUG DISPLACEMENT 1.2 gal

Static Water Level: 24.52

SLUG IN

WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME
24.35	1:15			
24.39	1:20			
24.40	1:25			
24.42	127			
24.43	1:35			
24.44	1:38			
24.45	1:40			
24.46	1:46			
24.47	1:53			
24.48	2:00			
24.49	2:10			
24.50	2:24			
24.51	2:42			
24.51	4:00			

END OF TEST

SLUG OUT

WATER LEVEL	TIME	TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
			ACTUAL TIME		
24.63	1:15	+15sec	= 1:30		
24.62	1:20		1:35		
24.60	1:25		1:40		
24.60	1:30		1:45		
24.59	1:35		1:50		
24.58	1:40		1:55		
24.57	1:48		2:03		
24.56	1:52		2:07		
24.56	2:00		2:15		
24.55	2:05		2:20		
24.54	2:15		2:30		
24.54	2:30		2:45		
24.54	2:45		3:00		
24.53	3:10		3:25		

END OF TEST

Comments:

10 sec for 5 min
1 min after 5 min
after 20 min

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-7

Date: DEC 17, 1991

Logged By: L. JONES, R. Lowry, T. SMITH

SLUG IN X SLUG OUT X

SLUG DISPLACEMENT 1.2 gal

Static Water Level: 56.22' TOC

SLUG IN

WATER LEVEL	Time	Δ TIME		WATCH TIME
56.22	0			1347
~~55.4~~	—	5		
55.6	5			
~~55.94~~	—	5		
55.94	:10			
55.98	:15	5		
56.12	:20			
	—	5		
56.12	:25			
	—	5		
56.12	:30			
	—	5		
56.12	:35			
	—	5		
56.14	:40			
	—	5		
56.15	:45			
	—	5		
56.16	:50			
	—	5		
56.17	:55			
	—	5		
56.18	1:00			
	—	5		
56.18	1:05			
	—	5		
56.18	1:10			
	—	5		
56.19	1:15			
~~10~~	10			

SLUG OUT

∇	TIME	Δ TIME	WATCH TIME OBSERVATIONS
56.19	0		1400
		10	
56.62	:10		
		20	
56.30	30		
		6	
56.30	36		
		5	
56.28	41		
		5	
56.27	46		
		3	
56.26	49		
		4	
56.25	53		
		7	
56.24	1:00		
		10	
56.24	1:10		
		10	
56.23	1:20		
		10	
56.23	1:30		
		10	
56.22	1.40		
		35	
56.22	2:15		
		1:15	
56.22	3:30		

END OF TEST

SLUG HAS DISPLACEMENT OF
gal or

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-7

Date: DEC 17, 1991

Logged By:

SLUG IN X SLUG OUT X

SLUG DISPLACEMENT

Static Water Level:

WATER LEVEL	TIME	Δ TIME			OBSERVATIONS
56.19	1:25				
		10			
56.19	1:35				
		10			
56.19	1:45				
		15	+15 sec		
56.19	~~1:55~~ 2:00				
		15			
56.19	2:15	~~15~~			
		15			
56.19	2:30	~~15~~			
	~~2:45~~	15			
56.19	~~4:00~~				
		1:15			
56.19	4.00				
		1:00			
56.19	5:00				
		6:00			
56.19	11:00			1358	
END OF TEST					

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-8

Date: DEC 18, 1991

Logged By: LOURY SMITH ALLINGER

SLUG IN ___ SLUG OUT ___

SLUG DISPLACEMENT

Static Water Level: 6.33

SLUG IN					SLUG OUT					
WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
6.33										
4.57	0									
4.62	5									
4.65	10									
4.67	13									
4.68	18									
4.71	25									
4.72	30									
4.73	35									
4.74	42									
4.75	45									
4.76	50									
4.77	85									
4.78	100									
4.80	190									

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-8

Date: DEC 18, 1991

Logged By: LOWRY SMITH ALLINGER

SLUG IN X SLUG OUT ___

SLUG DISPLACEMENT ___

Static Water Level: 6.33

SLUG IN					SLUG OUT					
WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
4.81	1:20									
4.83	1:30									
4.84	1:40									
4.85	1:50									
4.86	2:00									
4.87	2:10									
4.88	2:20									
4.89	2:30									
4.90	2:40									
4.91	2:50									
4.92	3:06									
4.94	3:30									
4.96	4:00									
4.98	4:30									
5.00	5:00									

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-8

Date: DEC 18, 1991

Logged By: SMITH LOWRY ALLINGER

SLUG IN Y SLUG OUT ___

SLUG DISPLACEMENT ___

Static Water Level: 6.33

SLUG IN					SLUG OUT					
WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
5.04	6:00									
↑	7:00									
5.06										
5.10	8:00									
5.12	9:00									
5.13	10:00									
5.21	15:00									
5.28	20.00									
5.33	25.00									
5.37	30.00									
5.46	40.00									
5.57	:55 min									
5.74	1:25:00									
5.84	1.55:00									
5.92	2.25:00									
6.20		7:45								

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-9

Date: DEC 18, 1991

Logged By: LOWRY Smith Allinger

SLUG IN X SLUG OUT ___

SLUG DISPLACEMENT ___

Static Water Level: 38.28

SLUG IN					SLUG OUT					
WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
~~38.28~~										
36.45	0									
36.53	5									
.54	8									
.55	12									
~~36.56~~	15									
.57	20									
.58	25									
36.59	30									
36.60	35									
.61	~~35~~ LA 40									
.61	50									
36.62	55									
.63	1:00									
.64	1:10									

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-9

Date: DEC 10, 1991

Logged By: LOWRY SMITH ALLINGE

SLUG IN Y SLUG OUT ___

SLUG DISPLACEMENT ___

Static Water Level: 38.28

SLUG IN					SLUG OUT					
WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
36.65	1:20									
36.66	1:30									
36.67	1:40									
36.68	1:50									
36.69	2:00									
36.70	2:20									
36.72	2:40									
36.74	3:00									
36.76	3:30									
36.79	4:00									
36.82	4:30									
36.84	5:00									
36.89	6:00									
36.93	7:00									
37.00	8:00									

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-9

Date: DEC 18, 1991

Logged By: LOWRY SMITH ALLINGER

SLUG IN X SLUG OUT ___

SLUG DISPLACEMENT ___

Static Water Level: 38.28

SLUG IN					SLUG OUT					
WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
37.02	9:00									
37.06	10:00									
37.19	13:00									
37.29	16:00									
37.43	20:00									
37.57	25:00									
37.68	30:00									
37.80	35:00									
37.85	40:00									
37.96	50:00									
38.10	1hr 05:00									
38.17	1:20 hr									
38.23	1hr 40 min									
END OF TEST										

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-10 → MW-15

Date: DEC. , 1991

Logged By: JONES

SLUG IN ___ SLUG OUT ___

SLUG DISPLACEMENT ___

Static Water Level: ___

SLUG IN					SLUG OUT					
WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
	THESE	WELLS	WERE	INTENDED	FOR	THE	NEW			
	LANDFILL	AREA.	WELLS	WERE	EITHER	DRILLED				
	DRY	OR	NOT	DRILLED.						

Comments: ___

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-16

Date: DEC 18, 1991

Logged By: JONES SMITH LOWRY

SLUG IN Y SLUG OUT X

SLUG DISPLACEMENT 1.2 gal

Static Water Level: 12.31' TOC

SLUG IN					SLUG OUT					
WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
12.31	STATIC			11:00					1114	
	0 SLUG IN				12.29	0	SLUG OUT			
10.82	:06				1318	:10				
11.28	:08				1304	:20				
11.45	:13				13.01	:29				
11.52	:17				12.95	:34				
11.63	:24				12.85	:40				
11.69	:28				12.80	:45				
11.75	:34				12.75	:50				
11.78	:37				12.71	:60				
11.81	:40				12.65	1:05				
11.84	:44				12.62	1:10				
11.87	:49				12.59	1:20				
11.89	:52				12.56	133				
11.91	:55				12.53	140				

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-16

Date: DEC 18, 1991

Logged By:

SLUG IN X SLUG OUT X

SLUG DISPLACEMENT 1.2 gal

Static Water Level:

SLUG IN					SLUG OUT					
WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
11.95	1:00				12.51	1:50				
11.97	1:05				12.48	2:05				
11.99	1:11				12.42	2:15				
12.01	1:18				12.45	2:30				
12.05	1:30				12.43	2:45				
12.08	1:40				12.42	3:00				
12.10	1:45				12.41	3:15				
12.11	1:50				12.40	3:30				
12.13	2:00				12.39	3:45				
12.14	2:10				12.39	4:00			1118	
12.16	2:20				12.38	4:30				
12.17	2:30				12.37	5:00			1119	
12.18	2:40				12.36	5:30				
12.19	2:50				12.35	6:00				
12.20	3:00			1103						

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-16

Date: DEC 18, 1991

Logged By:

SLUG IN X SLUG OUT X

SLUG DISPLACEMENT 1.2 gal

Static Water Level:

SLUG IN					SLUG OUT					
WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
					12.34	7:00				
12.20	3:10									
12.21	3:20									
						END OF TEST				
12.21	3.30									
12.22	3:40									
12.22	3:50									
12.23	4:00			1104						
12.23	4:15									
12.24	4:30									
12.25	5:00			1105						
12.26	6:00			1106						
12.26	7:00									
12.27	8:00			1110						
12.28	10:00									
12.29	12:00									
	END OF TEST									

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-17

Date: DEC , 1991

Logged By:

SLUG IN ___ SLUG OUT ___

SLUG DISPLACEMENT

Static Water Level:

SLUG IN					SLUG OUT					
WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
		THIS	WAS	A	DRY	HOLE	AND			ABANDONED

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-18

Date: DEC 18, 1991

Logged By: Janet Smith Lowry

SLUG IN X SLUG OUT X

SLUG DISPLACEMENT 1.2 gal

Static Water Level: 38.86 TOC

SLUG IN					SLUG OUT					
WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME	OBSERVATIONS
38.86	TOC ~~1332~~			1332	38.82				13:46	
	0 SLUG IN			1335		0 SLUG OUT			13:47	
							ACTUAL TIME			
37.77	:11				39.92	:11	+23 = :34			STOP WATCH CORRECTION
3802	:15				39.88	:18		:51		
12	:21				39.83	:25		:48		
16	:25				39.80	:30		:53		
21	:27				39.18	:35		:58		
27	:30				39.16	:45		1:08		
32	:32				39.14	:50		1:13		
35	:35				39.10	1:02		1:25		
38	:39				39.08	1:10		1:38		
43	:41				39.06	1:15		1:38		
45	:45				39.04	1:21		1:44		
47	:47				39.02	1:28		1:51		
51	:51				39.02	1:35		1:58		

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-18

Date: DEC 18, 1991

Logged By: Jones Smith Lowry

SLUG IN X SLUG OUT X

SLUG DISPLACEMENT 1.2 gal

Static Water Level: 38.86

SLUG IN

WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME
38.53	1:00			
38.55	1:05			
38.57	1:08			
38.58	1:11			
38.60	1:16			
38.62	1:21			
38.63	1:30			
38.64	1:35			
38.65	1:40			
38.66	1:49			
38.67	1:56			
38.68	2:01			
38.69	2:10			
38.70	2:25			
38.71	2:35			

SLUG OUT

WATER LEVEL	TIME	Δ TIME	ACTUAL TIME CHANGE TIME	WATCH TIME	OBSERVATIONS
39.00	1:45	+23 sec =	2:08		
39.00	1:55		2:18		
~~38.89~~	~~2:00~~	BAD			
~~.99~~	2:30				
38.96	3:00		3:23		
38.94	3:10		3:33		
38.94	3:22		3:45		
3894	3:30		3:53		
38.92	3:45		4:08		
38.92	4:00		4:23		
38.91	4:25		4:38		
38.90	4:30		4:53		
38.90	~~4:45~~ ~~5:00~~		5:08		
38.90	5:00		5:23		
38.90	5:30		5:53		

Comments:

SLUG TEST DATA

Metcalf & Eddy

Well I.D. No.: MW-18

Date: DEC 18, 1991

Logged By: Jones Smith

SLUG IN X SLUG OUT X

SLUG DISPLACEMENT 1.2 gal

Static Water Level: 38.86

SLUG IN

WATER LEVEL	TIME	Δ TIME	TIME CHANGE	WATCH TIME
38.72	2:45			
38.73	3:00			
38.74	3:15			
38.74	3:30			
38.75	3:45			
38.76	~~4~~:00			
38.77	4:30			
38.78	5:00			
38.78	5:30			
38.79	6:00			
38.81	7:00			
38.82	8:00			
38.82	9:00			
38.82	10:00			

END OF TEST

SLUG OUT

WATER LEVEL	TIME	Δ TIME	~~ACTUAL~~ TIME CHANGE TIME	WATCH TIME
38.89	6:00 + 23sec		6:23	
38.88	7:00		7:23	
38.88	8:00		8:23	

~~9:00~~

END OF TEST

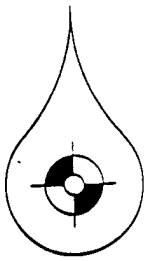
~~10:00~~

OBSERVATIONS

Comments:

EWC *Ewers Water Consultants Inc.*

160 Redwood Drive, Richmond, Kentucky 40475
Phone & Fax (606) 623-8464



DYE TRACING STUDY

Lexington Bluegrass Army Depot

Industrial and Sanitary Waste Disposal Landfill

Avon, Kentucky

Performed Under Contract
3193P-1634

By

Ralph O. Ewers Ph.D.
Senior Hydrogeologist

Peter J. Idstein M.S.
Hydrogeologist

September 12, 1994

TABLE OF CONTENTS

APPENDIX

EXECUTIVE SUMMARY

A groundwater tracing study utilizing a fluorescent dye was undertaken at the Industrial and Sanitary Waste Disposal Landfill at Lexington-Bluegrass Army Depot. The objectives of the study were to obtain an understanding of the direction and extent of movement of groundwater from beneath the area of the landfill, to determine the nature of the groundwater flow system within the carbonate rocks and to estimate the speed of movement. The study showed that no significant conduit flow is associated with the dye injection point and probably with the entire landfill site, and that groundwater flow is probably very slow. The direction of groundwater flow could not be deduced from the study.

INTRODUCTION

Objectives-

The study had two objectives. The first was to obtain an understanding of the direction and extent of movement of groundwater from beneath the area of the Industrial and Sanitary Waste Disposal Landfill (ISWDL) at Lexington-Bluegrass Army Depot (LBAD) (Location map in the rear pocket). Knowledge of the groundwater flow directions beneath this area and the resurgence points for this groundwater are important information for assessing the movement of contaminants within the aquifer and for evaluating and perfecting monitoring efforts.

The second objective was to determine the nature of the groundwater flow system within the carbonate rocks and to estimate the speed of movement. Carbonate aquifers frequently contain solution porosity (conduit porosity) as well as fracture porosity. Groundwater velocities are commonly several orders of magnitude greater than those encountered in the most permeable granular aquifers.

Dyes and Dye Detectors-

Fluorescent dyes are an excellent choice for groundwater tracing in carbonate aquifers (Quinlan and Ewers, 1985). They are safe, predictable, and inexpensive to use relative to most other tracers. Many of these dyes can be detected at parts per billion or parts per trillion levels in the groundwater. They are readily adaptable to inexpensive passive detectors which can be placed in springs, wells, rivers, and almost any raw water stream.

The dye detectors permit the tracer to be adsorbed over periods of several weeks, increasing the sensitivity of the analysis by several orders of magnitude and insuring that the tracer will not pass undetected. While the use of dye detectors can give only semi-quantitative results, they provide a very sensitive and cost effective means of determining the direction of groundwater flow in these highly heterogenous and anisotropic aquifers. Dye monitoring with grab samples and automatic samplers can miss the dye arrival and these techniques are significantly more expensive in terms of personnel time and analytical effort.

We customarily use one or more of the dyes listed in Table 1. These have a proven record of effectiveness for this purpose. They appear to be well understood in terms of their lack of toxicity and mutagenic effects (Smart & Laidlaw, 1977; Smart, 1984). They are injected into wells and sinkholes with the aid of potable water or with natural flows. The dye chosen is based upon an analysis of the background detectors, the nature of the test, and the existing groundwater flow conditions. Other fluorescent dyes are used in special circumstances.

Table 1

Dye Name	Color Index
Fluorescein	Acid Yellow 73
Rhodamine WT (R WT)	Acid Red 388
Optical Brightener	Fluorescent Brightener 28
Direct Yellow	Direct Yellow 96
Eosine	Acid Red 87

RECONNAISSANCE AND MONITORING POINT SELECTION

Thorough reconnaissance of the site and surrounding area to reveal all potential dye recovery points is the cornerstone of successful tracing work in carbonate aquifers. All of these potential recovery points need to be monitored because it is essential that the dye used in each trace be recovered at one or more of the monitoring points. If a dye is not recovered, then it is uncertain if: (1) insufficient dye was used, (2) the dye is moving more slowly than expected, or (3) the dye emerged at an unmonitored point. Resolving this uncertainty requires additional dye tests, increasing the time required for completion of the tracing program and increasing its cost.

A reconnaissance of the site and surrounding area was made on 11/23/93. Potential recovery sites included the following: (1) all of the identified springs, (2) production wells of large capacity, (3) monitoring wells on the Lexington-Bluegrass Army Depot that are in proximity to the ISWDL or are along the edges of the depot property and which were likely to intercept the dye that is introduced near the landfill. (4) Creeks that are located on the depot and the creek that flows along the southern border. Additional reconnaissance was accomplished on 11/30/93 when the first set of background dye detectors was recovered. The reconnaissance covered all of the area on the depot but due to high water conditions the creek that runs along the southern edge of the depot could not be examined closely for springs and seeps at that time. Further reconnaissance was completed on 3/25/94 when the water level of the creek to the south of the depot was flowing adequately but was low enough to reveal springs along its course. Table 2 is a list of the monitored sites. The locations of the dye monitoring sites are shown on the map in the rear pocket.

Special attention was given to monitoring the well at Prestress Services of Kentucky Inc. the only significant ground water user in the immediate proximity to LBAD. No springs or wells have been identified which appear to be used for human consumption.

Table 2
LIST OF MONITORED SITES & DYE DETECTOR LIST

MONITORING WELLS	DYE DETECTOR DEPTH
MW-6	25 FEET
MW-7	72 FEET
MW-8	19.5 FEET
MW-8D	54 FEET
MW-9	58 FEET
MW-18	59 FEET
MW-18D	95 FEET
MW-32	44 FEET
MW-32D	79 FEET
MW-33	52 FEET
MW-41	16 FEET
MW-45	32 FEET
MW-46	41 FEET
MW-47	30 FEET

SPRINGS AND OTHER MONITORED SITES	LOCATION
S-1	West creek, upper spring
ST-2	West creek at confluence
ST-3	North tributary at confluence with west creek
S-4	Seep by landfill on West creek
S-5	Seep East corner of building 17 on lagoon side of the road
S-6	Seep middle building 15 on lagoon side of the road
S-7	"Artesian Well" Spring
ST-8	West creek above swampy area near Landfill
ST-9	West creek below swampy area near Landfill
S-10	Landfill seep near road at toe of Landfill
S-11	Air photo spring
ST-12	Off post creek at west end of depot
ST-13	West drainage structure
S-14	Railroad seep west end of depot
S-15	Seep middle of railroad west of middle depot outfall
ST-16	Middle drainage structure from depot
ST-17	Off post creek at lowest bridge, mile marker 12
PS-18	Prestressed Services Inc. Concrete Plant well
ST-19	Drainage structure outfall at Prestressed Services Inc.
ST-20	Bridge across creek at Prestressed Services Inc.
S-21	Spring behind Ashland Station, Depot side
ST-22	Prestressed Concrete Office, Bridge south creek

S-23	Prestressed Office Spring
S-24-A	Seep on south creek, Prestressed property
S-24-B	Seep on south creek, Prestressed property
S-25-A	Seep on south creek, West end
S-25-B	Seep on south creek, West End
S-26	Seep on south creek
S-27	Spring on south creek, farthest down stream.

The monitored locations are shown on the map in the rear map pocket.

A passive dye detector was deployed at each spring site which was low enough to drain from the landfill area. The only production well in the area that met customary dye monitoring criteria was outfitted with a special dye detector which monitored the ground water pumped at this location. Monitoring wells were equipped with a cord and a stainless steel weight so that a dye detector could be attached and lowered into the water. Mr. Steve Hulett of Metcalf and Eddy, Inc. indicated the depth to the zone that the water entered the well. The detectors were placed in this zone so that the greatest amount of flow could be maintained over the dye detector without pumping water from the wells.

THE DYE INJECTION POINT

Mr. Hulett was consulted, during the site visit on 11/15/93, regarding the potential dye injection wells. Criteria for this use included: (1) the position of their screened interval within the bedrock aquifer, (2) their proximity to the ISWDL, and (3) the quantity of water which they yield under test conditions. Two wells near the ISWDL were chosen for further evaluation in the tracing program, they are MW-7 and MW-1121, their locations are shown on the map in the rear map pocket. MW-7 was tested on 4/7/94 for dye injection using potable water from a nearby fire hydrant. Water was introduced into this well at a rate of approximately eight (8) gallons per minute for one hour. The water level in this well rose less than five (5) feet during this test. This injection of potable water was to confirm the well's communication with the solution porosity of the aquifer. MW-1121 was not tested and was not used for dye injection.

A survey of sinkholes was undertaken in the area surrounding the ISWDL. No sinkholes were located in close proximity to the area of concern.

BACKGROUND TESTING

Passive dye detectors consisting of activated carbon and dye free cotton cloth were placed at each potential dye recovery point and exchanged after a period of one week. This exchange took place on 11/30/93. A second set of detectors were recovered on 12/07/93, this included sites that had not been monitored until 11/30/93. These detectors were analyzed for the dyes potentially useful in the study. Detectors were also recovered on 4/1/94 and

4/7/94, these recoveries also included sites that had not been monitored previously due to high water conditions. This standard background monitoring practice helps to insure that no confusion occurs due to dye from sources other than dyes that are injected during the tracing program. The laboratory procedure for the passive dye detectors requires that the sample be washed and dried prior to analysis. Analysis of the background samples collected on 4/7/94 was not completed prior to the dye injection on 4/8/94 due to the drying time required.

Rhodamine WT and Eosine Background

The dye detectors deployed for background determination showed acceptably low levels of background fluorescence[1] in the region of Rhodamine-WT and Eosine emission in the samples that were collected on 11/30/93, 12/7/93 and 4/1/94. No Rhodamine-WT or Eosine was present in detectable amounts in the elutant from these detectors. Several of the dye detectors collected on 4/7/94 that could not be analyzed prior to the dye injection showed fluorescence peaks at about 539nm indicating the presence of very small amounts of Eosine. Detectors deployed at these sites have consistently shown eosine subsequently. These are listed in Table 3. The source of this dye background[2] has not been determined. The high flow conditions during the exposure of the earlier background detectors may have diluted the Eosine below detectable levels.

Fluorescein Background

Fluorescein background was seen in detectors at several sites these are listed in Table 3. Some sites showed a level of fluorescence that was very near the wavelength of fluorescein but did not have sufficient intensity for a positive identification. These sites include drainage structures from the depot, seeps, creeks, monitoring wells, and the well at the Prestressed Concrete Plant.

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[1] Background fluorescence is a broad spectrum fluorescence of varying intensity seen in most natural waters and in elutant from dye detectors deployed in these waters. This fluorescence is frequently without well defined peak values throughout the emission range that is scanned. The fluorescence is likely to be caused by many naturally occurring compounds as well as some which are man-made. No specific compounds are usually identifiable as causing this fluorescence.

[2] Dye background is fluorescence in the form of a well defined peak in an emission scan which can be ascribed to the presence of a known dye which is used in groundwater tracing, but from a source or sources other than the dye injected into the aquifer by the hydrogeologist performing a tracer study.

Seep S-4 is located at the creek that runs along the west side of the landfill. Site S-7 has been referred to as the "Artesian Well". It is a large concrete structure that has water flowing up into it. These locations both showed very strong fluorescein background.

Table 3
SPRINGS, SEEPS, AND STREAM MONITORING SITES EXHIBITING DYE BACKGROUND

SPRINGS AND OTHER MONITORED SITES	EOSINE BACKGROUND	FLUORESCEIN BACKGROUND
S-1	+	
ST-2	+	
ST-3		
S-4		++
S-5	+	
S-6		
S-7		++
ST-8	+	
ST-9	+	
S-10		
S-11	+	+
ST-12		
ST-13	+	
S-14	+	
S-15		
ST-16		
ST-17	+	
PS-18		
ST-19		
ST-20	+	
S-21		
ST-22	+	
S-23		
S-24-A		
S-24-B		
S-25-A		
S-25-B		
S-26		
S-27	+	

\+ = Positive dye background
++ = Strong dye background
The monitored locations are shown on the map in the rear map pocket.

Site S-11 is a spring that is located off the depot and was noticed on several air photos of the area. This spring showed a

level of fluorescein background that is lower than Sites S-4 and S-7, but this fluorescence is still significant.

Monitoring wells MW-18D and MW-41 both showed significant levels of fluorescein background. MW-18D is located in the deeper portions of the aquifer and may indicate that it intercepts flow from the landfill. Landfills are frequently sources of fluorescein seen in groundwater.

DYE TRACING

Dye Selection

Fluorescein was present in the aquifer, making it a poor choice for this test. Rhodamine-WT is readily sorbed by shales which are present in the bedrock beneath LBAD and is less detectable than Fluorescein and Eosine. Eosine was chosen for the test because of its high level of detectibility and its very low tendency to sorb onto shales.

Dye Quantity

In order to maintain good relations with local residents, the amount of dye used was chosen such that noticeable coloration of spring and well waters would be avoided. The amount of dye was quite conservative because the aquifer is utilized by Prestressed Services of Kentucky Inc. as a water supply. The amount of dye injected was determined on the basis of the quantity of spring-flow at the time of injection, the probable distance the dye would travel, and our experience in geologically similar situations. Initially, the amount of Eosine to be used was estimated at 12 pounds. When the well was tested, and it was determined how readily the aquifer accepted the water, it was decided that only 4 pounds of dye should be used. The remaining 8 pounds was saved for a second injection if the initial dye pulse was not detected after a few weeks. The initial dye injection occurred on 4/8/94. This conservative approach was used in order to avoid visual levels of the dye in water off of the depot. The remaining 8 pounds of eosine was introduced in the same well on 5/11/94.

Dye Injection

During the injection process special precautions were taken to avoid spillage of the dye and contamination of clothing, equipment, and vehicles. Although the dyes are harmless and pose no threat to personnel even in concentrated form, they are routinely detectable in the range of parts per trillion with our laboratory instrumentation. This level of sensitivity requires extreme care in order to avoid sample contamination. No personnel associated directly with the dye injection subsequently handled dye detectors or approach monitoring sites until decontamination procedures were followed precisely.

The dye was injected below the standing water level to avoid foaming produced by the concentrated dye solution. Each dye slug was flushed into the aquifer with approximately 2000 gallons of

potable water. This volume of water has given excellent results in similar circumstances in the past. Extremely large quantities of injection water could force the tracer into routes that it would not follow under natural circumstances. During the water injection period, the water level in the well was continuously monitored. The water was injected at a rate which did not cause excessive elevation of the potentiometric surface in the vicinity of the well. This avoided lifting the dye mass into the vadose zone where solution porosity could cause trapping of the dye.

Dye Detector Recovery and Analysis

Dye detectors were recovered and replaced at intervals of one week. This continued until 6/12/94 when the dye detectors were recovered again on 6/28/94.

The detectors were carried enclosed in "Zip Lock" re-closable polyethylene bags, numbered and labeled for each monitoring site. Customary practice during dye detector exchange included rinsing of the technicians hands in the water source down-stream from the detector site. Disposable gloves were used when there was any indication of dye present at the site or when contamination of the water was suspected. The detector was then exchanged and the recovered detector was shaken to remove excess water and placed in the numbered polyethylene bag. The analysis procedure is described in the appendix.

RESULTS

The dye detectors that were placed in the monitoring wells did not show any of the background fluorescence in the emission range of eosine. These detectors did show a consistent fluorescent signature that is related to the activated charcoal contained in the dye detectors. Elutant from fresh Fisher brand activated charcoal that is the standard used in dye tracing has fluorescence peaks near the range of Fluorescein and Rhodamine WT. This fluorescence is washed from detectors that are placed in flowing water for more than a few hours. Elutant from the detectors that were recovered from the monitoring wells showed the pattern of fluorescence typical of charcoal that has not been subjected to flowing water. The water in the wells must not have been flowing sufficiently to remove this background fluorescence. The water in the wells in most cases did not contribute any substances to the charcoal to significantly modify the normal fluorescence signature. The fluorescent signature from the dye detectors from the monitoring wells indicates that the water in the monitor wells could only be exchanged very slowly with the water in the aquifer under the non-pumping conditions investigated.

The dye that was injected has not been satisfactorily detected at any of the monitoring locations. There are several possible reasons for this.

1) The amount of dye used may have been too small. The dilution of the dye as it flowed through the aquifer may have been sufficient that when the dye emerged it was below the detection limit. The amount of dye used was conservative but more than sufficient under normal circumstances for the expected, relatively short, travel distance.

2) The dye could have emerged at a site that was not monitored. However, the stream detectors were placed so that they would detect dye from hidden unmonitored springs. Missing the dye was not considered likely, unless the dye emerged at a site that is located farther from the study area than the farthest downstream monitoring location.

3) The dye may have been moving to resurgence points in very small quantities that were diluted below the level at which it could be recognized, particularly at the stream monitoring points.

4) The groundwater flow began to wane a short time after the second dye injection, and flow was reduced or stopped at several of the monitoring locations. These reduced flow conditions may have played a role in the lack of detection of the injected dye.

5) When dye background exists and is well understood, that dye can still be used successfully by raising the concentration significantly above the background. The Eosine fluorescence in the samples recovered after the dye injection may have been the result of the background or from the injected dye. The detectors that were recovered after dye injection did not show sufficient fluorescence at the emission wavelength for eosine to be considered positive for this trace.

6) The length of time that the monitoring was done may have been insufficient for the dye to travel through the aquifer. The dye may not be moving in conduits through this aquifer and thus the travel time for the dye could be very long.

7) The dye may have adsorbed onto portions of the aquifer as it was moving through the pore system. Slow flow in narrow fractures could result in significant sorptive loss opportunities. This could reduce the amount of dye flowing from the aquifer to below the detectable level. Dilution of the remaining dye, particularly at stream monitoring sites, would also contribute to the deductibility problem.

CONCLUSIONS

The absence of dye in significant levels at all of the monitoring sites was likely due to a combination of the factors listed above. It can be concluded that no significant conduit flow is associated with the dye injection point and probably with the entire landfill site. If significant conduit porosity were

extant, the dye should have appeared in the dye detectors at concentrations several orders of magnitude higher than the background levels. This conclusion is consistent with the very small discharge of the springs and seeps identified in the area surrounding LBAD. The lack of dye recovery within the period of dye monitoring suggested that groundwater flow was slow, and of an order of magnitude that was more characteristic of fracture flow or granular flow than of the conduit flow associated with typical karst aquifers. The direction of groundwater flow could not be deduced from the study.

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APPENDIX

LABORATORY PROCEDURES and Quality Assurance/Quality Control

Storage-

Prior to analysis, samples are stored in a controlled refrigerator or sample cabinet under the sole control of the analyst or other appropriate laboratory personnel who's signatures appear on the custody transfer record.

Records-

The sample sets are assigned a laboratory number and the custody transfer record is added to the laboratory custody log. Paper documentation generated by the analytical instruments is added to the Laboratory custody log.

Instrumentation-

A Shimadzu spectro-fluoro-photometer (spectrofluorometer) is used for dye analyses. This instrument is used in accordance with the manufacturer's instructions. Samples are equilibrated to ambient laboratory temperature, and analyzed at that temperature.

Cuvets-

Disposable cuvets of glass or plastic are used for routine dye determinations. Each batch of cuvets is tested for the presence of dye by filling two randomly selected cuvets with elutant and analyzing spectrofluorometrically. EWC has never encountered a case of dye contamination in cuvets. When necessary, non disposable cuvets are used. These are cleaned by brushing in Sparkleen solution, followed by a tap water rinse, a distilled water rinse for 10 min and a final distilled deionized water rinse.

Dye Identification-

Dye identification is performed by synchronous excitation-emission scanning. An excitation-emission interval of 16nm is used for Rhodamine WT (RWT, AR-388), Eosine (AR-87) and Fluorescein (AY-73). A scan range of 470nm to 600nm excitation is normally used.

Fluorescence wavelength standards are prepared from the most recently available samples of dye from the EWC suppliers. Standards are prepared from the dye samples supplied by the client when EWC is requested to do so. The wavelength of maximum emission for most dyes are sensitive to the chemical characteristics of the water in which it is dissolved. The standards for analysis of water samples are prepared in de-chlorinated laboratory tap water. This is a consistent bicarbonate water. Standards for analysis of elutant from charcoal detector packets are prepared in the elutant appropriate for the dye.

Dye quantification-

Dye concentrations in water samples and detector elutant are determined by the three point method. Wavelengths for these determinations are selected on the basis of spectrofluorometric analyses of the samples. This method effectively removes the influence of background fluorescence.

Standards are prepared from the most recently available samples of dye from the EWC suppliers. Appropriate concentrations are obtained by serial dilution in de-chlorinated activated carbon filtered bicarbonate water or in elutant as required.

Rhodamine WT concentration in the dye sample used for standard preparation will be assumed to be 20%. AY-73 and Eosine concentration in the dye sample used for standard preparation will be assumed to be the percentage given by the dye manufacturer. Concentration of the dye is normally reported as pp(n) of dyestuff supplied by the manufacturer or the client, not as pp(n) of fluorescent ingredient.

Sample Order-

Standards and samples are customarily analyzed in the following order:

1- Laboratory water samples,
2- Elutants, if used,
3- Standards,
4- Blanks,
5- Samples of presumed low concentration,
6- Samples of presumed high concentration.

All positive analyses of water samples near the practical detection limit are verified with additional analyses in fresh cuvets.

Water Samples-

A sample of water, approximately 3ml, is introduced into a clean cuvet and analyzed spectrofluorometrically. When the sample possesses noticeable turbidity the cuvet is centrifuged to remove the suspended solids to the bottom of the cuvet.

Charcoal Detectors-

Activated charcoal dye detector packets are treated in the following way:

1- Vigorous tap water rinse,
2- Remove excess water by manual centrifugal extraction,
3- Dry the detectors in a controlled dye-free drying cabinet, or a secure room,
4- Withdraw 3g of the activated charcoal into a disposable pre-labeled plastic container,

5- Elute the dye with 6 ml of Smart solution for RWT and Fluorescein or Ewers solution for Eosine for a period of 1 hour, covered,
6- Decant the elutant into a clean cuvette,
7- Analyze spectrofluorometrically.

The reserved charcoal is stored in labeled Zip Lock bags for later analysis if required or returned to the client when requested.

The analysis of elutant from dye detector packets is at best semi-quantitative relative to the amount of dye contained in the water passing over the detector. The quantity of dye adsorbed by a detector is a function of the temperature and velocity of the water passing over the detector, the duration of contact with the water containing dye, the quantity and species of molecules competing with the dye for the charcoal acceptor sites, the turbidity of the water, and the dye concentration in the water. The amount of dye recovered from the charcoal is a function of the amount of charcoal that is eluted, the amount of elutant that is used, and the duration of the elution process. Only the laboratory procedures can be standardized. The dye concentration in elutant is normally reported in the following manner with the abbreviations listed:

ABBREVIATIONS

Dye

-	Negative
?	Questionable Fluorescence at the correct wavelength
+	Positive
++	Very Positive
+++	Spectacularly Positive

Dye Background or (Weak Positive)

B-	Weak Background (a slight trace)
B	Background (a trace)
B+	Strong Background (a very noticeable trace)
-Cf	Charcoal Fluorescence associated with limited flow of water over the dye detector (no dye present)

Detector or Sample

/	Detector not exchanged
L	Detector Lost or stolen
NR	Sample Not Recovered
NS	New Sample Site (no sample recovered)

Dye Type

(F) Fluorescein

(R) Rhodamine WT
(Y) Direct Yellow 96
(B) Optical Brightener, FBA 28
(E) Eosine

Laboratory Reagent Blanks-

Elutant used during the preparation of charcoal packets is analyzed spectrofluorometrically prior to its use on the charcoal packets. One reagent blank determination is made for each batch of charcoal samples analyzed. Additional blank determinations are made whenever different batches or formulations of elutant are employed.

A sample from each one pound canister of activated charcoal is analyzed before its initial use in the manner proscribed for charcoal detectors. (This procedure applies only to charcoal and charcoal detectors supplied by EWC)

FIELD PROCEDURES and Quality Assurance/Quality Control

Dye Detectors-

Dye detectors are constructed of vinyl coated fiberglass screen cloth. The cloth is folded and stitched with water resistant white thread to form two enclosures, one for a swatch of cotton cloth, the other for a ten gram mass of granular activated carbon (Fig. 1). The cloth, which contains no dyes or optical brighteners, absorbs FB-28 and DY-96 from the groundwater passing over it. The activated carbon absorbs RWT, AR-87, and AY-73. Dye detectors are prepared in advance in a dye-free environment, individually packaged in sealable polyethylene bags, and pre-marked for their intended site of utilization.

Detector Deployment, Springs and Streams-

Detectors are normally suspended in the water flow utilizing weighted wire stands which are tethered well above water level to a fixed object. The design of the stands is after Quinlan and Ewers (1981) (Fig. 2). The detectors are attached to the stands by means of black brass safety pins. There is no evidence to suggest that disposable gloves need be worn, and considerable evidence to the contrary. However, when traces of dye are expected in the water disposable gloves are routinely worn. Gloves are worn when there is the possibility of significant levels of hazardous contaminants in the spring or stream.

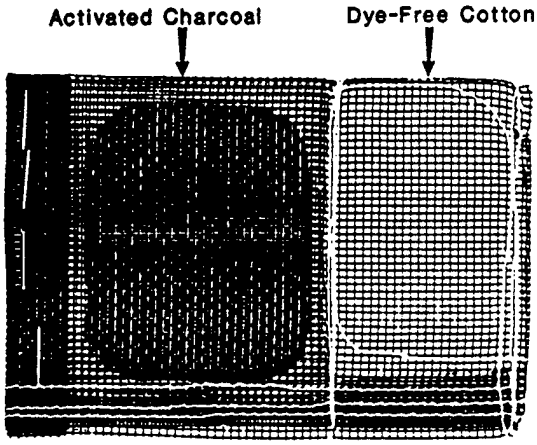
When a detector is to be exchanged the stand is first retrieved from the water by means of the tether, and the fresh detector is removed from its pre-labeled sealable polyethylene bag. The recovered detector is released from the stand and safety pin, agitated in the spring or creek water to remove accumulated sediment if necessary, excess water is shaken from it, and it is placed in the pre-labeled sealable bag. The fresh detector is attached to the pin and stand and returned to a position in the water where it will be exposed to as strong a water flow as possible. The bag containing the recovered detector is dated and placed in a cooler at ambient temperature.

When wading is necessary to recover a detector rubber boots are worn and the detector location is approached from down stream. Boots which have been potentially exposed to low levels of dye are thoroughly decontaminated.

Detector Deployment, Wells-

Detectors are normally placed in the well discharge, utilizing canisters which are attached by plastic hose to a tap on the well. A second hose conveys the water discharged from the canister to an appropriate disposal site. During an exchange of these detectors, the water flow is halted, the canister halves unscrewed, and the

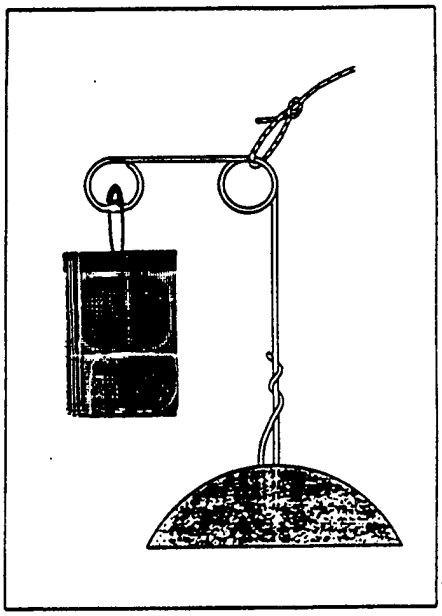
Figure 1 - Dye Detector



Shown One-half Size

Figure 2 - Dye Detector Stand

After Quinlan and Ewers (1981)



detector is removed and replaced with a fresh unit in a manner similar to the spring and stream detectors. The canister is then closed and the water flow is restarted. Typically, water flow rates of one to three gallons per minute are utilized with these canisters, depending upon the capacity of the well.

Detector Transport-

Dyes absorbed onto charcoal are extremely stable. Only bacterial action is believed to compromise these samples, this appears to be very slow. Under normal circumstances, detectors are stored and transported in coolers at ambient temperature. If more than 72 hours will elapse before the samples arrive at the laboratory they are refrigerated to retard this bacterial action.

Dye Preparation and Transport-

Those tracer dyes which are supplied in powdered form are dissolved in appropriate quantities of water at a location remote from the site of testing before being transported to the injection site. Personnel associated with the dye preparation utilize protective clothing, boots, and gloves, and observe thorough decontamination procedures before engaging in other activities.

The dye solutions are transported in heavy polyethylene containers which are suitable, by DOT certification, for transport of gasoline. The containers are placed, with a pad of absorbent material, inside a heavy polyethylene bag, and then inside a waterproof shipping drum with a latching metal ring seal. When a larger amount of dye solution is required it is prepared in a 55 gallon drum, sealed, and transported by trailer to the injection site.

The dye and the injection equipment is transported in a vehicle that is not being used for transport of equipment and personnel which are involved in dye detector exchange.

Dye Injection-

Personnel associated with the dye injection utilize protective clothing, boots, and gloves, and observe thorough decontamination procedures before engaging in other activities.

Stream Injections- The tracers are injected directly into sinking streams when adequate water flow exists. The dye container is carefully removed from its protective over-packing and the solution is carefully poured from its container into the flowing water as quickly as possible without splashing. The empty container is returned to the over-packing. The gloves and any potentially contaminated protective gear are also placed in the over-packing and sealed.

When larger quantities of dye solution are injected it is released from the drum(s) through hoses. The drum(s) is(are) then sealed, and the hose, gloves, and any potentially contaminated

protective gear are placed, with a pad of absorbent material, inside a heavy polyethylene bag, and then inside a waterproof shipping drum with a latching metal ring seal.

Sinkhole Injections- These sites are first prepared by injection of appropriate quantities of potable water. This insures that the sinkhole will conduct the dye into the aquifer and saturates any sediments which would otherwise absorb the tracer. One thousand gallons of water is the minimum quantity for this purpose.

The dye container is carefully removed from its protective over-packing, additional potable water is introduced into the sinkhole, and the dye solution is carefully poured from its container into this flowing water as quickly as possible without splashing. The flow of water into the sinkhole is maintained after the dye has been released until a minimum of 1000 gallons is added. The empty container is returned to the over-packing. The gloves and any potentially contaminated protective gear are also placed in the over-packing and sealed.

Well Injections- These sites are first tested by injection of appropriate quantities of potable water. This insures that the well is connected to the solution porosity in the carbonate bedrock and will conduct the dye into the aquifer. A few hundred gallons of water is an appropriate quantity for this purpose.

An injection device, consisting of a hose, a vacuum/pressure gauge, and valves, is placed in the well. The injection device allows the dye to be released below the level of the standing water in the well. This permits the level of the water in the well to be monitored during the injection process, and avoids foaming problems associated with the concentrated dye solutions. Foaming and well overflow during dye injection can cause severe dye contamination problems around the well and to equipment and personnel.

The dye container is carefully removed from its protective over-packing, potable water is introduced into the well through the injection device, and the dye solution is aspirated from its container into the well. The flow of water into the well is maintained after the dye has been released until a minimum of 2000 gallons is added. The empty dye container is returned to the over-packing and sealed. The injection device, gloves, and any potentially contaminated protective gear are placed, with a pad of absorbent material, are placed inside a heavy polyethylene bag, and then inside a waterproof shipping drum with a latching metal ring seal.

Decontamination of Equipment-

Non-disposable field equipment is decontaminated by washing to remove all dye and clay and thoroughly rinsed at a location

remote from the site of testing. Rubber boots exposed to moderate levels of dye are decontaminated by washing, washing with 1% sodium hypochlorite solution, and thoroughly rinsed. Non-disposable injection equipment is thoroughly flushed at a location remote from the site of testing. Non-disposable clothing is machine washed with detergent and sodium hypochlorite bleach. Disposable equipment and clothing, gloves, absorbent pads, bags, and contaminated shipping drums present no toxic hazards and are disposed of with municipal solid waste at a location remote from the site of testing.

APPENDIX J
WELL USAGE SURVEY SVERRUP ENVIRONMENTAL, INC.

DRAFT REPORT
OFF-POST WELL SURVEY
LEXINGTON-BLUEGRASS ARMY DEPOT
LEXINGTON, KENTUCKY

Prepared for:

DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
NASHVILLE, TENNESSEE
CONTRACT DACW62-93-D-0028

Prepared by:

Sverdrup

Sverdrup Environmental, Inc.
13723 Riverport Drive
Maryland Heights, Missouri 63043

September 1994

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APPENDICES:

FIGURES, DRAWINGS, AND TABLES

†*Sheets 1 and 2 are E-size (42"x30") drawings and are folded and stored in the back cover*

1.0 GENERAL

1.1 INTRODUCTION

The U.S. Army Corps of Engineers-Nashville District contracted with Sverdrup Environmental, Inc. (SvE) to perform an Off-Post Well Survey at the Lexington-Bluegrass Army Depot (LBAD), Lexington, Kentucky. SvE has prepared this report summarizing the results of the survey as required under the provisions of Delivery Order No. 0036 of IDT Contract DACW62-93-D-0028.

1.2 PROJECT OBJECTIVES

The objective of the Off-Post Well Survey was to ascertain past and present off-post groundwater usage within four miles of the perimeter of the Lexington-Bluegrass Army Depot. The data collected will be incorporated into the Metcalf & Eddy RCRA Facility Investigation Groundwater Report for the depot. The scope of the survey included the following activities:

- Site visit and preparation of work plans
- Door-to-door survey within one mile of the depot
- Extended area survey from one to three miles of the depot
- Preparation and submittal of draft and final reports

1.3 SITE DESCRIPTION AND LOCATION

The Lexington-Bluegrass Army Depot (LBAD) is located in Fayette County, Kentucky, in the town of Avon, approximately ten miles east of Lexington. The facility encompasses 782 acres within the Central Bluegrass Region, which is characterized by rolling hills dissected by numerous streams. The facility was established as a signal depot by the Department of War in June of 1941. LBAD was constructed for the storage of ground radar, other classified radio equipment, and special vehicles required to transport radar. By 1945, the administration building, eight warehouses, the motor pool building, the power plant, and 40 wood-framed, concrete-based temporary buildings had been constructed. Following World War II, additional facilities had been added as required by mission changes or expansion. An industrial

maintenance shop was built in 1953, and two more warehouses were added in 1954. In the late 1950s, seven housing units were constructed. Throughout the 1960s and 1970s, a total of ten buildings were built, including an electronic and communications security equipment maintenance facility and seven warehouses. From 1941 to 1977, the installation's mission involved various paint stripping, metal plating, etching, and anodizing operations. The facility has been a major storage depot for materials and supplies such as dry cell batteries, clothing and textiles, tungsten, tin, quartz crystals, and rubber. In December of 1988, the Defense Secretary's Commission on Base Realignment and Closure recommended LBAD for closure, with September 1995 set as the date for completion of closure.

2.0 ONE-MILE RADIUS SURVEY

2.1 PURPOSE

The purpose of the One-Mile Radius Survey was to obtain detailed information on available water sources from individuals living or working within one mile of the limits of the depot. Information collected included the following:

- Name, address, telephone number, number of occupants
- Number and type of structures on the property
- Current source of potable water and any known problems associated with this water
- Presence or absence of wells, springs, and septic systems
- Well use, construction, and abandonment details, where available
- Use of any type of water filtration system

2.2 PROCEDURES

The survey was conducted from June 22-26, 1994 using two interview teams with each team consisting of two persons and a vehicle. The teams operated between the hours of 7:00 am and 7:00 pm, and attempted to personally contact each residence and business within the survey area. During interviews, the Water Supply Survey Questionnaire was used to standardize the collection of data. In instances where the survey teams were unable to contact residents in person, a form letter was left at the residence. This letter briefly outlined the purpose of the survey, provided point-of-contact phone numbers, and requested the resident to contact the survey team to schedule an interview. To facilitate residents in contacting the survey teams, SvE maintained a field office at the depot with a telephone, an answering machine, and a facsimile machine.

In addition to leaving form letters, the survey team utilized local phone books and cross-directories (a compilation of phone numbers by street address) to obtain the phone numbers of residents they were unable to contact in person. Although telephone numbers for most required residents were available, some telephone numbers could not be obtained due to non-published

telephone numbers or the absence of telephone service at a residence.

The survey team made at least three attempts to contact residents in person. If unsuccessful on the third attempt, the team left a copy of the original form letter, a Water Supply Survey Questionnaire, and a second letter requesting that the resident fill out the questionnaire as completely and quickly as possible. A stamped, addressed envelope was provided for returning the questionnaire and a toll-free telephone number was included.

Examples of the Water Supply Survey Questionnaire and form letters are presented in Appendix I. Street addresses, corresponding survey questionnaire numbers, and the approximate locations of residences are depicted on Sheet 1.

2.3 FINDINGS

As of July 22, 1994, SvE had obtained water supply data for 112 of 120 residences within one-mile of the LBAD perimeter. No data was obtained for 8 of the 120 residences due to either no response from the resident or no occupancy at the location. The results of the survey were compiled and are presented in the table contained in Appendix II. The completed Water Supply Survey Questionnaires are presented in Appendix III.

2.3.1 Supplied Water

108 of the 112 persons responding to the survey reported that Kentucky American Water Company (KYA) was their source of potable water. The four locations that reported not to be supplied with potable water from KYA have water supplied through cisterns. No residents reported to have potable water supplied from wells or springs (groundwater).

The dates reported for municipal water service, where available, varied. The earliest reported date for municipal water service was 1940. Many reported that they have had municipal water for as long as they have resided at the location, which dates back to the early 1980's and before (i.e., connection to the municipal water supply occurred before their occupancy).

KYA purchased the water mains from the now defunct Lexington-Winchester Water District in 1966. At the time of purchase, six-inch water mains existed in the area. In 1973, KYA installed twelve-inch water mains. Information concerning water supply in the area with respect to the Lexington-Winchester Water District was not available from KYA.

2.3.2 Water Wells/Springs

Twenty residents reported wells on their property. Four of the twenty residents reported that the wells were active. Ten of the twenty residents reported that the wells have been abandoned. Three of the five active wells are used to supply water to livestock. One of the five active wells is also used to supply water to a geothermal heating system (this well also acts to supply water to livestock). One of the active wells was used by a concrete company to supply water to their batching operations. None of the five residents with active wells on their properties reported the use of water filters. Well construction and well abandonment information, where available, is presented in the summary table (Appendix II).

The water table is relatively shallow, particularly in low lying areas. Naturally occurring streams, springs, and ponds exist in the area but were not reported to supply water for domestic use. The streams, springs, and ponds were reported to be used by livestock and to provide irrigation to farms. Table 1 summarizes the information collected on wells and springs.

2.3.3 Septic Systems

There is no municipal waste water treatment plant in the area and most every respondent reported the use of a septic system. Two respondents did not know if they had a septic system. One respondent reported using an out-house and reported that a septic system has not been installed. Information concerning septic systems and the number of people utilizing them is provided in Appendix II on the summary table.

Table 1
WELL/SPRING SUMMARY

SHEET NO.	ADDRESS	OWNER	WATER SUPPLY	WELL STATUS	SPRING USE
100	6500 Briar Hill Road	B. Florence	KYA	Livestock	None
102	6340 Briar Hill Road	Chenault	KYA	Abandoned	Unused
103	6338 Briar Hill Road	R. Welch	KYA	Abandoned	Unused
107	6251 Briar Hill Road	C.E. Gibson	KYA	None	Livestock
108	6154 Briar Hill Road	A. Graves	KYA	Inactive	None
109	6116 Briar Hill Road	W. Jacobs	KYA	Livestock	Irrigation/Lives
110	5878 Briar Hill Road	W. Jacobs	KYA	None	Livestock
111	5740 Briar Hill Road	A. Allen	KYA	Abandoned	None
115	5655 Briar Hill Road	C. Paris	KYA	Abandoned	None
116	5668 Briar Hill Road	R. Lawrence	KYA	Inactive	None
117	5660 Briar Hill Road	R. Lawrence	KYA	Inactive	None
137	4978 Briar Hill Road	L. Simpson	KYA	None	Unused
141	5108 Briar Hill Road	C. Asbury	KYA	Unknown	Unused
145	3211 Muir Station Road	J. Morton	KYA	Abandoned	None
200	55436 Haley Road	S. Yoates	KYA	Concrete Mixing	None
202	4984 Haley Road	B. Abney	KYA	Inactive	None
206	4781 Haley Road	G. Meadows	KYA	None	Unused
207	4781-B Haley Road	C. Asbury	KYA	Inactive	Livestock
208	4650 Haley Road	H. Dotson	KYA	None	Unused
309	4129 Willow Road	A. Clay	KYA	Abandoned	Unknown
311	4179 Willow Road	Case	KYA	None	Unused
313	4196 Willow Road	J. Robinson	KYA	None	Unused
400	3057 Huston-Antioch Road	J. Dwyer	KYA	None	Irrigation
403	3239 Huston-Antioch Road	Pambarton	KYA	Inactive	None
405	3471 Huston-Antioch	Carmichael	KYA	Unknown	Unused
406	2745 Huston-Antioch	T. Schrpetta	KYA	None	Unused
411	2700 Huston-Antioch	Banahan	KYA	None	Livestock
500	6400 Ware Road	J. Littrell	KYA	Abandoned	None
505	6251 Ware Road	B. Florence	KYA	None	Livestock
507	(Rt. 9 Ware)	B. Eades	KYA	Inactive	None
510	6298 Ware Road	F. Sagraves	KYA	Abandoned	Livestock
511	6260 Ware Road	J. Jarrell	KYA	Geothrm./Livestock	Livestock
513	6139 Ware Road	R. Isbell	KYA	Unknown	Livestock
515	6041 Ware Road	Mason	Cistern	None	Unused
516	Box 349, Rt. 5	R. Decreech	KYA	Abandoned	Unused
519	6135 Ware Road	B. Kephart	KYA	None	Livestock

3.0 FOUR MILE RADIUS EXTENDED AREA STUDY

3.1 PURPOSE

The purpose of the extended area study was to identify areas not served by municipal water in a zone extending from one to four miles beyond the perimeter of the LBAD. The zone covered by the extended area study is depicted in Figure 1.

3.2 PROCEDURES

The extended area study consisted of reviewing existing available data obtained from the two water supply utility companies serving the area around LBAD. SvE obtained electronic USGS quad maps from American Digital Cartography, Inc. for the area surrounding the LBAD and visited both the Kentucky American Water Company (KYA) and the Boonesborough Water Association (BWA) to obtain water supply line maps. Water supply line information was transferred from KYA and BWA maps to the electronic USGS quads. The approximate locations of the KYA and BWA water supply lines in the area of extended study are shown on Sheet 2.

KYA is in the process of digitizing their existing water supply line maps; however, only hard copies of the maps were available at the time of this study. BWA has retained Kenvirons, Inc. of Frankfort, Kentucky since 1989 to assist in maintaining utility maps and associated information. A copy of the BWA water system map, prepared by Kenvirons, Inc., was obtained from BWA and the water main location was transferred onto the electronic USGS quads for the area. Copies of written correspondence from BWA and written summaries of telephone conversations between SvE, KYA, Kenvirons, Inc., and BWA are contained in Appendix IV.

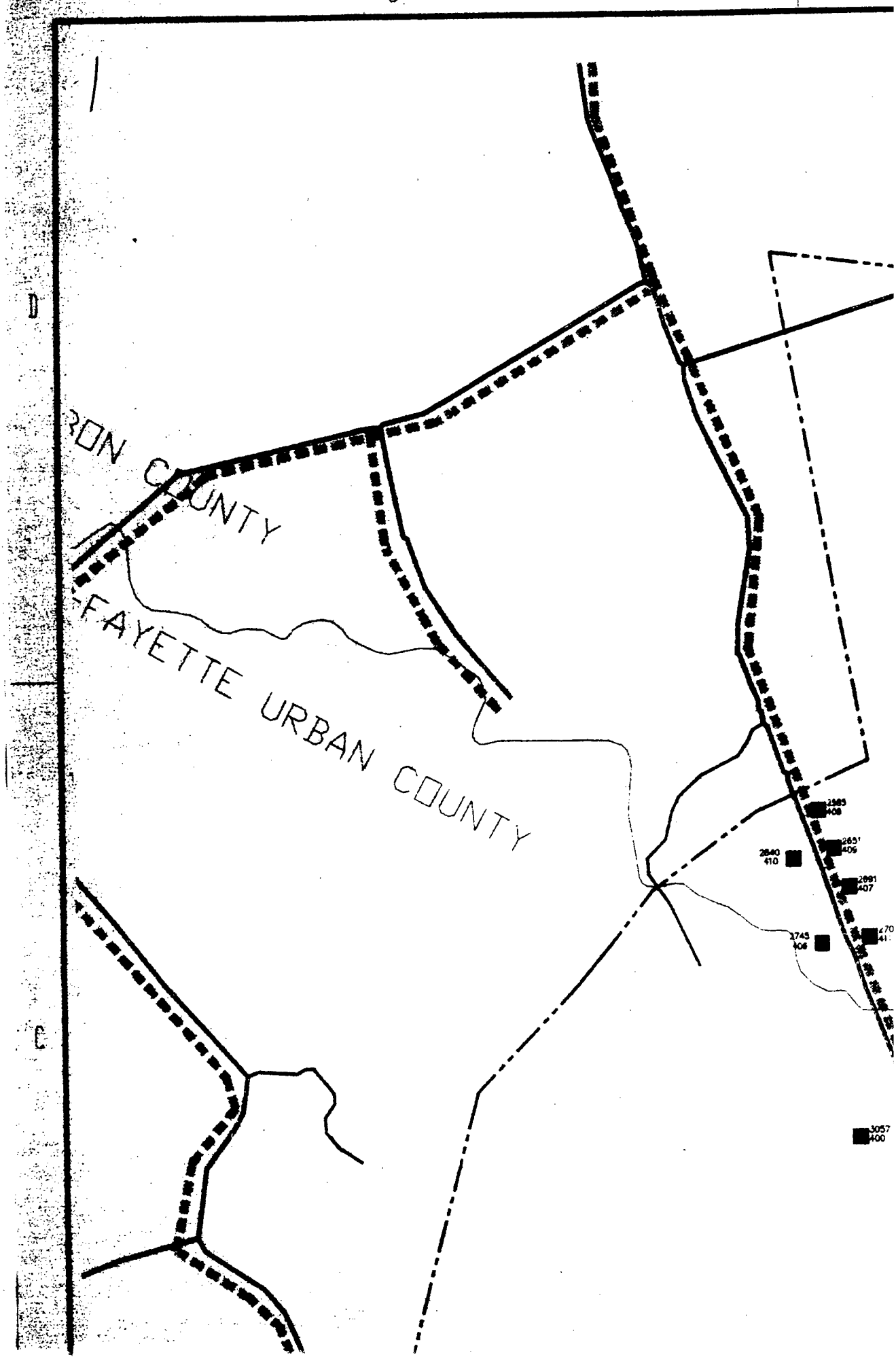
3.3 FINDINGS

KYA began servicing the area surrounding LBAD after purchasing water supply lines from the now defunct Lexington-Winchester Water District. Information about water supply lines installed prior to KYA's purchase was not available from KYA. At the time of purchase, six-inch water mains existed in the area. In 1973, KYA installed twelve-inch water mains and replaced some existing six-inch mains with twelve-inch mains.

BWA installed most of their water lines in the vicinity of LBAD in the late 1960's up until approximately 1971. Water lines were installed in the Hancock Valley area along the Clark

County and Lexington-Fayette Urban County lines in approximately 1974. Water lines were installed along Van Meter Road from a period beginning in 1976 and ending in 1990.

Based on a review of available data and conversations with KYA, BWA, and Kenvirons, Inc. no residences within four miles of the LBAD perimeter are known to use wells or springs as a source of potable water. The only alternative source of potable water reported to be used in the vicinity of LBAD is provided by cisterns. Due to the rural nature of the extended area surrounding LBAD, residences may exist that are not connected to the public water supply and whose source of potable water is not known by the water utility companies. KYA and BWA can generate a list of customers; however, this information would only serve to identify residences connected to known water supply lines.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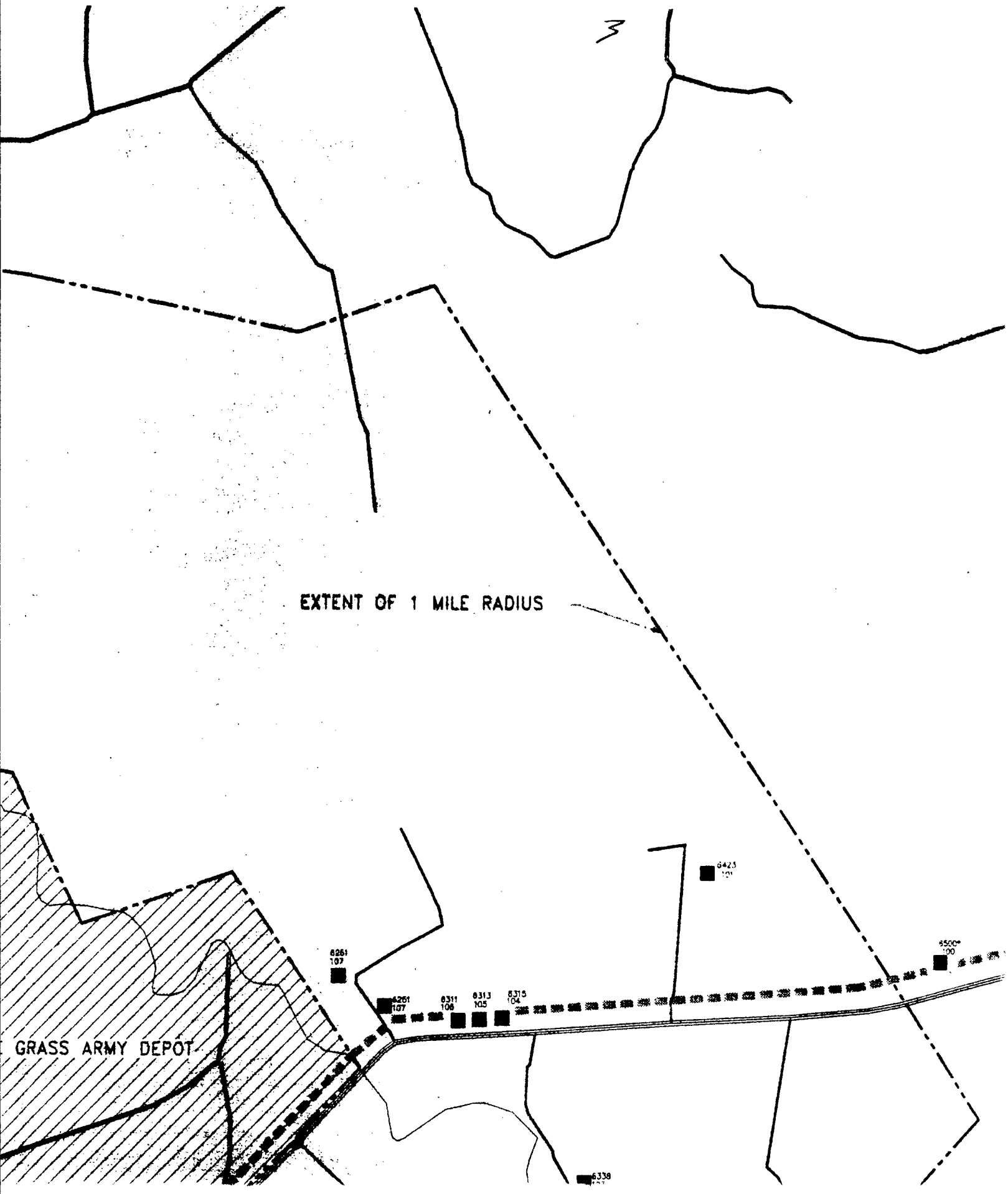
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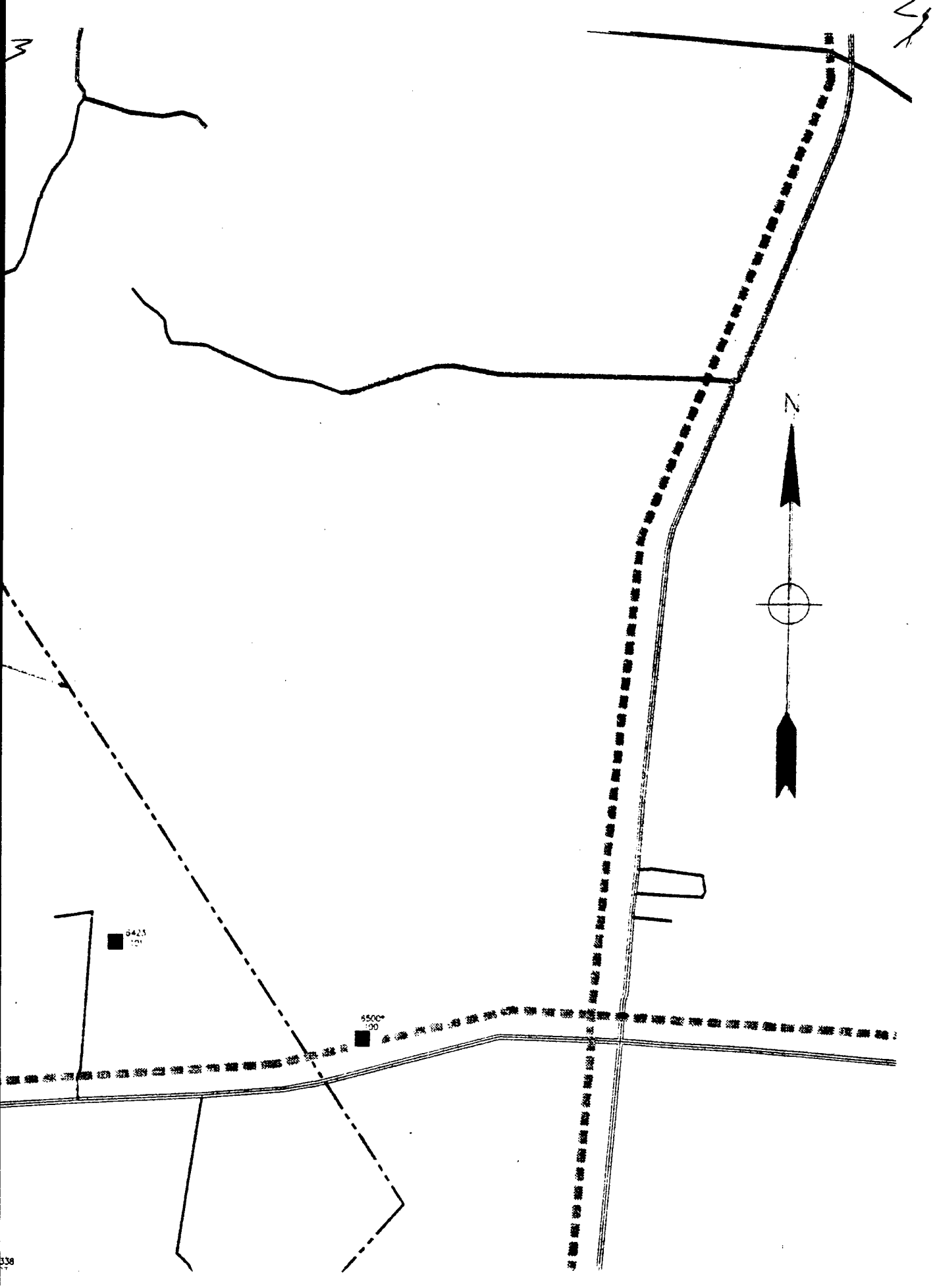
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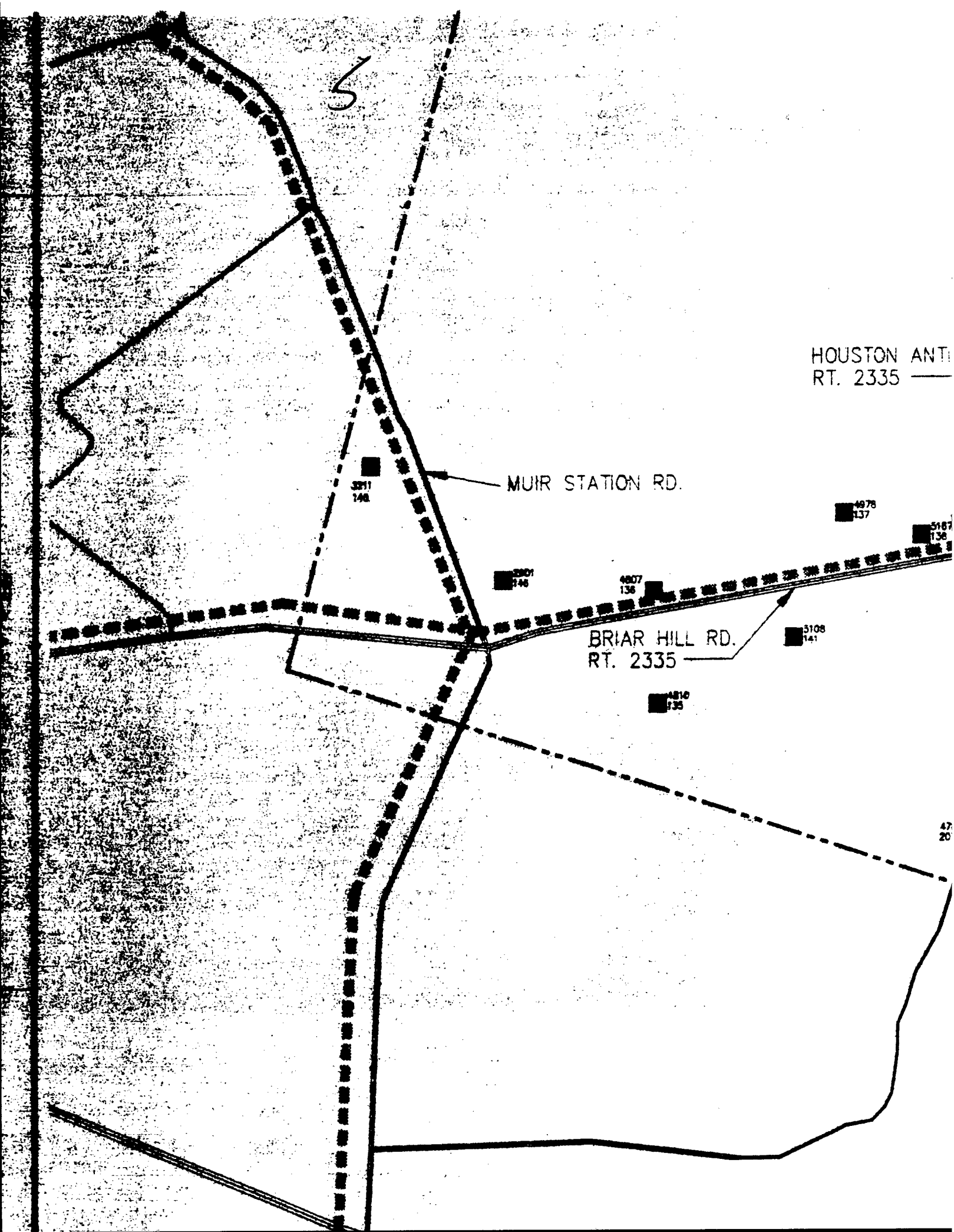
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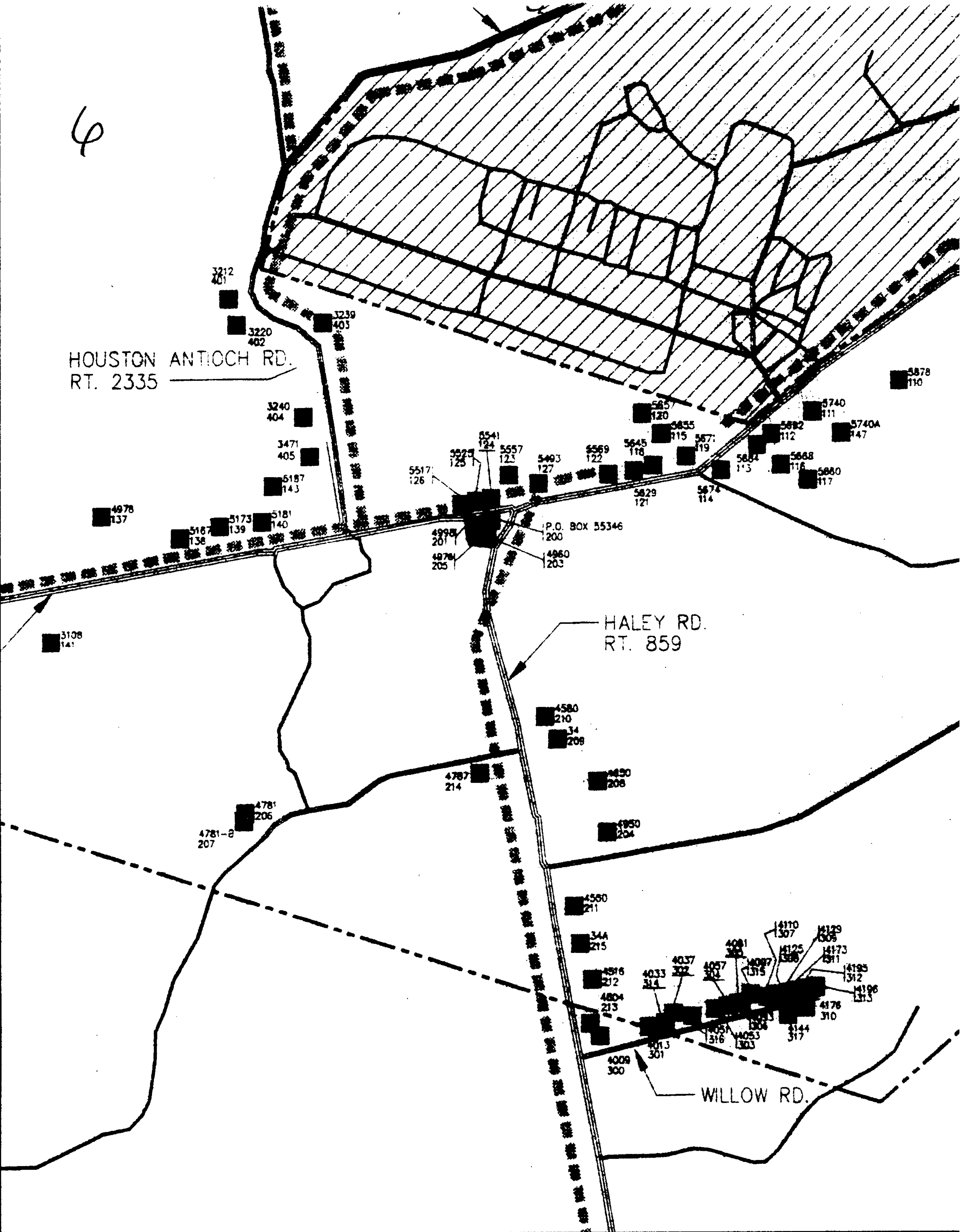

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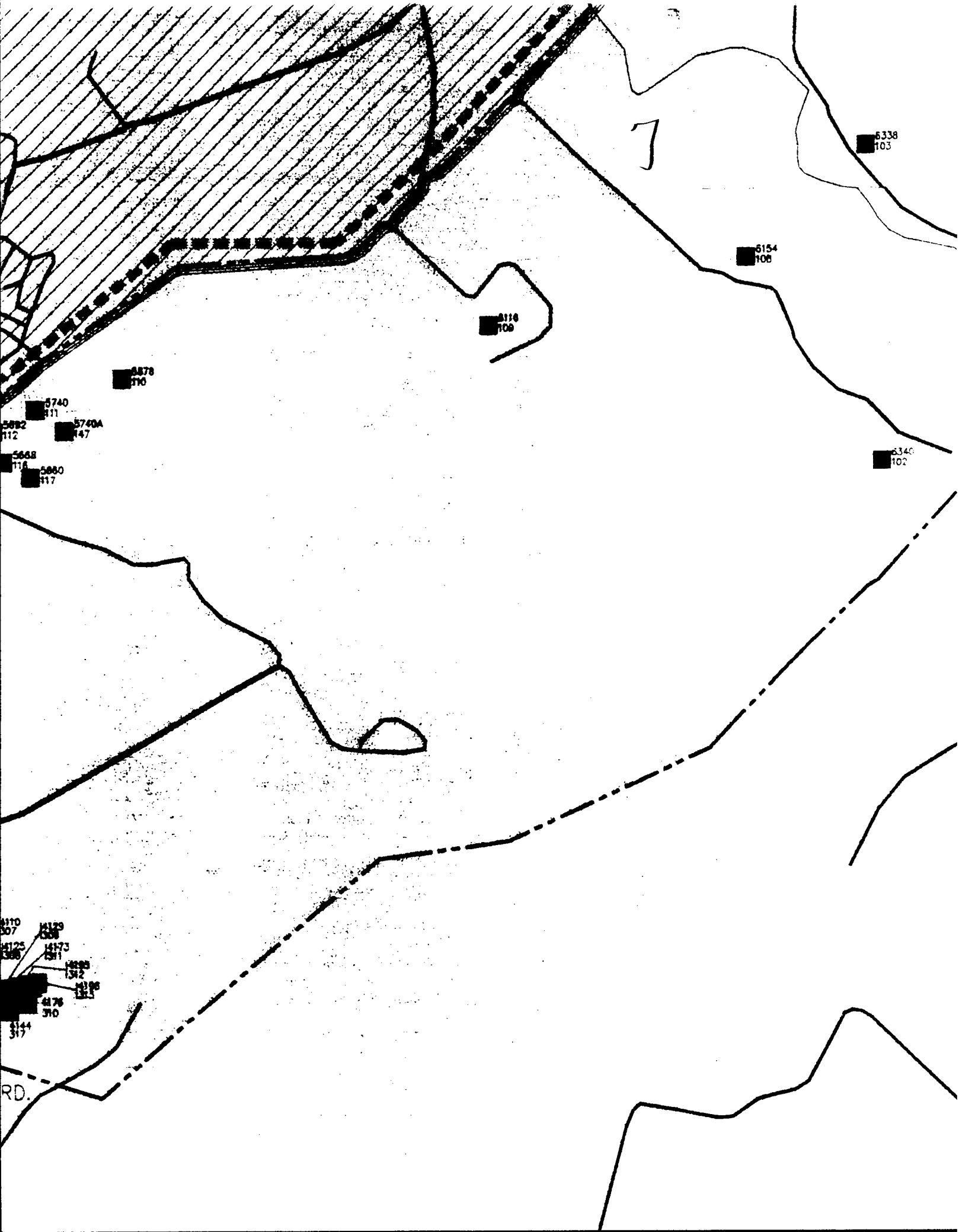
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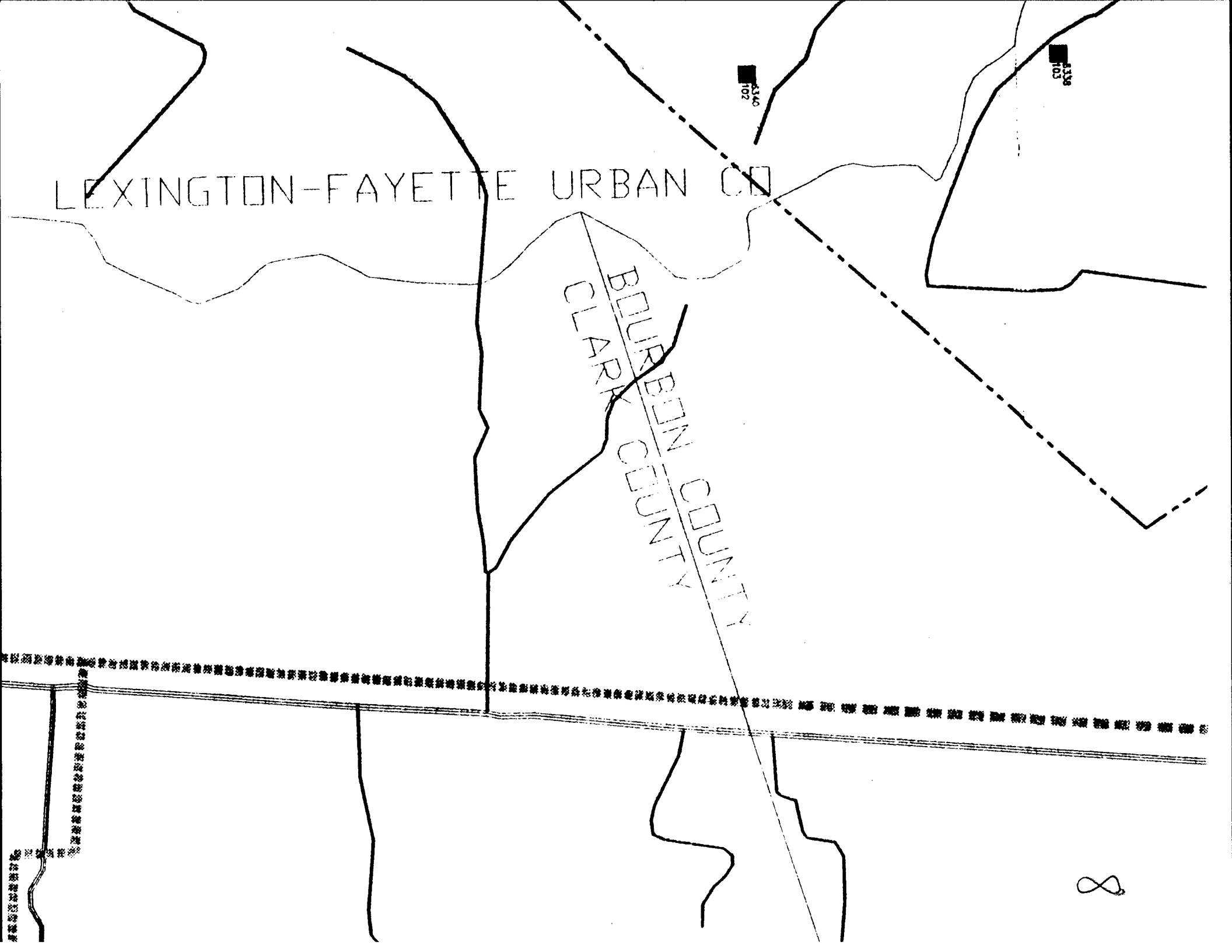
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110 — CORRESPONDING FIELD SURVEY SHEET NO. (SEE APPX. II & APPX. IV)

KENTUCKY AMERICAN WATER COMPANY WATER LINE

2 BOONESBORO WATER ASSOCIATION WATER LINE

[1] HOUSES/BUILDINGS SHOWN ARE NOT TO SCALE. LOCATIONS ARE APPROXIMATE. HOUSES/BUILDINGS OUTSIDE 1 MILE RADIUS ARE NOT SHOWN.

[2] LOCATIONS SHOWN ARE FOR PRESENTATION PURPOSES ONLY AND DO NOT REPRESENT THE ACTUAL ALIGNMENT

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Revisions	Date	Description	By	Checked

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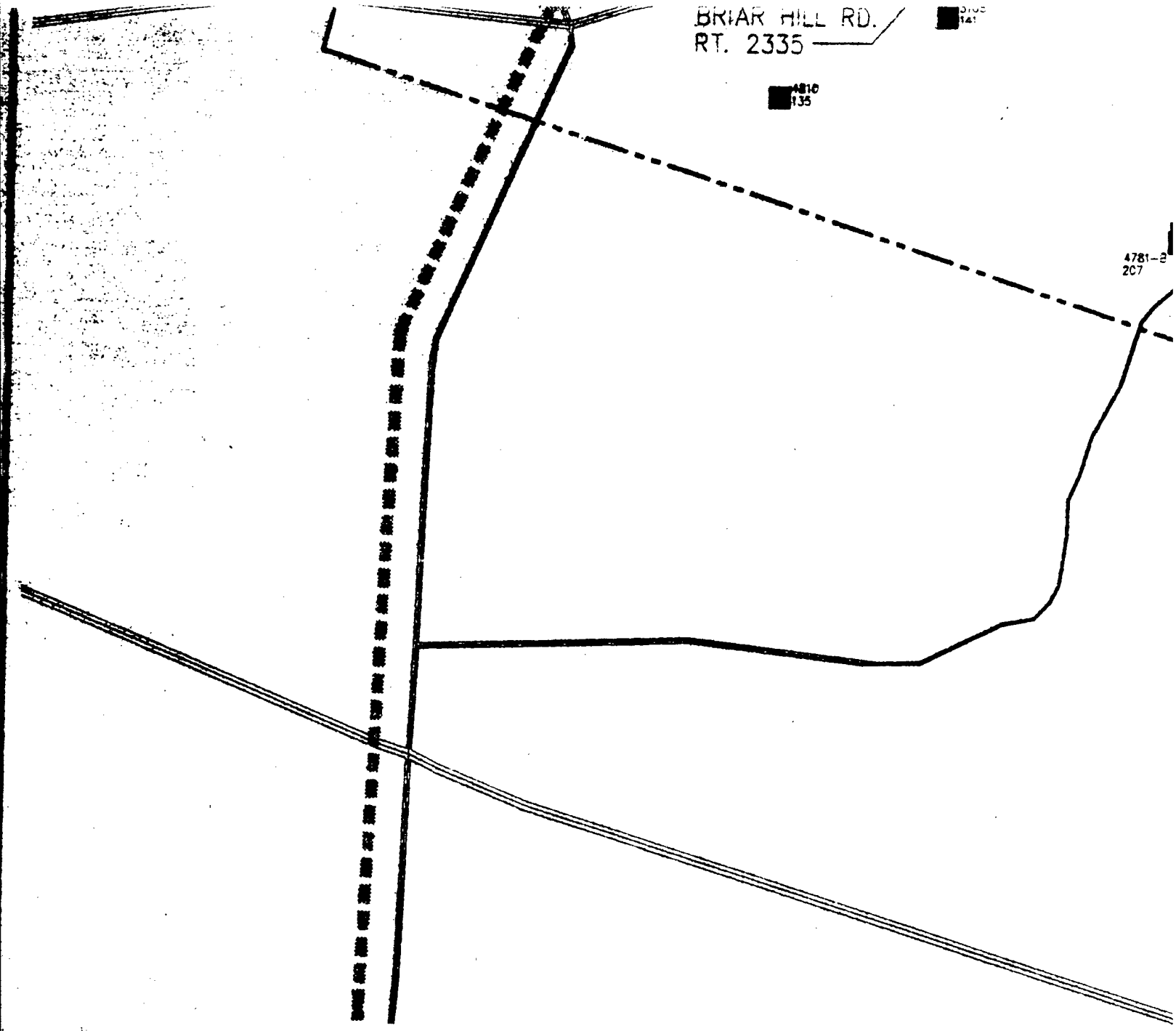

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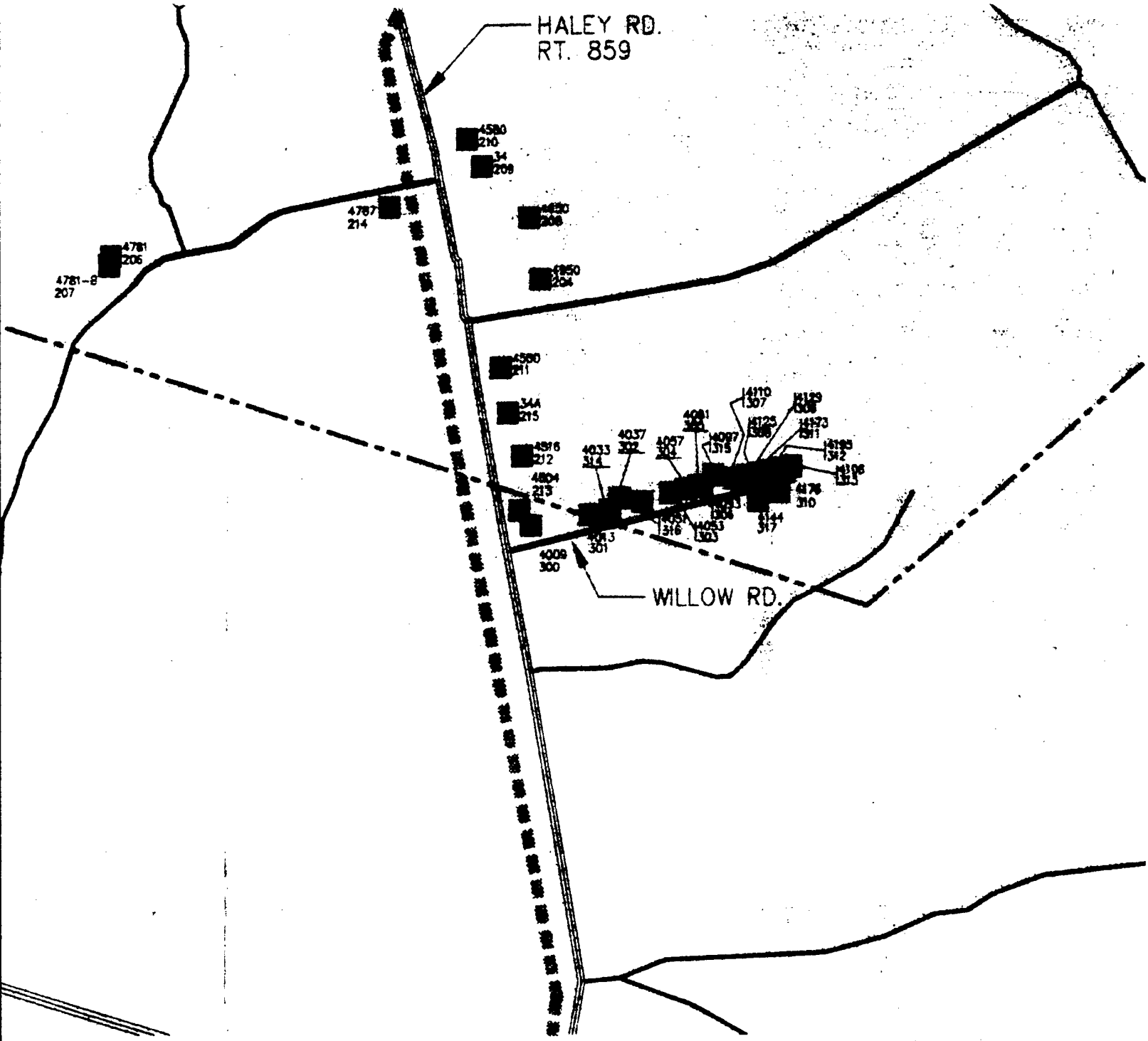
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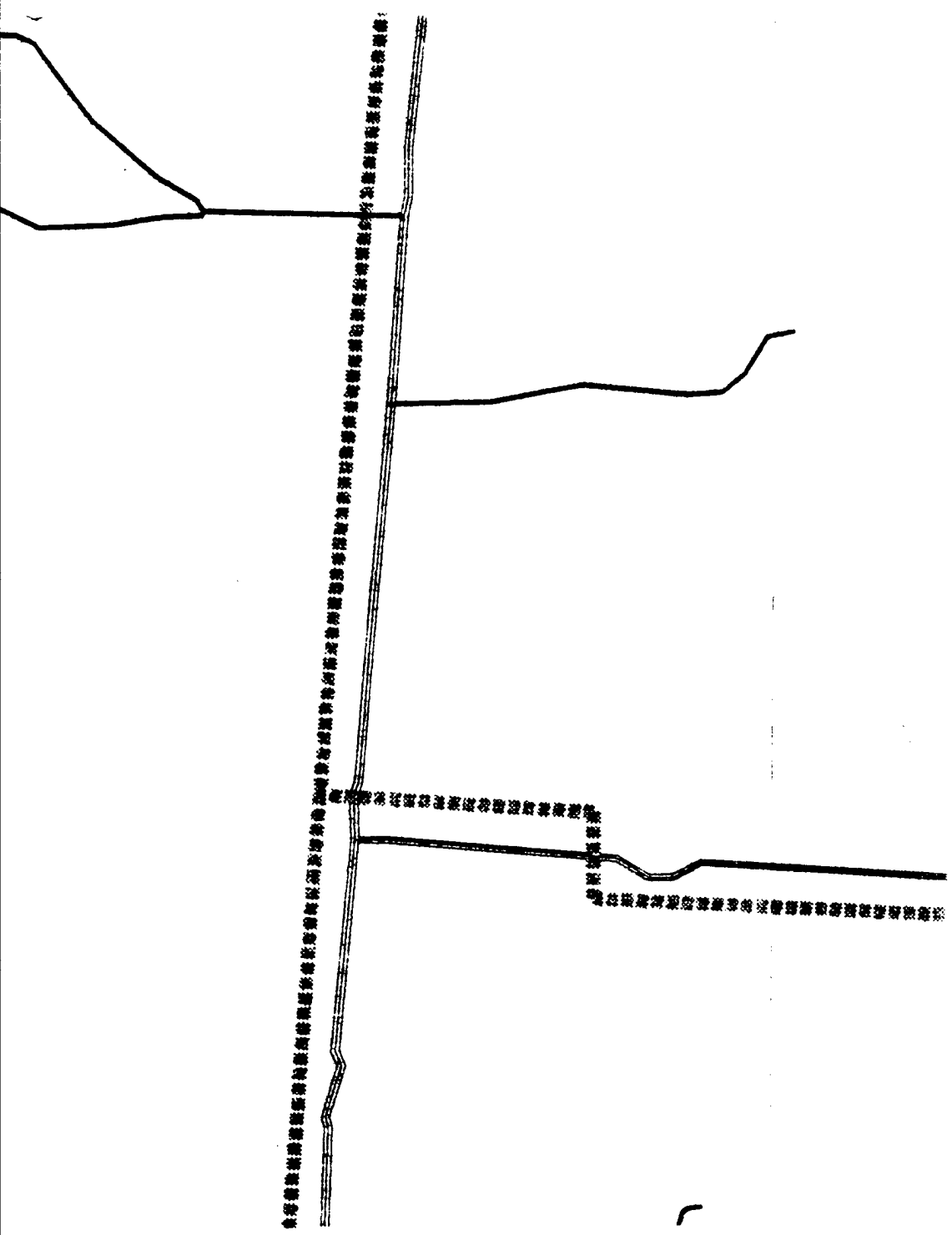

Revisions	Date

Sverdrup
ENVIRONMENTAL, INC.
13723 RIVERPORT DR
MARYLAND HEIGHTS,

Drawn By:
B. MEYERS

Checked By:
D. MALONEY

ENGINEER

Approved By:

CHIEF, HTRW DESIGN BRANCH

CHIEF, ENV. RESTORATION DIV

COMPUTER AIDED DESIGN & DRAFTING

14 2

ARE APPROXIMATE. HOUSES/BUILDINGS OUTSIDE 1 MILE RADIUS ARE NOT SHOWN.

2 LOCATIONS SHOWN ARE FOR PRESENTATION PURPOSES ONLY AND DO NOT REPRESENT THE ACTUAL ALIGNMENT

Revisions	Date	Description	By	Checked

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Graphic Scale

Sverdrup ENVIRONMENTAL, INC.
13723 RIVERPORT DRIVE
MARYLAND HEIGHTS, MO. 63043

US Army Corps of Engineers Nashville District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NASHVILLE, TENNESSEE

A

Drawn By: B. MEYERS

Checked By: D. MALONEY

ENGINEER

LEXINGTON KENTUCKY
ARMY DEPOT ACTIVITY

ONE MILE RADIUS MAP

Approved By:

CHIEF, HTRW DESIGN BRANCH

CHIEF, ENV. RESTORATION DIV.

Date: 08-09-94

Record Drawing as constructed dated

Scale: AS NOTED

Sheet 1 of 2

Drawing Number 1

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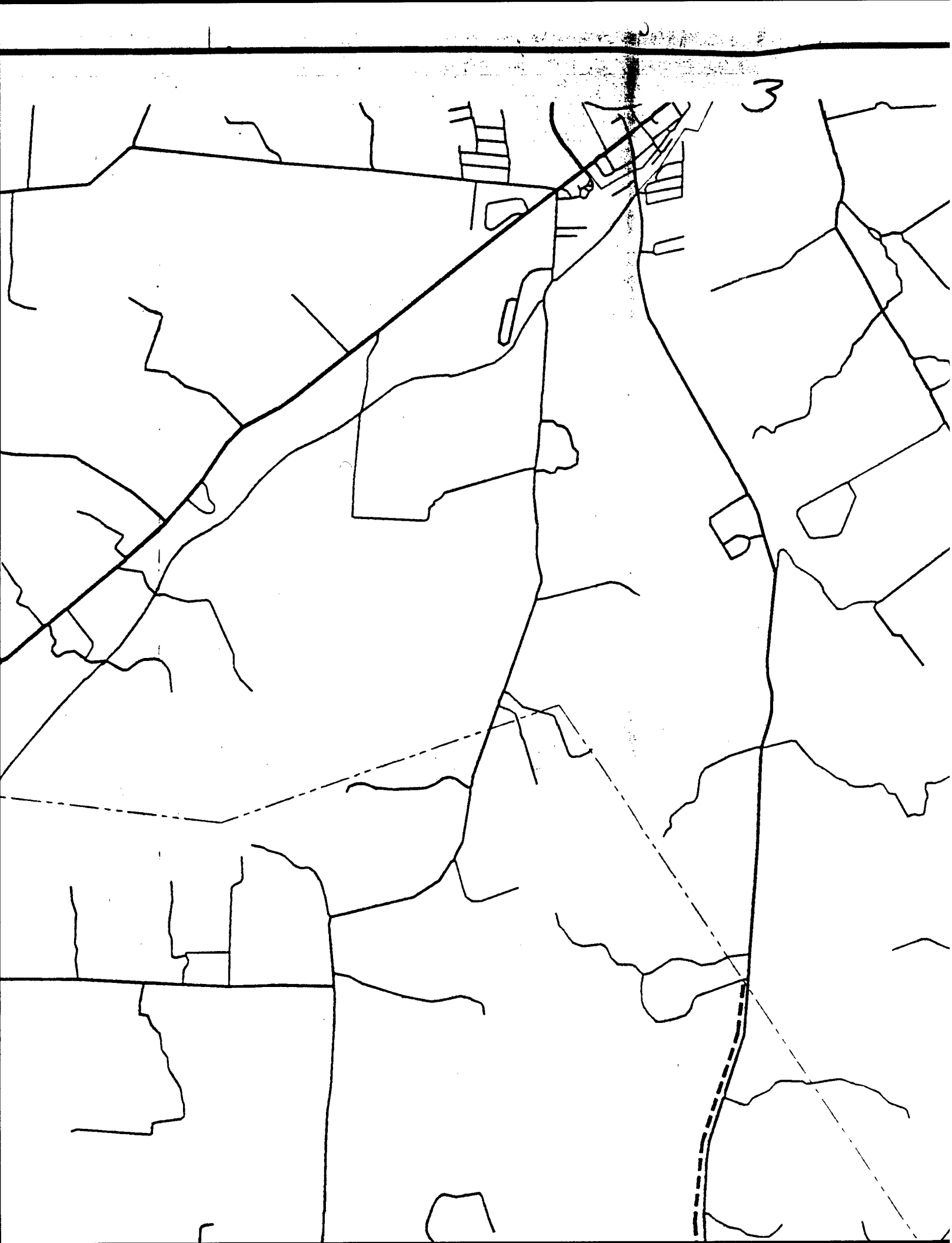
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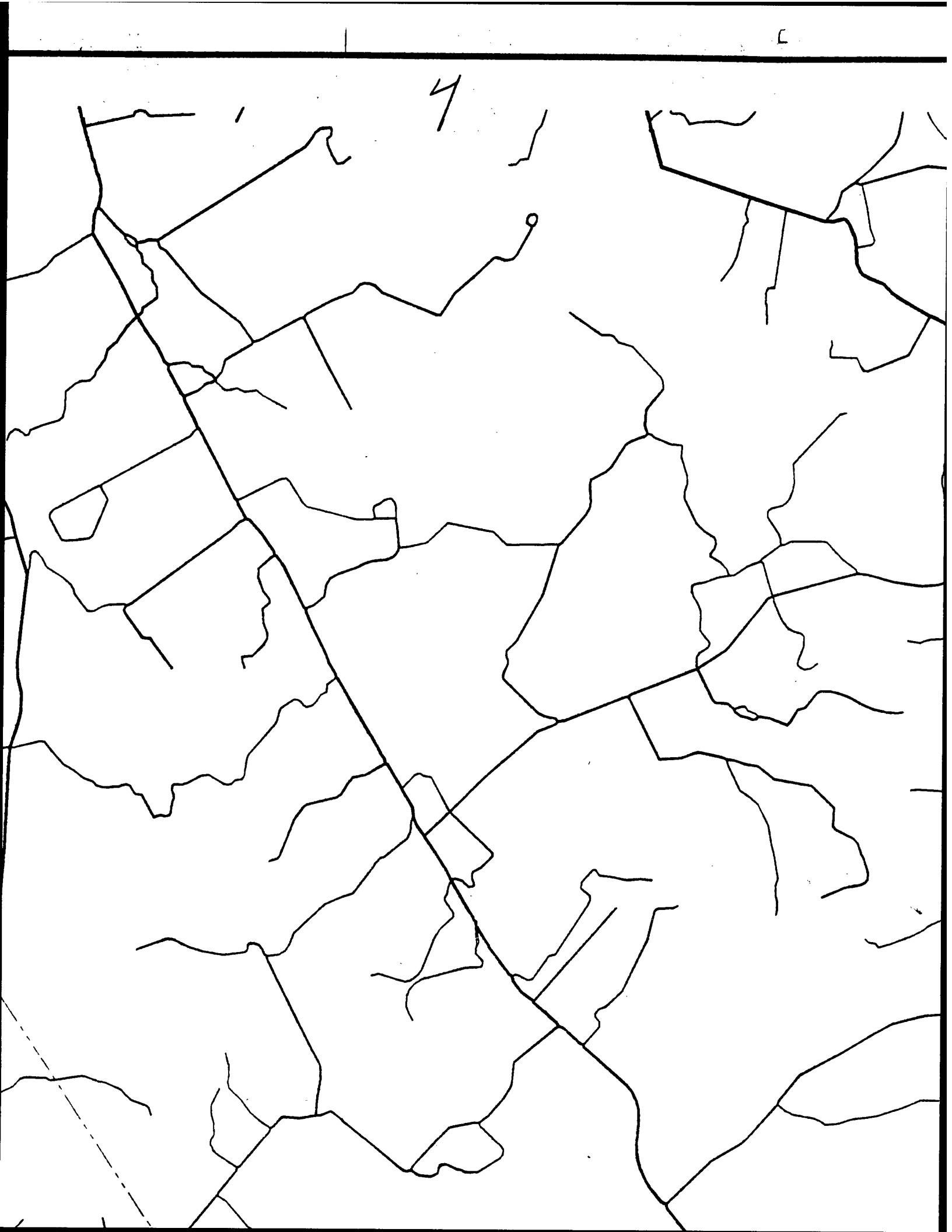

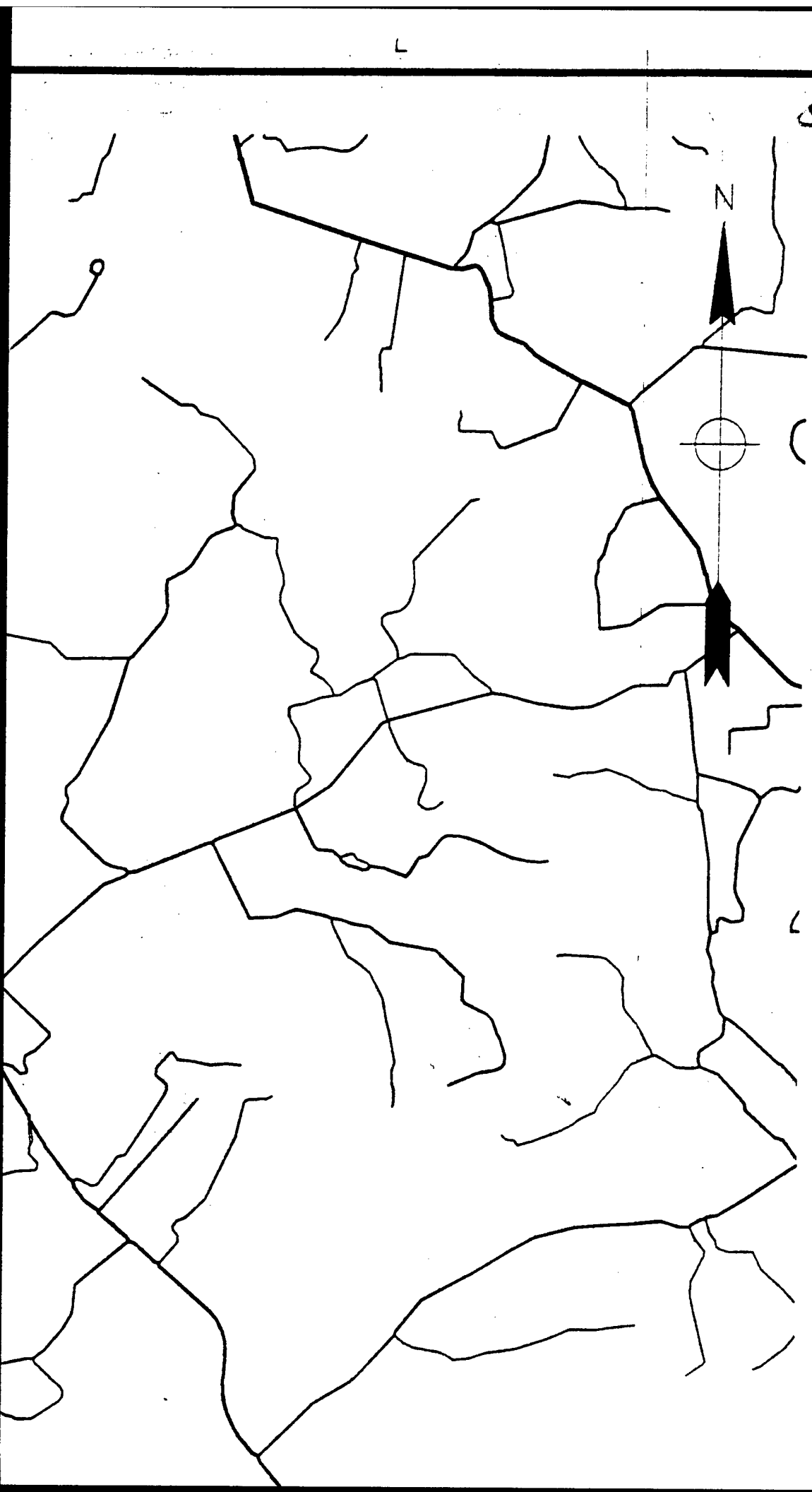
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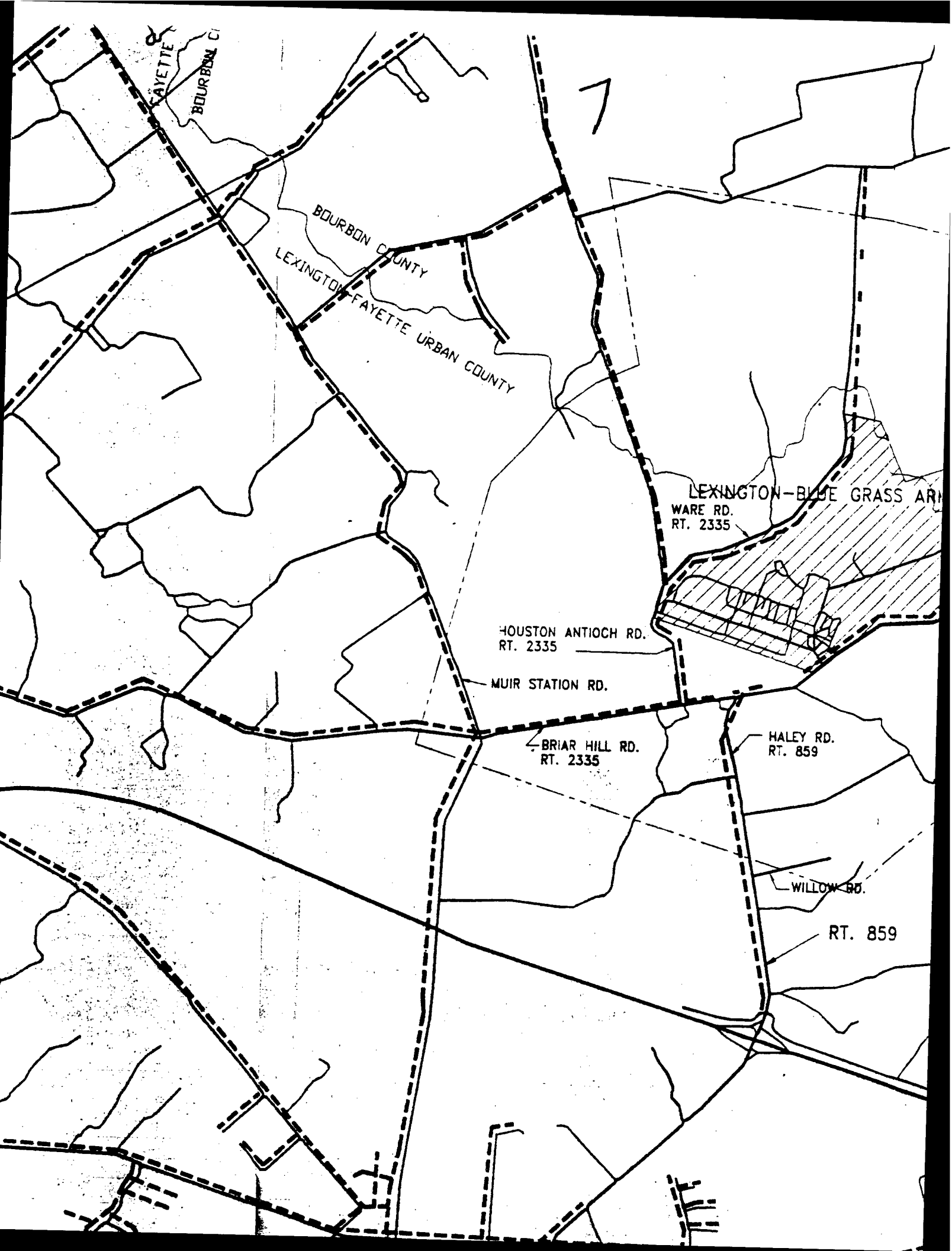
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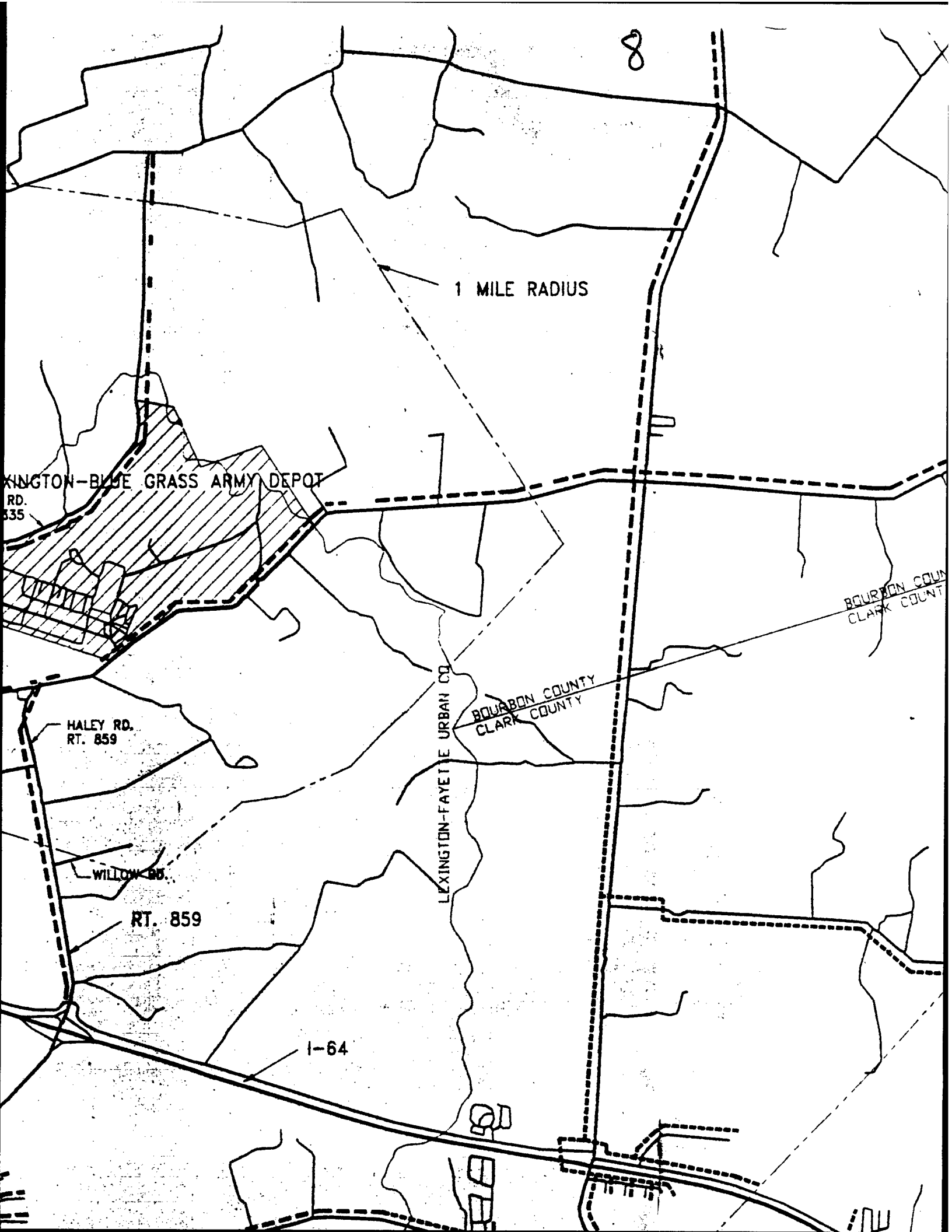
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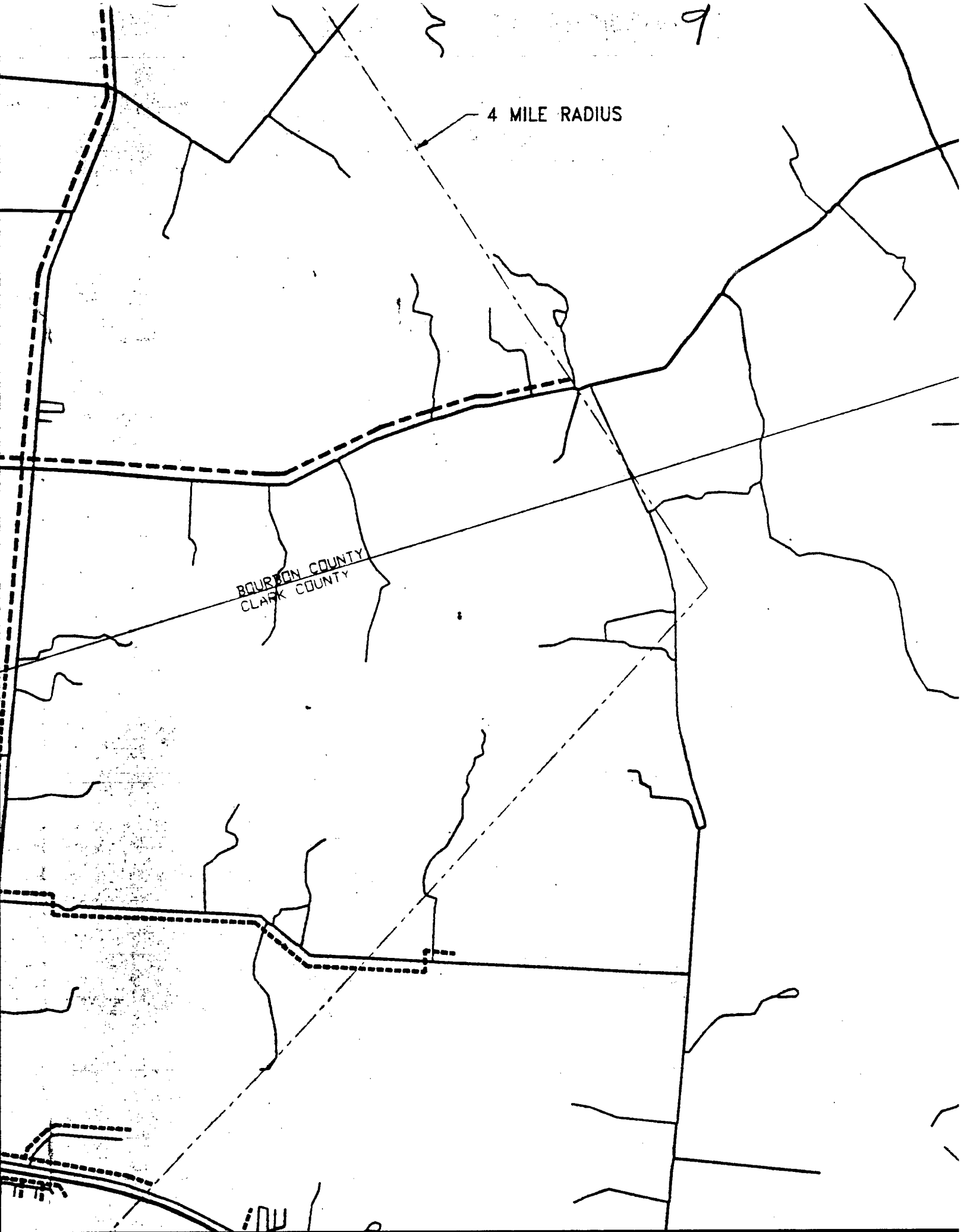
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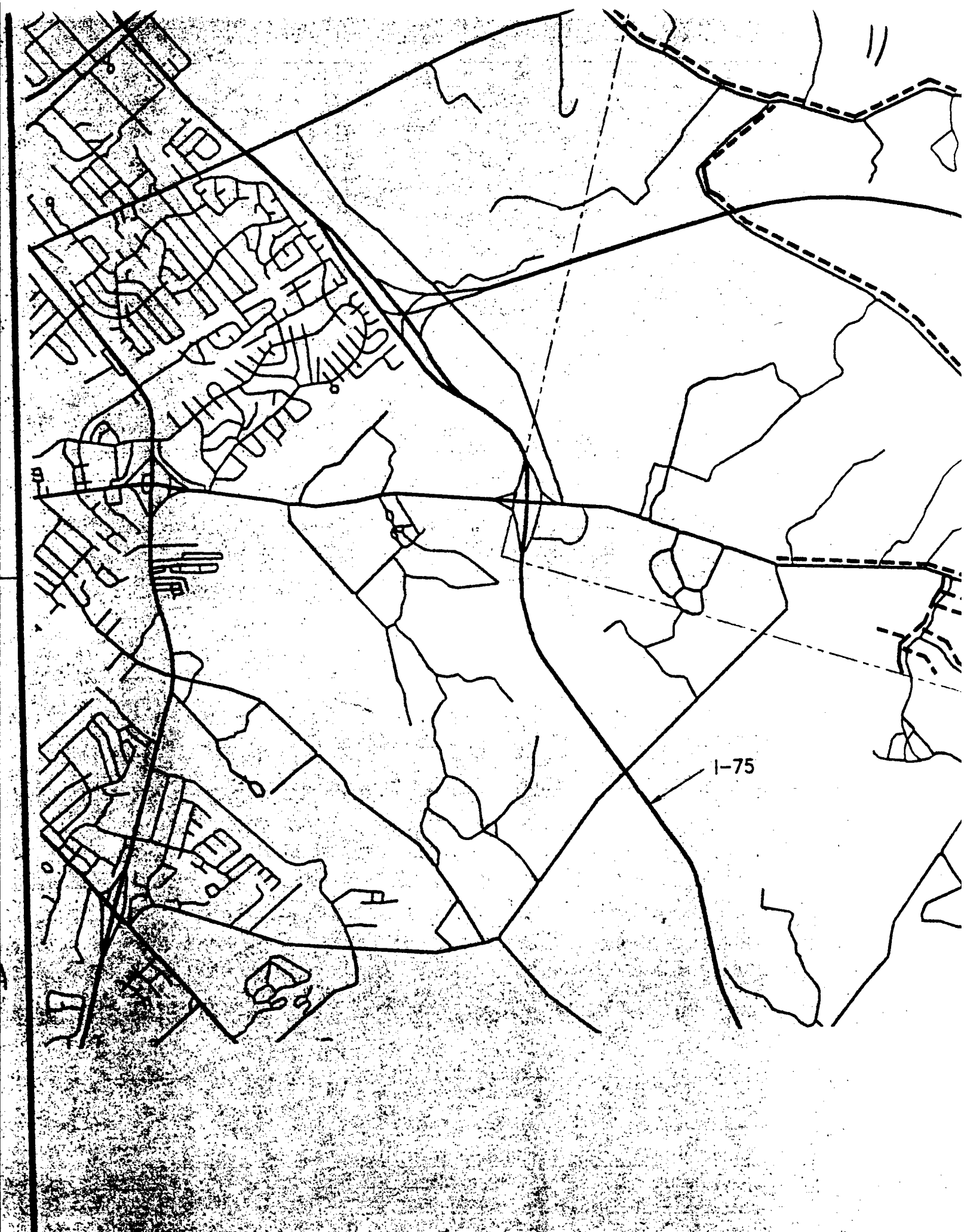
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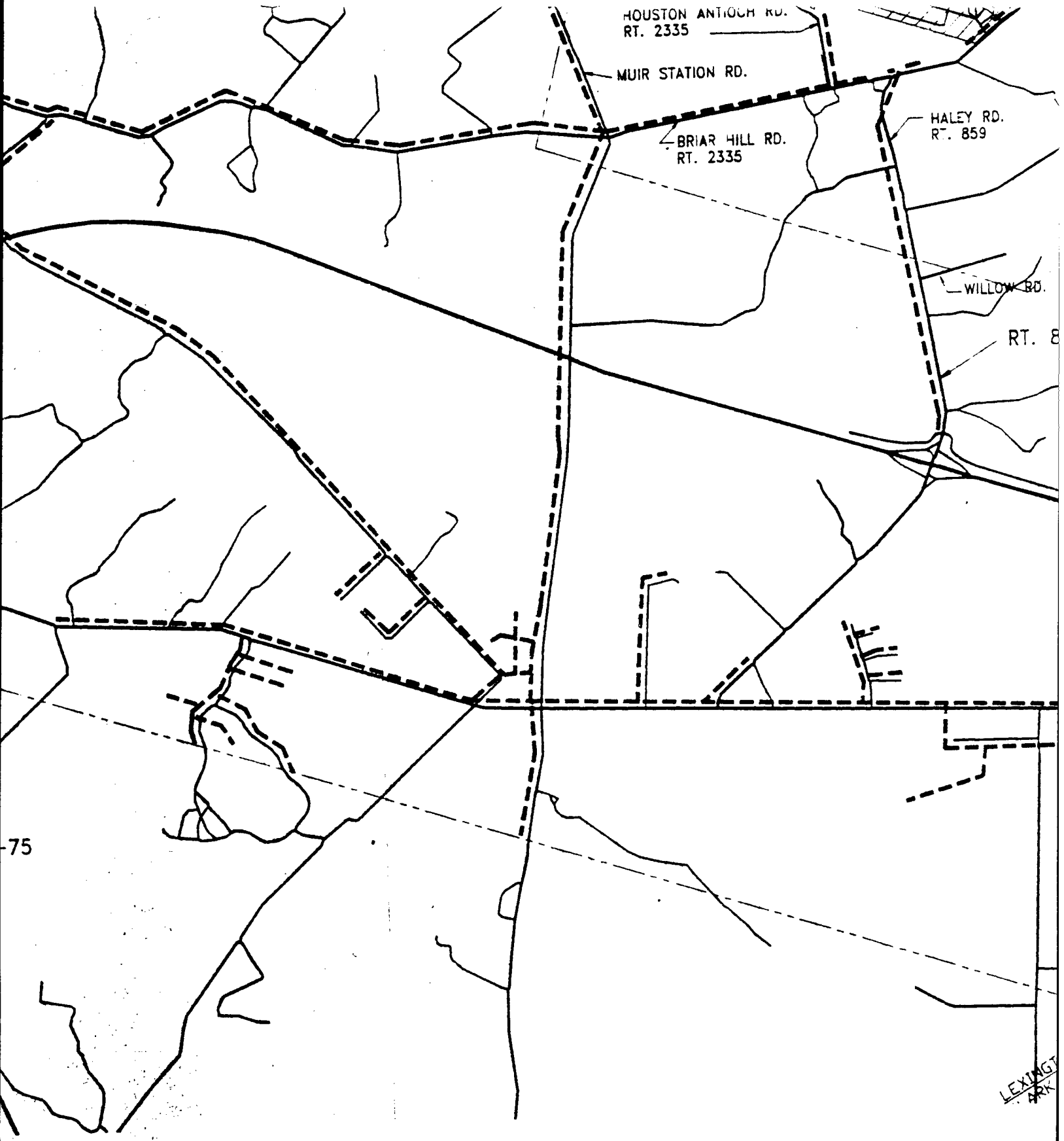
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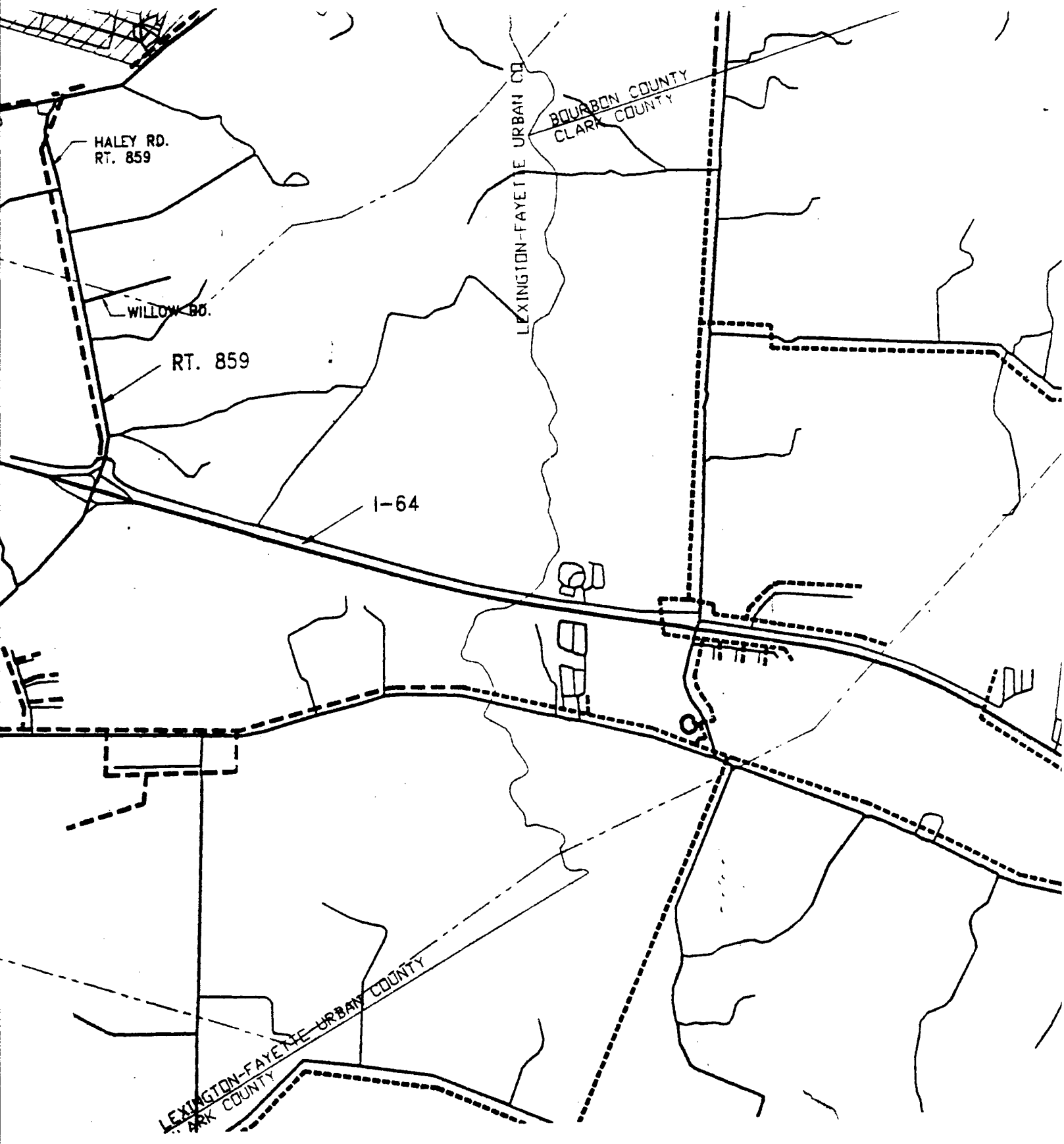
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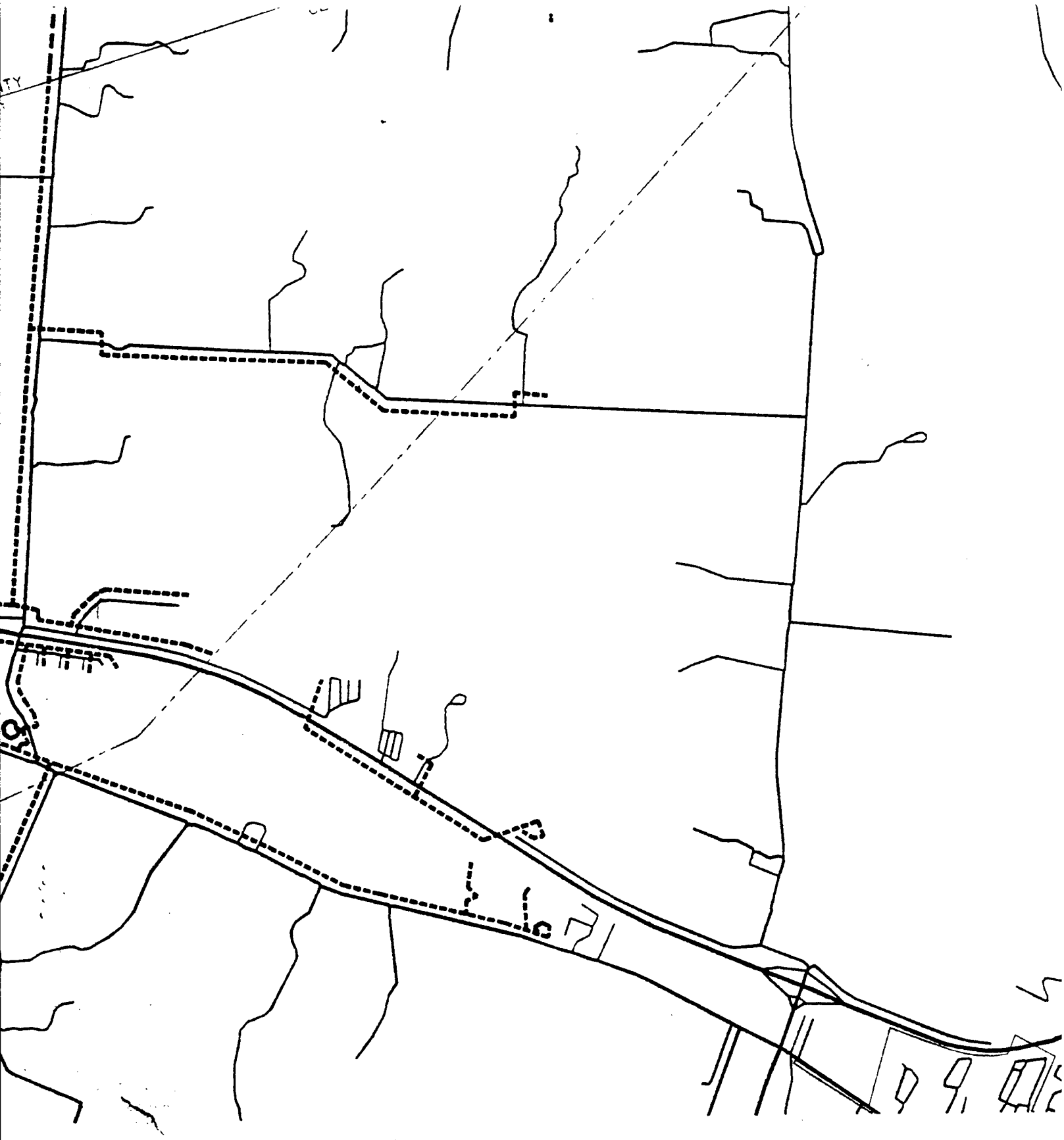

KENTUCKY AMERICAN WATER COMPANY WATER LINE

BOONESBORO WATER ASSOCIATION WATER LINE

[1] LOCATIONS SHOWN ARE FOR PRESENTATION PURPOSES ONLY AND DO NOT REPRESENT THE ACTUAL ALIGNMENT

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	Date	Description	By	Checked

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Graphic Scale

Sverdrup ENVIRONMENTAL, INC.

723 RIVERPORT DRIVE
RYLAND HEIGHTS, MO. 63043

US Army Corps of Engineers Nashville District

U.S. ARMY ENGINEER DISTRICT
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NASHVILLE, TENNESSEE

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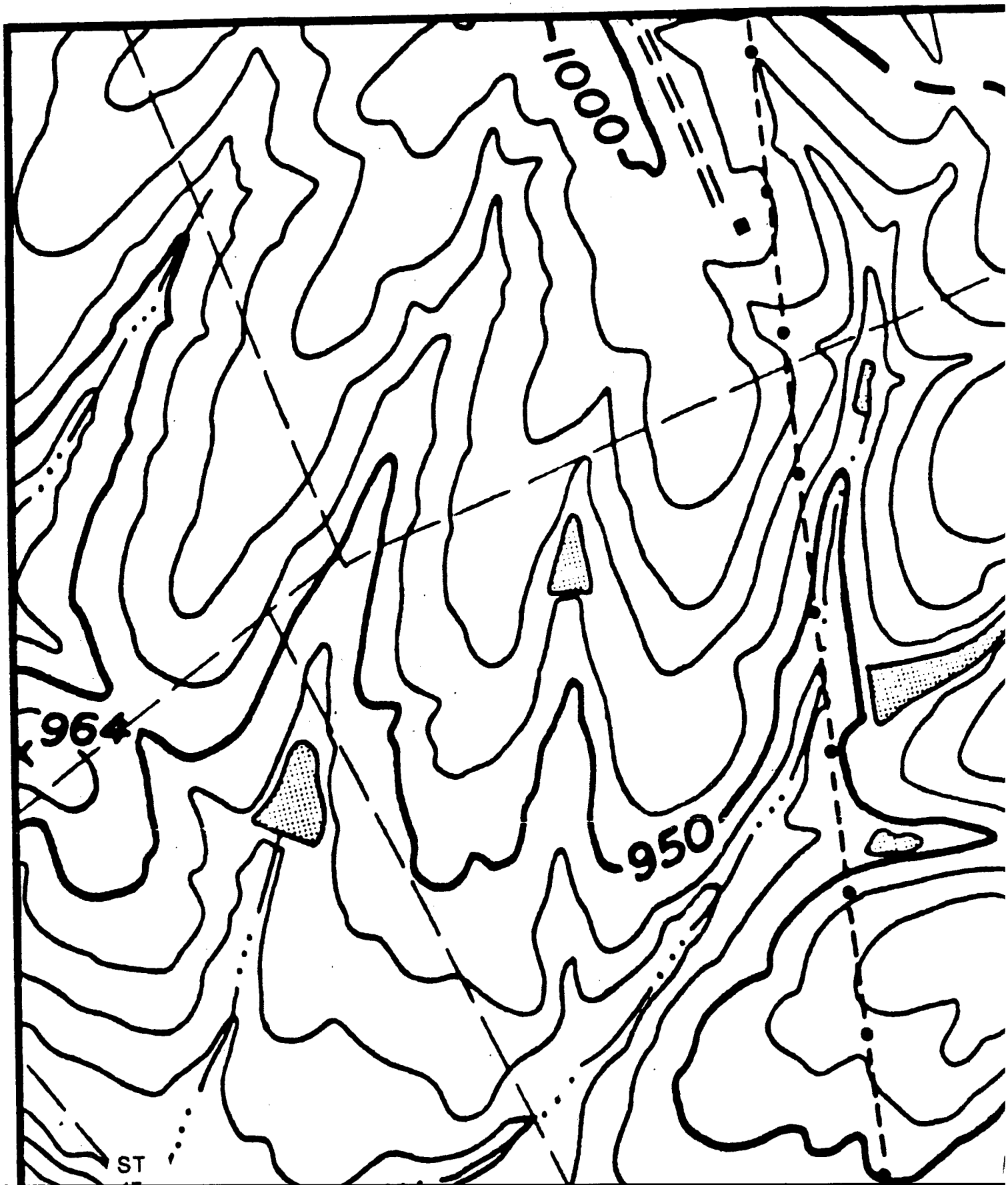
LEXINGTON KENTUCKY
ARMY DEPOT ACTIVITY

FOUR MILE RADIUS MAP

Date: 09-30-94

Scale: AS NOTED

Sheet 2 of 2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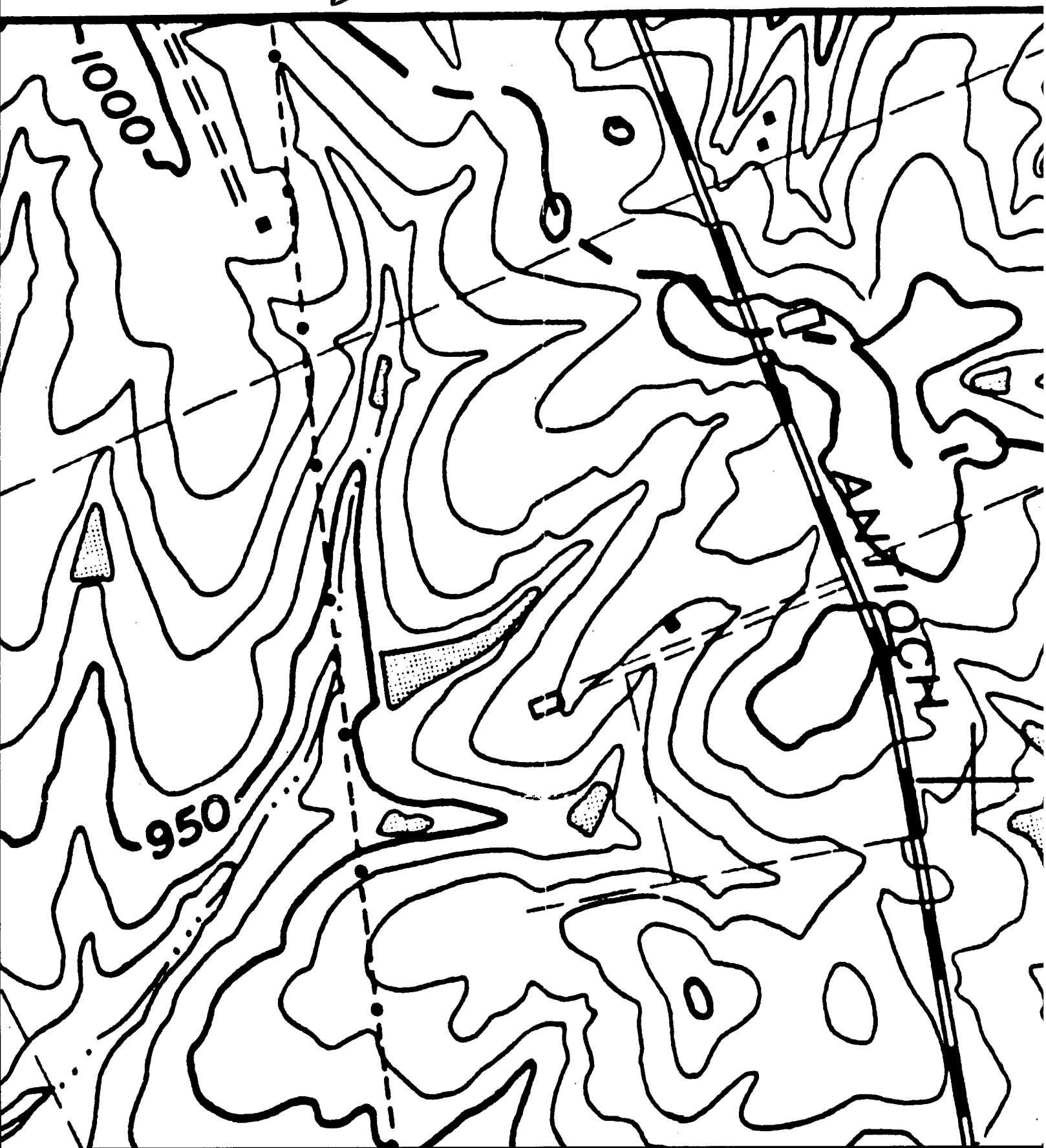
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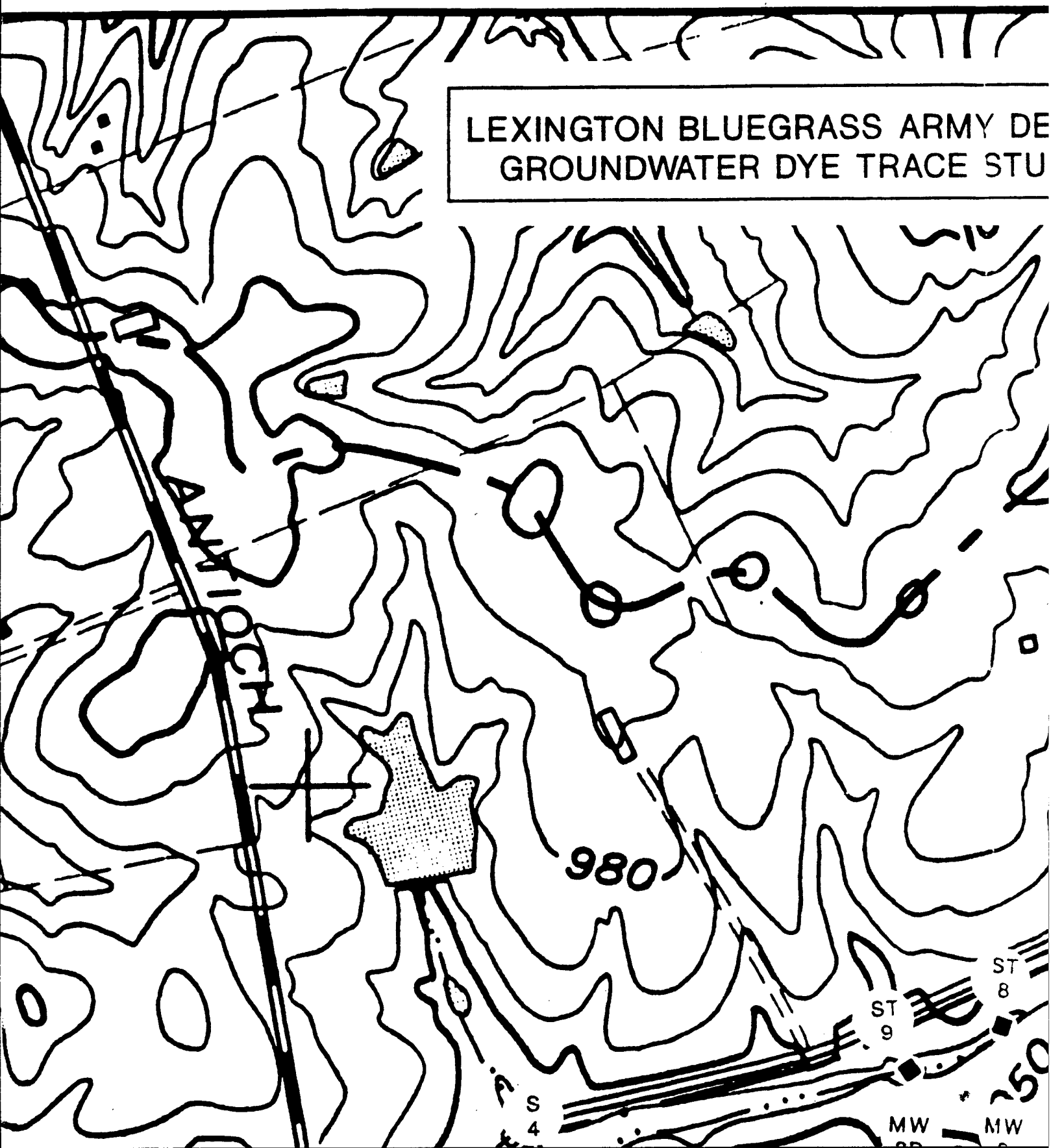
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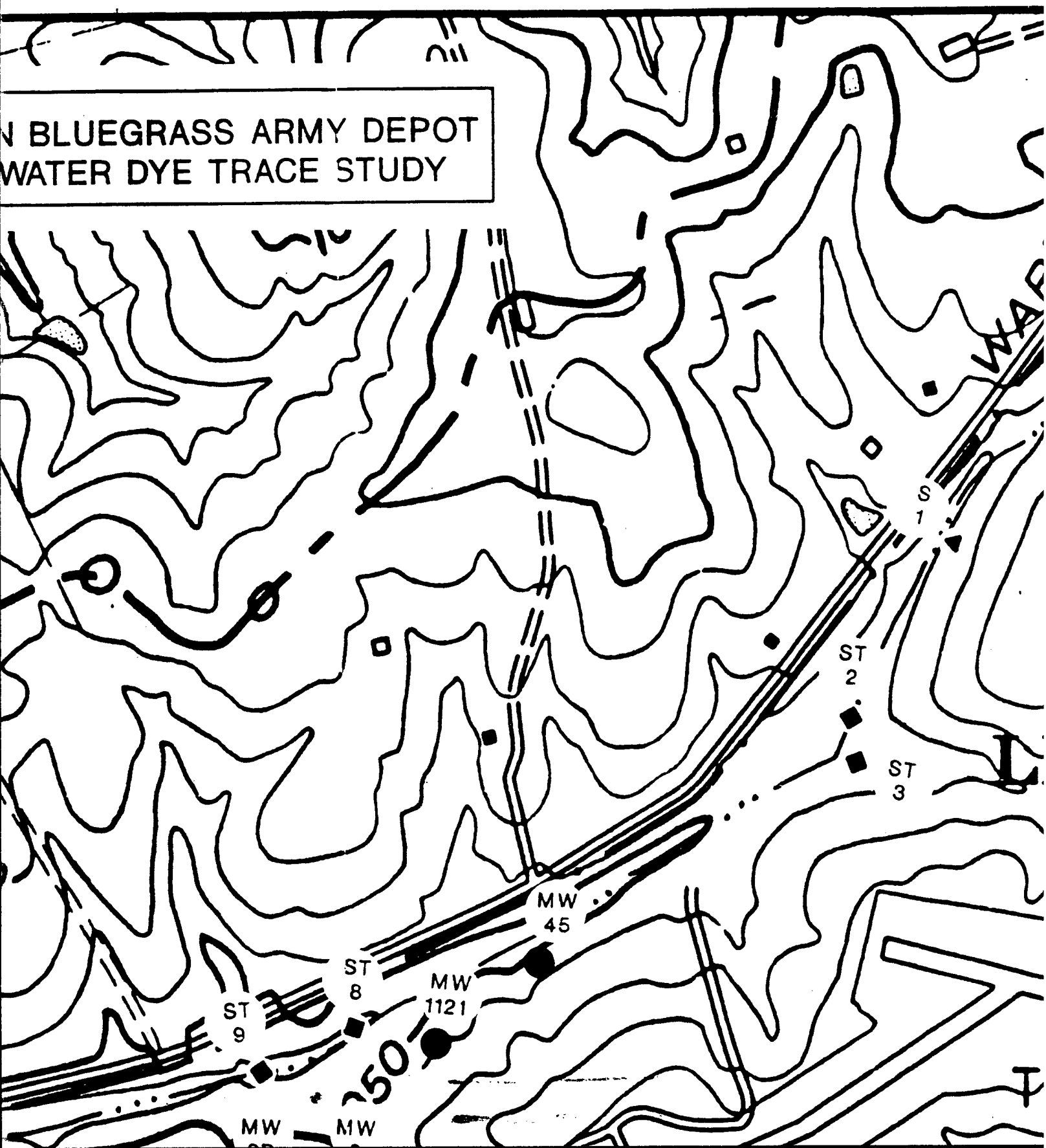
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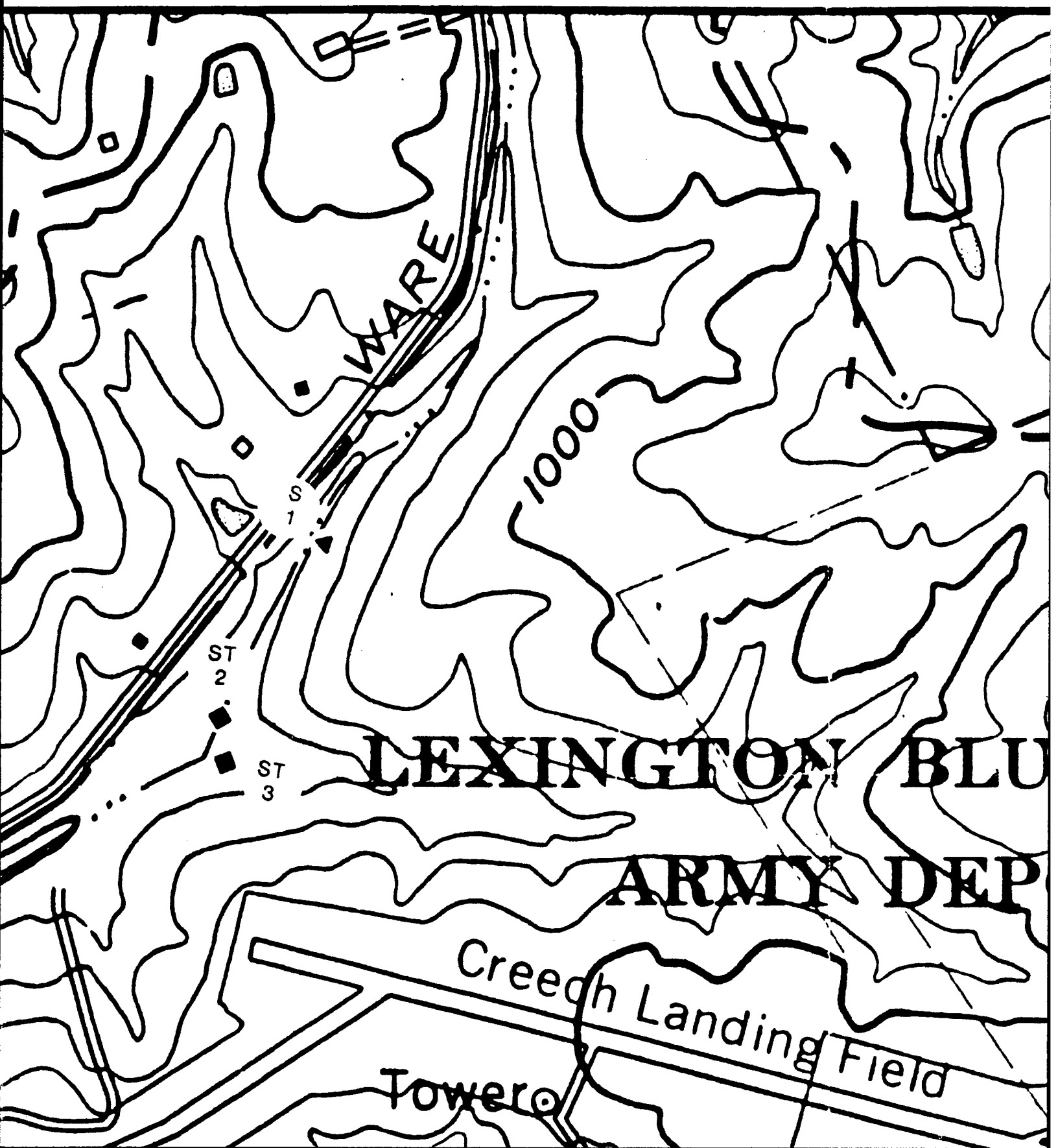
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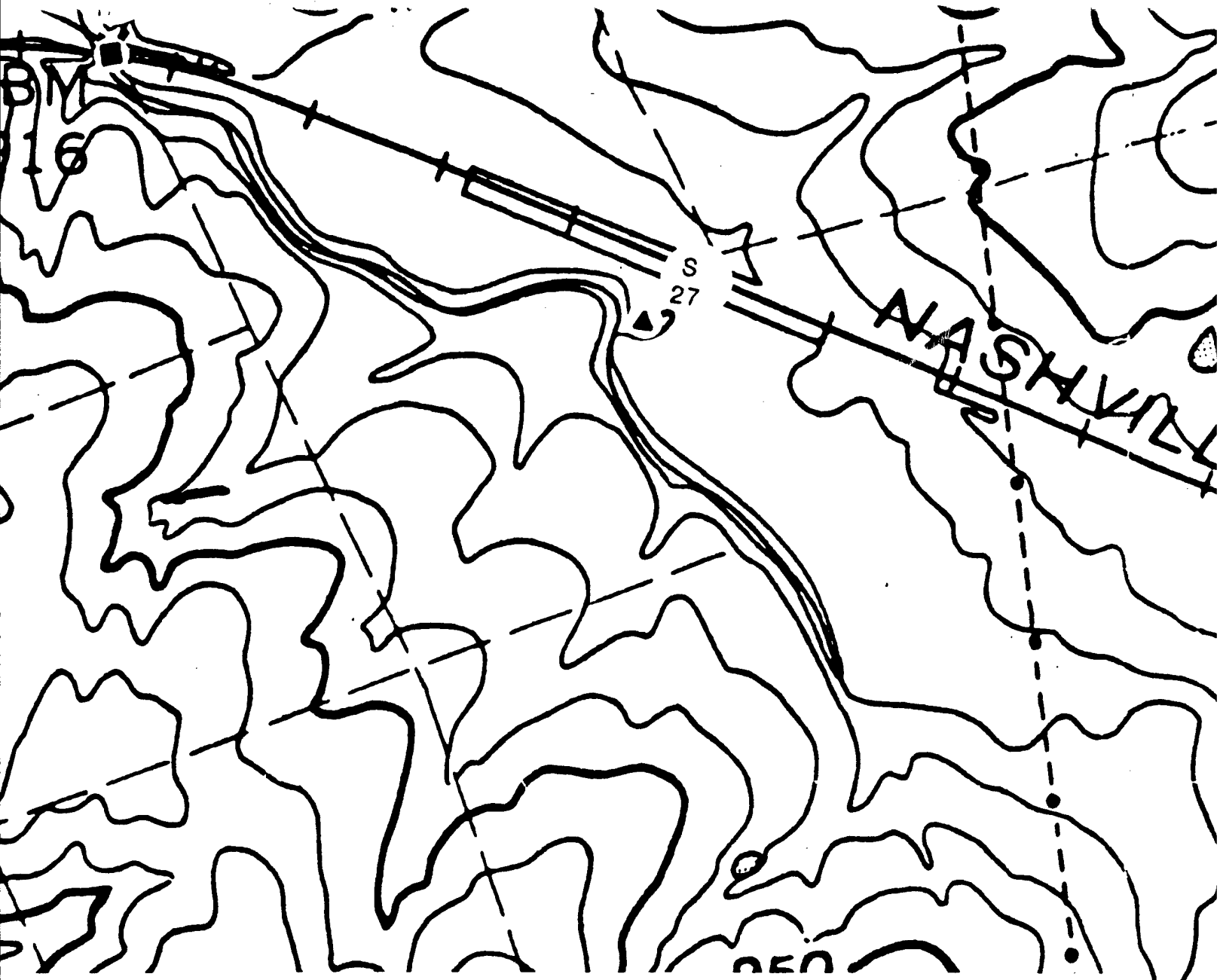

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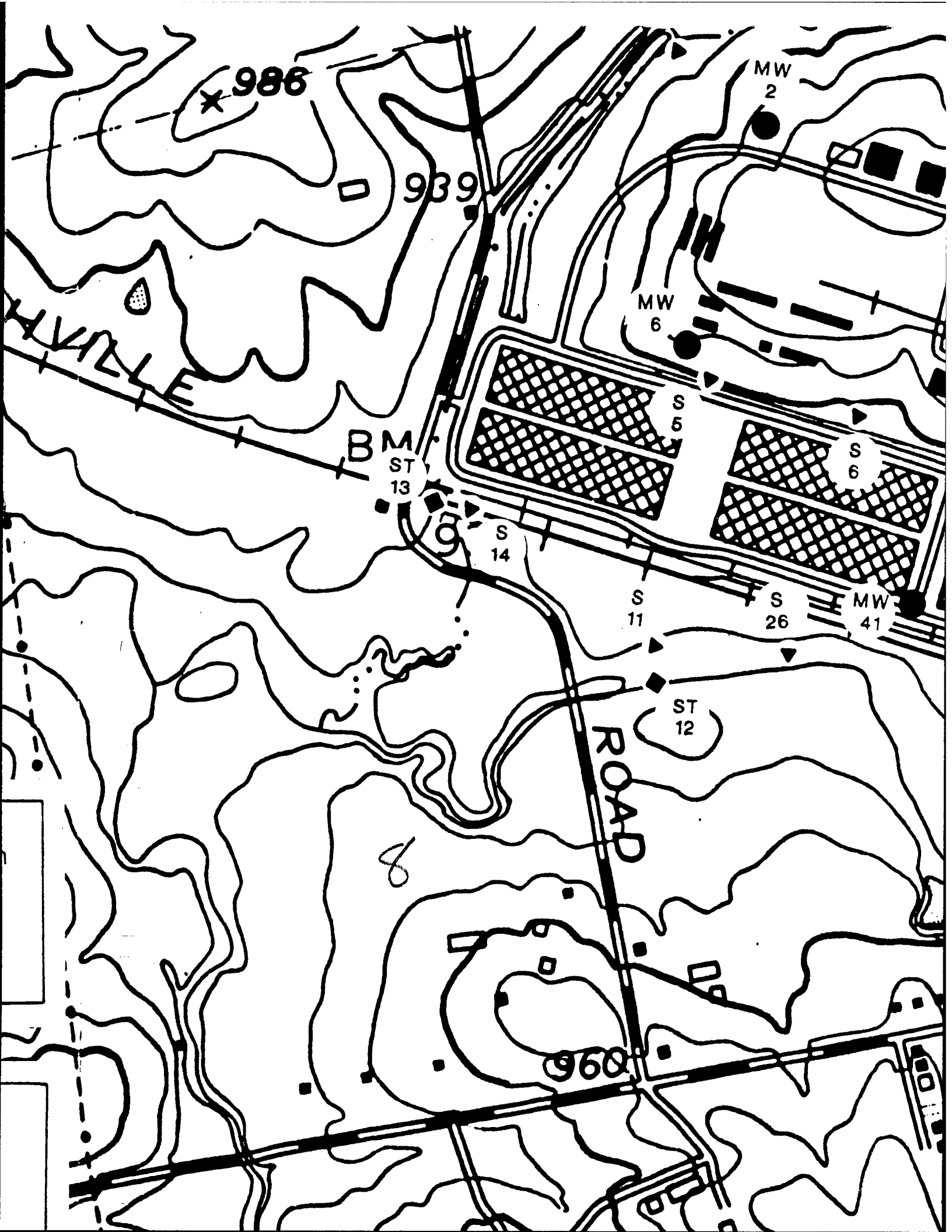
160 Redwood Drive, Richmond, Kentucky 40475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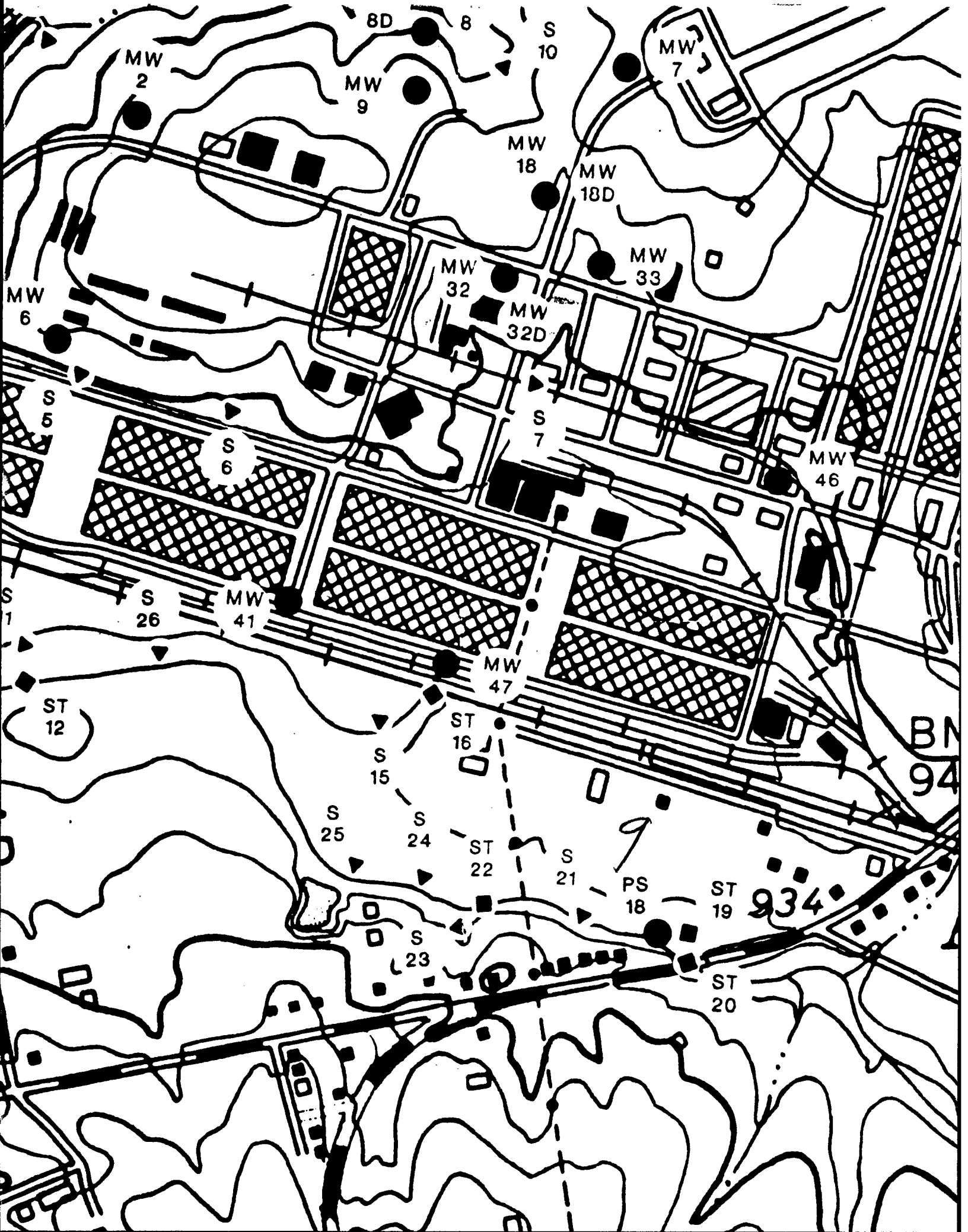
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8
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MW 2
MW 9
MW 7
MW 18
MW 18D
MW 6
MW 32
MW 32D
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S 5
S 6
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MW 46
S 1
S 26
MW 41
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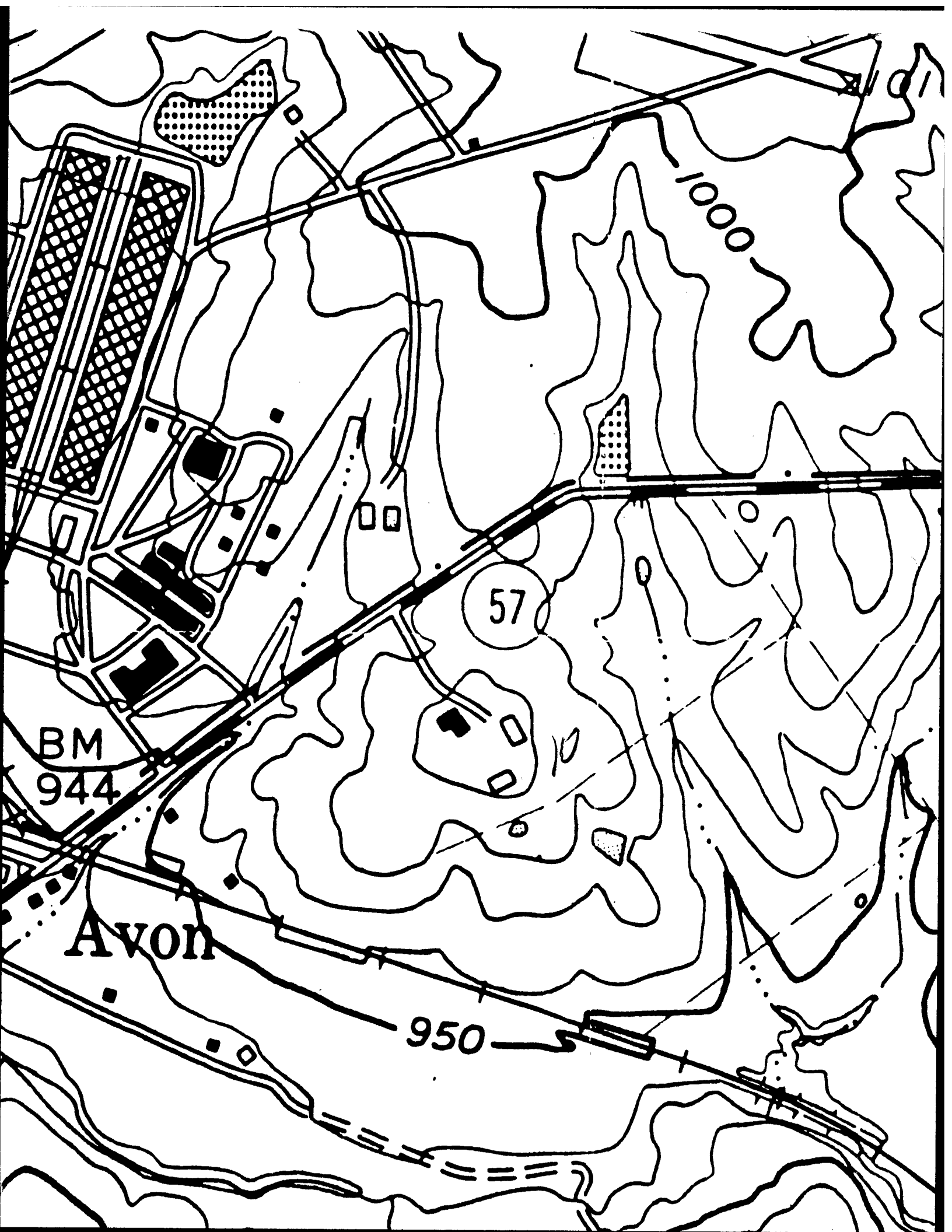
ST 16
S 15
S 25
S 24
ST 22
S 21
PS 18
ST 19
S 23
ST 20
BN 94
934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BM
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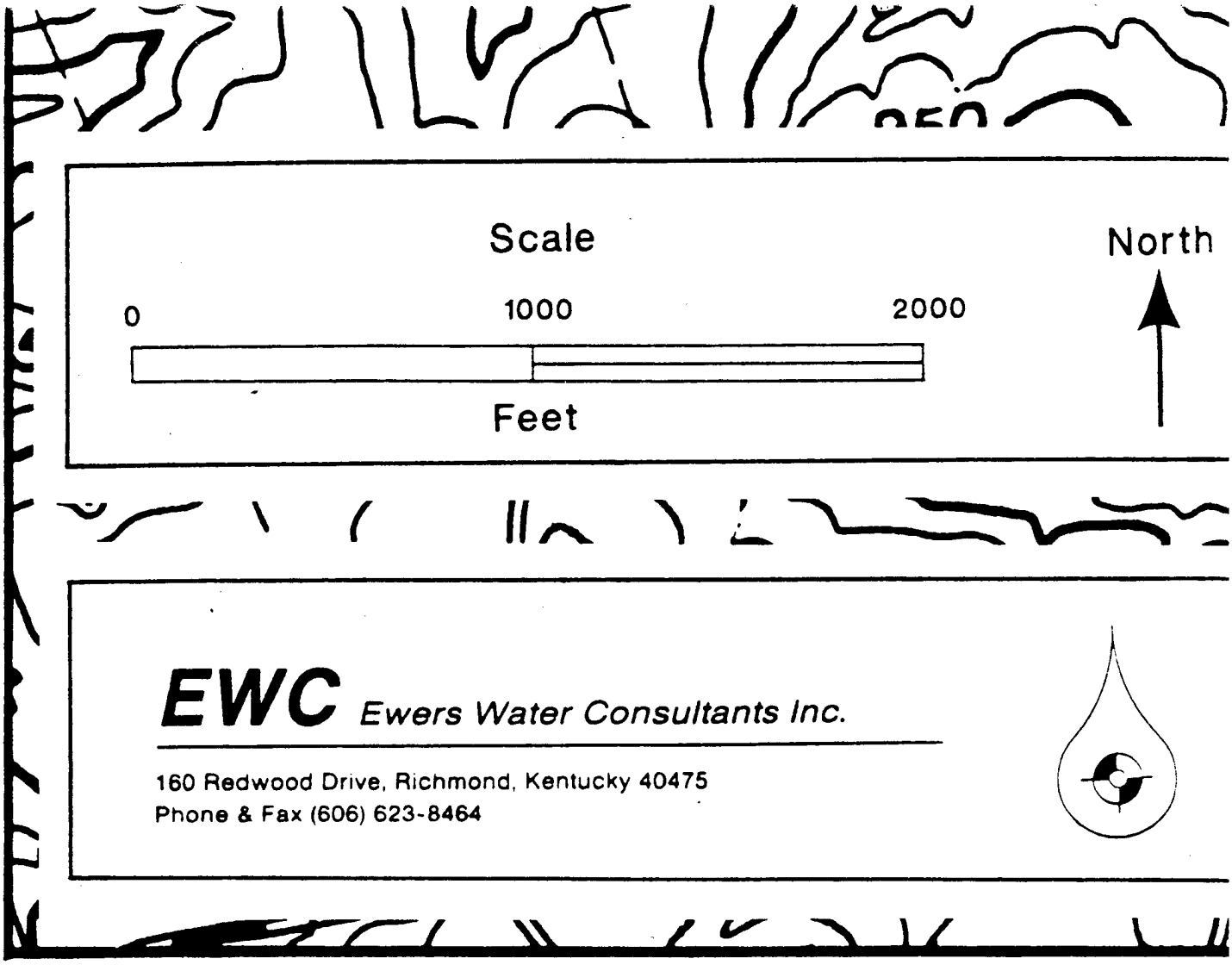
Avon
950

1000
57



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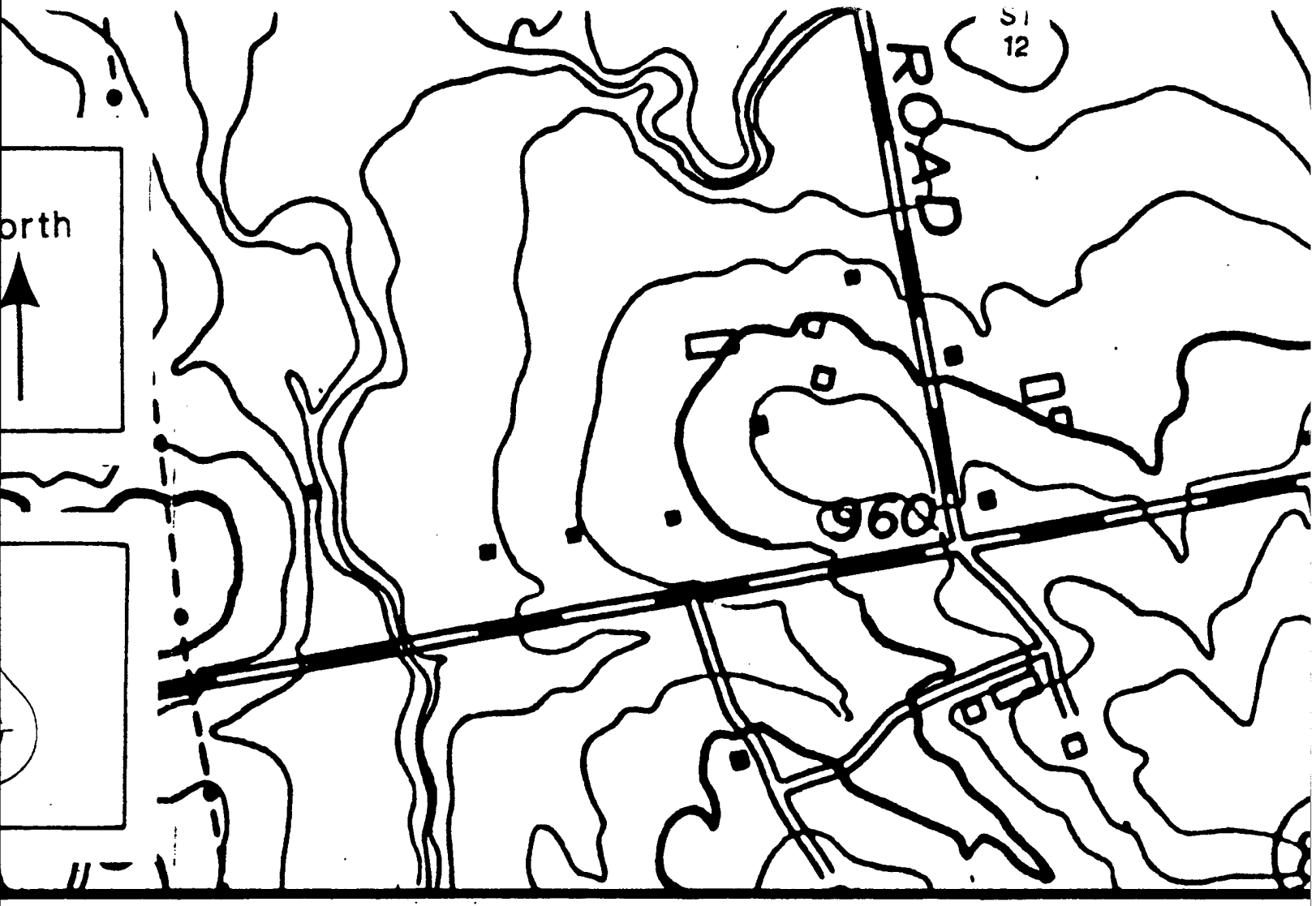

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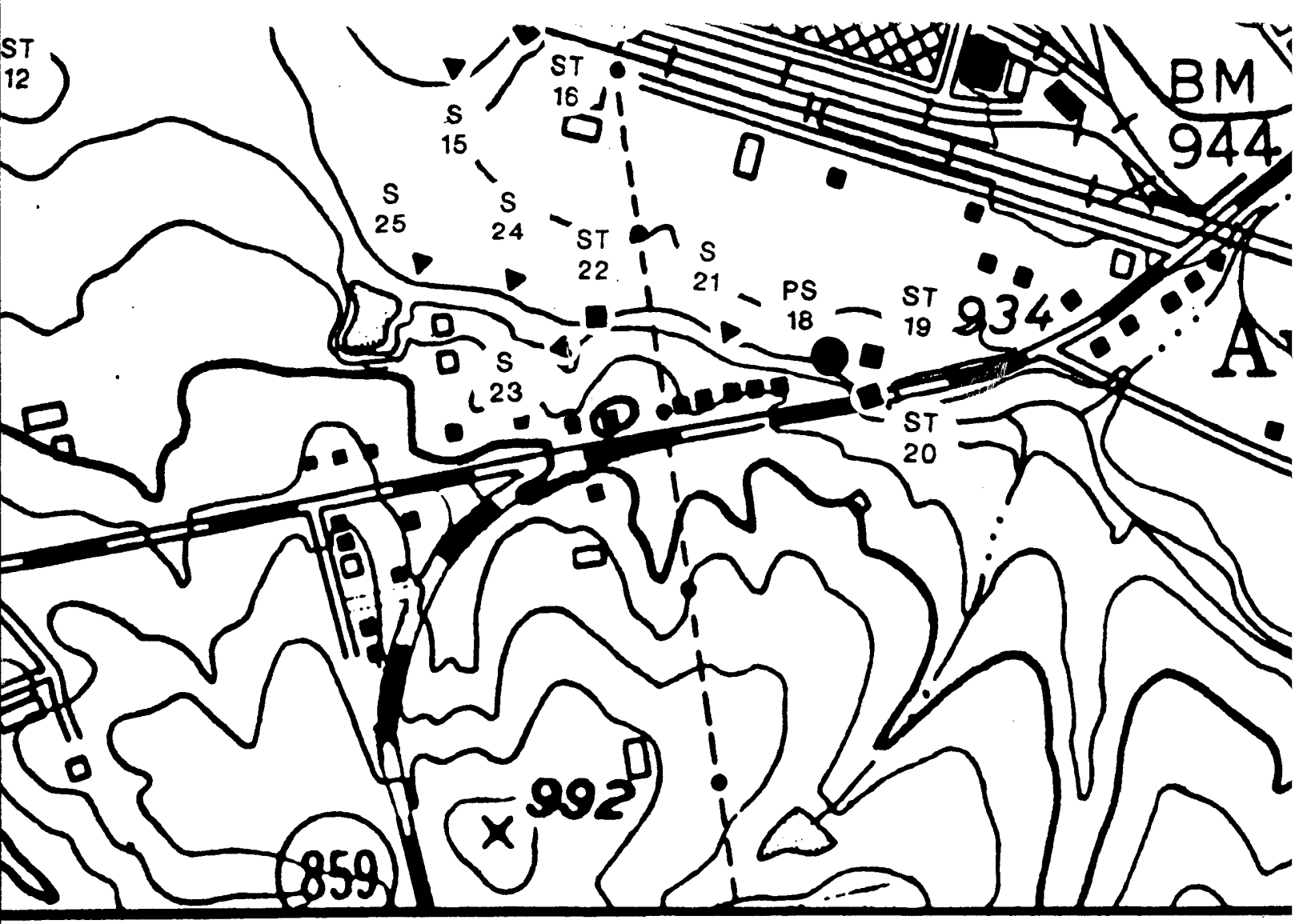
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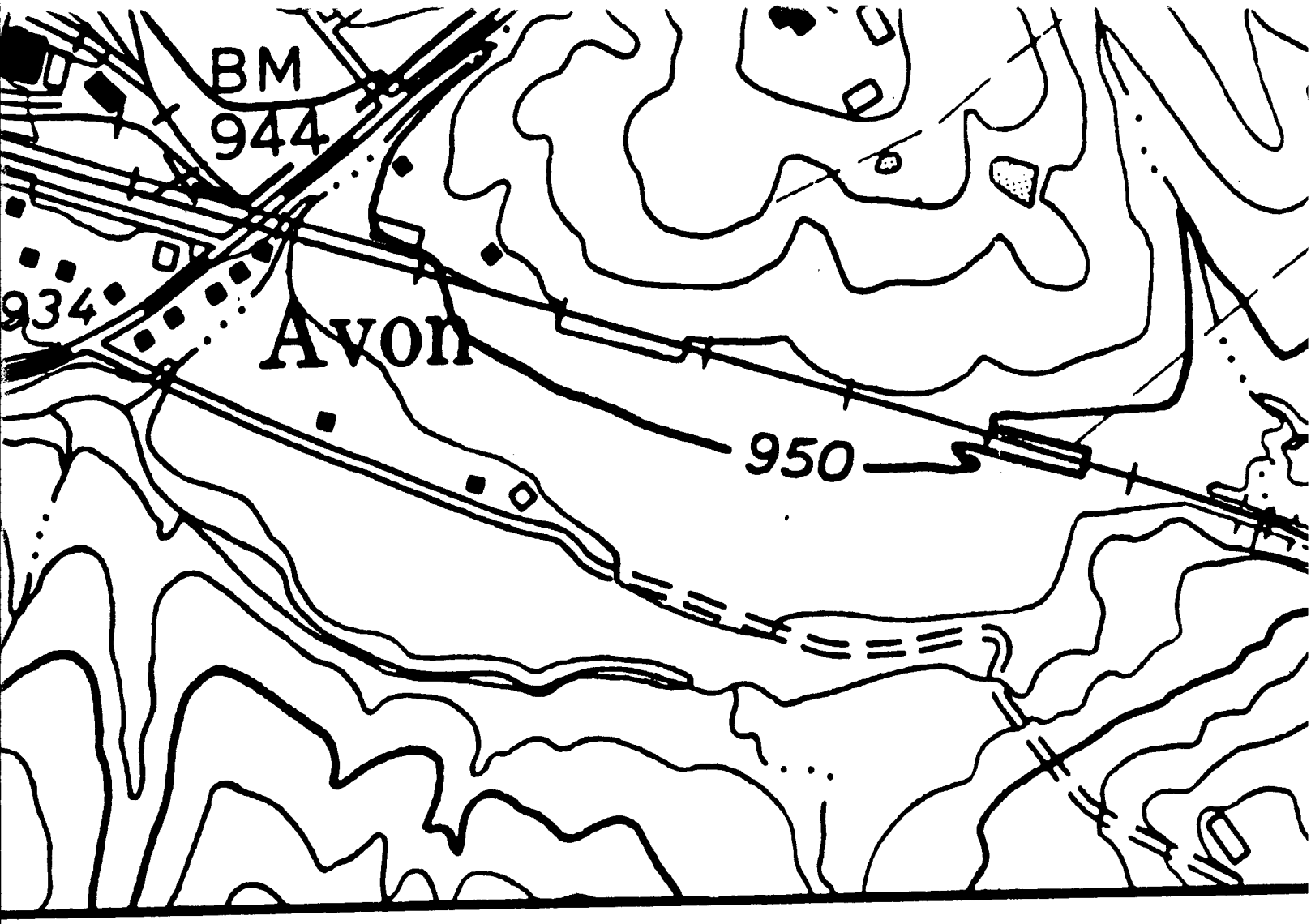
13



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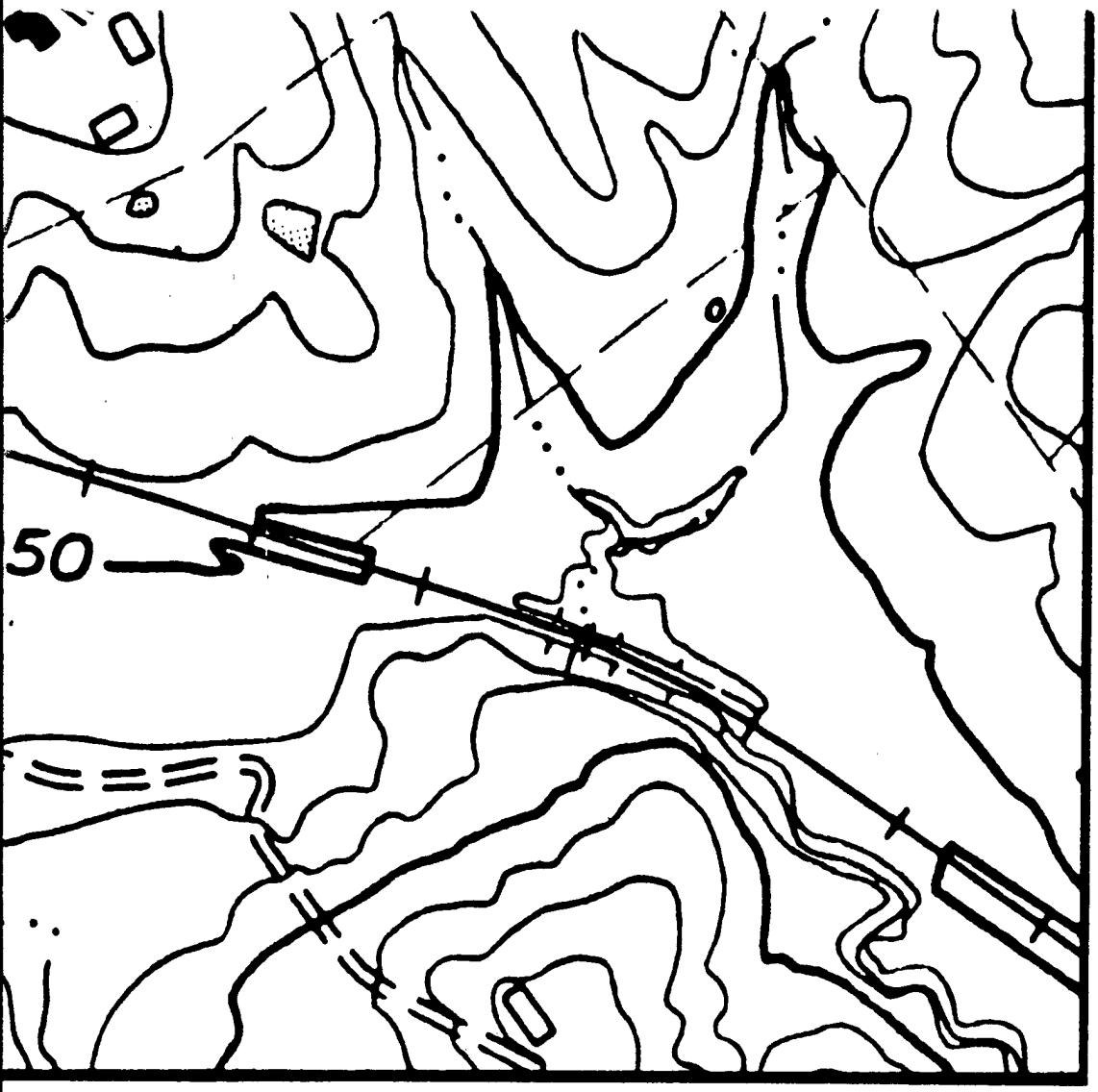

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