MALCOLM PIRNIE

CONSTRUCTION CERTIFICATION REPORT PERMEABLE REACTION WALL PILOT TREATMENT SYSTEM WATERVLIET ARSENAL, SIBERIA AREA , NE QUADRANT Watervliet, New York

US Army Corps of Engineers Baltimore District

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Baltimore District
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PERMEABLE REACTION WALL
PILOT TREATMENT SYSTEM
WATERVLIET ARSENAL
SIBERIA AREA, NE QUADRANT
WATERVLIET, NEW YORK

CONSTRUCTION CERTIFICATION REPORT

PROJECT NO: 0285-734

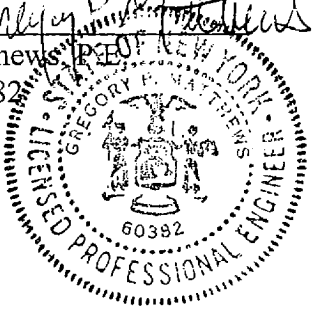
February 1999

We certify under penalty of law that this document and all attachments were prepared under our direction or supervision to assure that qualified personnel properly gathered and evaluated the information submitted. Based on our inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of our knowledge and belief, true, accurate, and complete. We are aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Gene E. King
Colonel, U.S. Army
Watervliet Arsenal
Commanding

2/11/99.

Gregory P. Matthews, P.E.
New York #60382



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1.0 INTRODUCTION

1.1 BACKGROUND AND PURPOSE OF DOCUMENT

On May 8, 1998, a Draft Work Plan for the installation of a permeable reaction wall pilot treatment system at the Watervliet Arsenal was submitted to the United States Environmental Protection Agency (USEPA) and the New York State Department of Environmental Conservation (NYSDEC) for review and comments. This document entitled, "Draft Work Plan, Permeable Reaction Wall Pilot Treatment System, Watervliet Arsenal, Siberia Area, NE Quadrant, Watervliet, New York, April 1998", was prepared by Malcolm Pirnie, Inc. (Malcolm Pirnie) for the United States Army Corps of Engineers, Baltimore District. The Draft Work Plan presented conceptual designs for two alternative configurations of the permeable reaction wall pilot treatment system. Cost estimates were provided in the Draft Work Plan and results of groundwater modeling efforts were also presented.

Written comments on the Draft Work Plan were received from the USEPA and NYSDEC in June and July, 1998. In response to the written comments, additional field work was conducted at the site in July and early August 1998 to support the selection of a final design for the permeable reaction wall pilot treatment system.

On October 28, 1998, a Final Work Plan for the installation of the permeable reactive wall pilot treatment system was submitted to the USEPA and NYSDEC. This document entitled, "Final Work Plan, Permeable Reaction Wall Pilot Treatment System, Watervliet Arsenal, Siberia Area, NE Quadrant, Watervliet, New York, October, 1998" included the additional field work and final design details and construction documents. The Final Work Plan was intended to supplement the April 1998 Draft Work Plan, not supersede it. The reader is referred to the April 1998 document for information on site background, groundwater modeling, bench-scale treatability testing, and other basic information.

Malcolm Pirnie entered into an agreement with the United States Army Corps of Engineers, Baltimore District, to provide technical, professional, and construction services for the Permeable Reaction Wall Pilot System Construction at the Watervliet Arsenal,

Siberia Area, NE Quadrant, Watervliet, New York. Malcolm Pirnie employed a single contractor, Kilby Brothers, Inc., to perform construction and related services for the project. The construction schedule was as follows:

ACTIVITY	DATE
On-Site Mobilization	October 21, 1998
Substantial Completion	November 24, 1998
Final Completion	December 14, 1998

The construction activities were performed by Kilby Brothers, Inc. and their subcontractors under the full-time oversight of Malcolm Pirnie.

This Construction Certification Report is intended to document and certify that the permeable reactive wall pilot treatment system was completed in accordance with the construction documents. A summary of the construction operations, including minor variations to the approved Work Plan, is provided in the following sections.

2.0 CONSTRUCTION ACTIVITIES

2.1 DETERMINATION OF PROPER MIX OF REACTIVE WALL MATERIALS

The designed thickness of pure granular iron in the reactive wall was one-foot. The minimum trench width using conventional excavation and shoring equipment was determined to be 30-inches. Therefore, granular iron and concrete sand was mixed together to make up the additional volume within the trench in the proportions of 1.5 volumes of concrete sand to one volume of granular iron. The actual mixing of the materials was done on a weight basis rather than a volume basis. The unit weight of the granular iron was approximately 150 pounds per cubic foot and the concrete sand weight was approximately 100 pounds per cubic foot. Therefore, the 30-inch wide trench required a mix containing 150 pounds of concrete sand (1.5 cubic feet) to 150 pounds of granular iron (1.0 cubic feet), or a 1:1 ratio by weight.

The granular iron was comprised of clean, well-graded metallic iron particles free of oxidation. The material was procured from Connelly-GPM, Inc., Chicago, Illinois (Product ETICC-1004). The manufacturer's certification and the particle size analysis are presented in Appendix A.

The concrete sand was comprised of clean, well-graded, mechanically washed sand free from: organic matter, roots debris, vegetation, wood, sod, soil lumps, and other deleterious materials. The particle size and index density test results for the concrete sand are presented in Appendix A.

2.2 REACTIVE WALL MATERIALS BATCHING OPERATIONS

Proportioning the granular iron and concrete sand was performed at the Bonded Concrete, Inc. transit mix plant located in Watervliet, New York. This plant has a New York State Department of Transportation-approved measuring system consisting of computerized weigh bins which discharge directly into the transit mix trucks.

The granular iron was shipped in bulk to the mix plant in covered end dump trailers. The trailers were emptied into a dedicated, concrete-lined hopper at the mix plant which discharges directly to a conveyor belt leading to a dedicated, covered load cell. The granular iron deliveries were scheduled to coincide with the actual usage of the material at the site, to the extent possible, and the remainder of the iron was stored in the covered load bin. However, when the covered load bin was filled to capacity, a portion of the granular iron was temporarily stored in the concrete-lined hopper and covered with polyethylene sheeting to keep it dry until additional material was needed at the site.

The concrete sand was staged in concrete-lined hoppers at the mix plant which also discharged to the conveyor belt leading to a dedicated load cell. The load cell containing the concrete sand discharged an aliquot of sand into the weigh bin first and the load cell containing the granular iron then discharged approximately the same weight of iron to the same weigh bin. The weigh bin was then emptied into the rotary drum of the transit mix truck pending delivery to the site. A load ticket was generated at the mix plant documenting the weight of the concrete sand and the composite weight of the sand and granular iron. A summary of the weights of the granular iron and concrete sand is provided in Table 1. Copies of the load tickets are provided in Appendix B.

The granular iron and concrete sand was mixed in the rotary drum of the transit mix truck and delivered to the site. In order to get a homogeneous mixture, the material was mixed a minimum of five minutes before placement in the trench. A photographic log showing the batch plant and other construction and QA/QC activities is provided in Appendix C.

2.2.1 Batching QA/QC

The weight ratio as indicated on the load tickets was checked prior to discharging of the mixed material into the trench. A grab sample of the mixed material was also collected from each batch at random times during the placement of the material in the trenches (i.e., at the beginning, middle, and end of the load). A random evaluation of the adequacy of the mixing was performed on selected loads by weighing an aliquot of the mix and then

TABLE 1

Watervliet Arsenal
Permeable Reaction Wall
Pilot Treatment System
Summary of Granular Iron and Concrete Sand Weights

Date	Ticket Number	Sand Weight (lbs)	Iron Weight (lbs)	Composite Weight (lbs)
Trench B				
10/26/98	133526	18,500	18,900	37,400
10/27/98	133548	15,560	15,760	31,320
10/27/98	133559	15,500	15,580	31,080
10/27/98	133578	15,600	15,140	30,740
	Total Trench B	**65,160**	**65,380**	**130,540**
Trench A				
10/27/98	133588	15,540	15,860	31,400
10/28/98	133655*	15,600	15,600	31,200
10/28/98	133638	15,380	15,960	31,340
10/28/98	133630	15,900	15,560	31,460
10/28/98	133626	15,600	15,620	31,220
10/29/98	133723	12,500	12,480	24,980
10/29/98	133677	15,660	15,540	31,200
10/29/98	133704	15,580	15,680	31,260
10/30/98	133779	15,660	17,020	32,680
10/30/98	133789	15,520	15,640	31,160
10/30/98	133797	15,540	15,440	30,980
10/30/98	133806	15,300	15,980	31,280
10/30/98	133811	15,520	17,100	32,620
11/2/98	133856	15,540	15,320	30,860
11/3/98	133928	15,440	15,600	31,040
11/3/98	133939	15,460	15,620	31,080
11/3/98	133946	15,460	15,540	31,000
	Total Trench A	**261,200**	**265,560**	**526,760**
	Total Trech A and B	**326,360**	**330,940**	**657,300**

* - Weights not available on ticket. Ratio of Fe/sand verified by field measurement. Assumed weights as follows
Sand: 15,600 pounds Fe: 15,600 pounds

magnetically separating the iron from the sand. The separated sand and iron were then weighed individually and the results recorded. The test results showed that the random samples contained acceptable ratios of sand and iron by weight. A record of the test results is provided in Appendix D.

2.3 EXCAVATION OPERATIONS

The trenches for both reactive wall segments were excavated with a conventional track-mounted excavator with a 24-inch bucket. The trenches were excavated vertically to the weathered/competent bedrock interface as evidenced by the penetration rate of the excavator bucket and the visual appearance of the exposed bedrock. Elevations of the bottom of the trench were determined with a level at a minimum of 20-foot intervals and tied to a known elevation datum on the site. The excavated material was stockpiled in a central area of the site. The material was enveloped in 6-mil polyethylene sheeting and a silt fence was placed around the perimeter of the pile to limit mechanical transport by wind and surface water.

The target trench width was 30 inches. To accomplish this, the trenches were excavated to a width of approximately 32 to 36 inches and one-inch thick steel sheeting plates 10-feet high and 20-feet long were placed vertically on each side of the trench to maintain the width. The opposing shoring plates were held in position using pairs of expandable hydraulic shoring posts oriented horizontally. The width between the shoring plates was measured at the top and the bottom to verify the trench width prior to the placement of the reactive wall materials. Based on these measurements, the completed reactive wall segments range from approximately 28- to 32-inches wide. Fine sand was placed between the shoring plates and the walls of the trench, as necessary, to fill larger voids in the trench walls.

The mixed granular iron and concrete sand was transferred from the transit mix trucks into the shored trenches using chutes. The mixed materials were placed from one end of the shored trench segment to the other and allowed to flow evenly to fill the entire trench without bridging or forming voids. Where possible, the material was allowed to migrate down the

angle of repose from the upper portions down to the lower portions of the trench. The hydraulic shoring posts were removed when enough iron and sand was in place to adequately maintain the width between the steel sheeting. The granular iron and concrete sand mix level within the sheeting was brought up to approximately six inches above the design elevation to allow for voids left by the steel sheeting and voids not completely backfilled between the sheeting and the trench walls. The steel sheeting was removed and additional mixed iron and sand added, as necessary, to bring the level up to the design elevation.

The Wall B segment was backfilled to within one foot below the finished grade with native soil from the trench excavation. The reactive wall materials (and native backfill at Wall B) were compacted with the wheels of a rubber-tire loader. The walls were then backfilled to finished grade with select fill composed of crushed stone materials. The select fill was also compacted with the loader wheels.

2.4 DEWATERING OPERATIONS

Significant standing water was not encountered within Trench B during the excavation and reactive material placement. However, approximately 4,000 gallons of groundwater from within Trench A was removed prior to the placement of the reactive materials. Since it was not practical to remove all of the water, a depth of approximately two inches of groundwater remained in some of the lower areas of the shored trench segments prior to placement of the iron and sand. The groundwater was pumped to a modular holding tank with a capacity of 50,000 gallons. Upon completion of the reactive walls, a single grab sample was collected and analyzed for volatile organic compounds (VOCs) via USEPA Method 8260. The concentrations of VOCs in the sample were below the laboratory detection limits for all analytes except vinyl chloride at 3 µg/l (the analytical data are presented in Appendix E). Since the concentrations of VOCs in the collected water in the modular tank were lower than the concentrations encountered historically within the area of concern, the water was discharged into an infiltration trench located hydraulically upgradient of the reactive wall system, as outlined in the approved Final Work Plan. As the water did not contain any visible floating petroleum products, absorbent pads and boom were not used.

The infiltration trench was backfilled with native soils after the water from the modular tank was discharged. The modular tank was then disassembled and the liner was cut up and disposed of with the contaminated soil from the trenches.

2.5 OFF-SITE DISPOSAL OF SOLID WASTE

A total of four composite soil samples were collected from the soil stockpiled from the trenching operations to characterize the material for disposal. The samples were analyzed for all toxicity characteristic parameters using the Toxicity Characteristic Leaching Procedure (TCLP) as well as for polychlorinated biphenyls (PCBs). All TCLP concentrations were below the toxicity characteristic concentrations and the PCBs were below 1 μg/g. The sample results are provided in Appendix E.

A total of 567 tons of material (including soil, polyethylene used to cover the soil piles, the modular tank liner, and approximately four cubic yards of left over iron and sand mixture) were disposed of at the Town of Colonie Landfill as Non-Hazardous, Contaminated Soil. The material was transported to the landfill by Mangiardi Trucking under New York State Department of Transportation Permit Number 4A-209. A copy of the Bills of Lading and the landfill weight slips are presented in Appendix F.

2.6 MONITORING SYSTEM INSTALLATION

2.6.1 Monitoring Well Installation

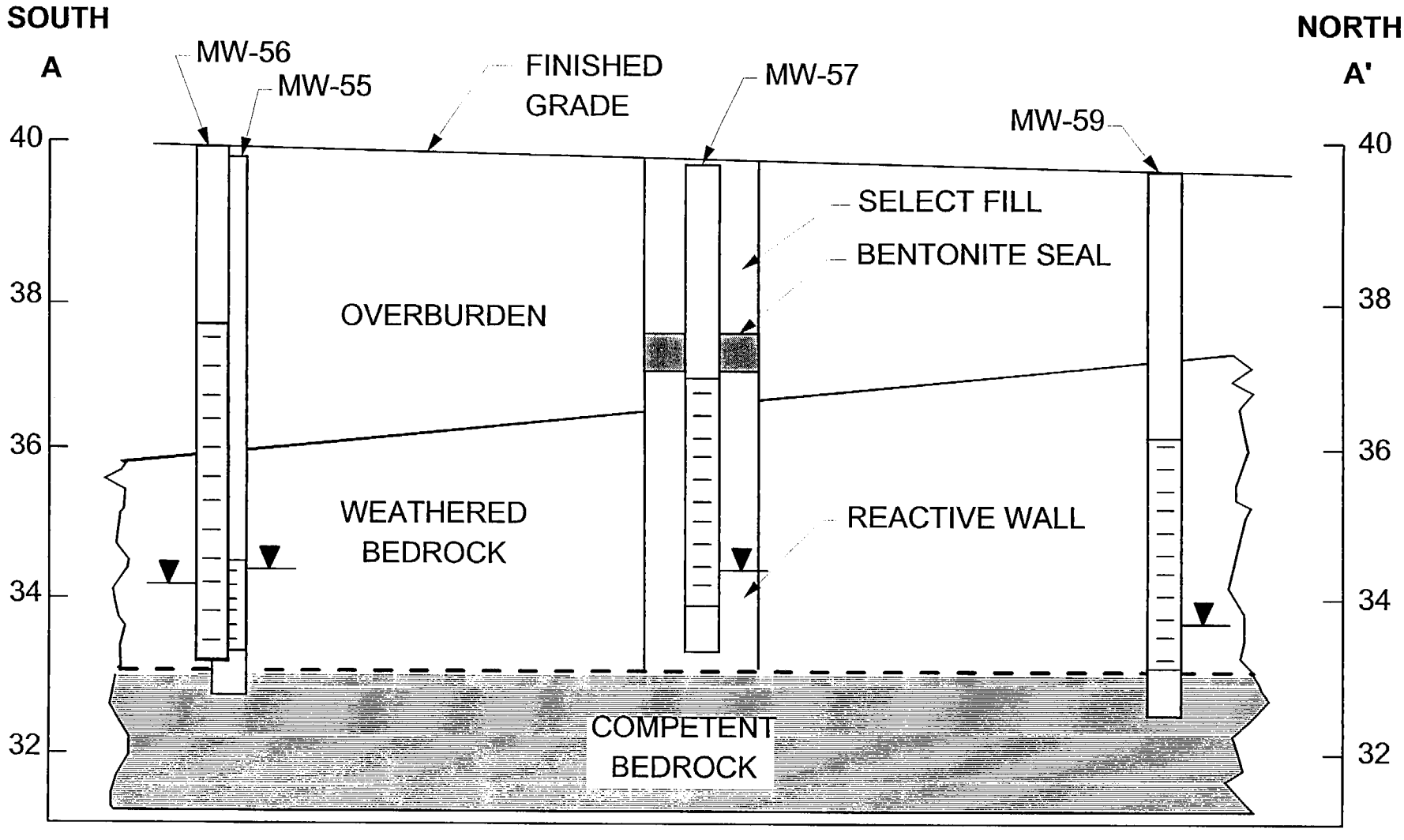
The groundwater monitoring system was installed upon completion of the reactive wall installations. The system includes 32 monitoring wells installed in and around the reactive wall segments. A summary of the monitoring system is presented on Sheet 1 and the monitoring well locations are shown on Sheet 2.

Three clusters of monitoring wells were installed at each wall segment. With the exception of the western cluster of Wall B, each cluster consists of five monitoring wells; two screened discretely in the overburden (one hydraulically upgradient and one down gradient), two screened discretely in the weathered bedrock (one hydraulically upgradient

and one down gradient), and one fully penetrating within the reactive wall. The cluster located at the western end of Wall B consists of four monitoring wells because the weathered bedrock in this area was encountered at four feet below the ground surface (bgs) south of the wall and two feet bgs north of the wall. The shallow depth to weathered bedrock precluded the installation of monitoring wells screened discretely in the overburden. Therefore, a monitoring well screened discretely in the weathered bedrock was installed on each side of the wall and a hybrid well screened across the saturated overburden and weathered bedrock was installed on the north (i.e., upgradient) side of the wall. With only two feet of overburden on the south side of the wall, a monitoring well screened within the overburden was not installed. A generalized cross section of the western end of Wall B is presented in Figure 1. Three supplemental monitoring wells were also installed downgradient of the reactive walls.

The monitoring wells were constructed using threaded, four-inch diameter polyvinyl chloride screen and riser materials. The screens consist of continuous slot, PVC wire wound design with 0.01 inch slot openings. The detailed Well Construction Logs for each monitoring well are included in Appendix G.

The monitoring wells within the reactive walls were installed through five-inch inside diameter drive casing. The precise centers of the walls were determined by exposing the top of the reactive materials across the width of the trenches by hand excavation. The casing was then advanced through the center of the reactive walls into the underlying bedrock. The casing was then flushed with potable water and the screen (with filter sock) and riser were installed. Additional mixed reactive wall materials were added after flushing, as necessary, to bring the elevation of the iron and sand up to the desired bottom elevation of the well. The bottom of the screen was set less than one foot from the bottom of the reactive wall and extended to within one foot of the top of the reactive wall to intercept as much of the groundwater within the wall as possible. The drive casing was then extracted incrementally allowing the reactive wall materials to cave around the well. A bentonite seal was then placed above the exposed reactive materials to limit vertical migration of concrete during the



SOUTH

▼ GROUNDWATER ELEVATION MEASURED 12/14/98

0285-734-5

US Army Corps of Engineers

WATERVLIET ARSENAL
PERMEABLE REACTION WALL-GENERALIZED CROSS SECTION

PILOT TREATMENT SYSTEM CONSTRUCTION

MALCOLM PIRNIE, INC.

FIGURE 1

placement of the surface pads. A typical in-trench monitoring well detail is presented on Sheet 1.

The monitoring wells outside of the reactive walls were installed through 6-1/4 inch hollow stem augers. The wells screened within the weathered bedrock were sampled with split spoons continuously from two feet bgs to the total depth of the reactive wall to determine the overburden/bedrock contact for screen placement. The weathered bedrock wells were screened from approximately the bottom of the adjacent reactive wall segment to the overburden contact. The overburden wells were screened from the weathered bedrock contact to above the water table. The typical weathered bedrock and overburden monitoring well details are presented on Sheet 1.

The three supplemental downgradient monitoring wells were also installed through 6-1/4 inch hollow stem augers. Split spoon samples were collected to determine the overburden/bedrock contact as well as the depth to competent bedrock. These wells were constructed as hybrid wells with the screens extending from the top of competent bedrock to above the water table. The typical supplemental monitoring well detail and a summary of the monitoring system for the reactive walls are presented on Sheet 1.

All of the monitoring wells were completed with lockable caps and flush mount curb boxes. Bollards and chain were installed around the reactive wall monitoring well clusters to limit traffic and staging of materials in the immediate vicinity of the wells.

2.6.2 Monitoring Well Development

The monitoring wells within the reactive walls were not developed to avoid unnecessary segregation of the granular iron and concrete sand around the screened intervals. Three to five gallons of water were carefully evacuated with bailers to remove solids from within the wells.

The monitoring wells outside of the reactive walls were developed by surging and removing the water using bailers. A four-inch surge block was manually actuated within the entire wetted portion of the screened interval. The standing water within the wells was evacuated using PVC bailers. Water quality parameters were monitored to help determine

when development had been completed, however the turbidity exceeded the criteria of 50 Nephelometric Turbidity Units (NTUs) in each well. Therefore, at least five well volumes were removed during the development process or a maximum of five hours of development efforts were expended on the wells which were slow to recover. Well number MPI SA MW-53, located in the center cluster of Wall B and screened discretely in overburden contained less than 0.2 feet of standing water and consequently was not developed. This well may yield enough groundwater for sample collection during seasonal high water table conditions, however. The Well Development Logs are presented in Appendix H.

3.0 RECORD DRAWINGS

The general surface features, lateral extent of the reactive walls, and monitoring well locations were surveyed by Vollmer Associates Land Surveying and Engineering, P.C. upon completion of construction activities. The As Built Site Plan is provided in Sheet 2. The elevations of the top of the monitoring well covers and the top of the PVC risers are provided in Sheet 1.

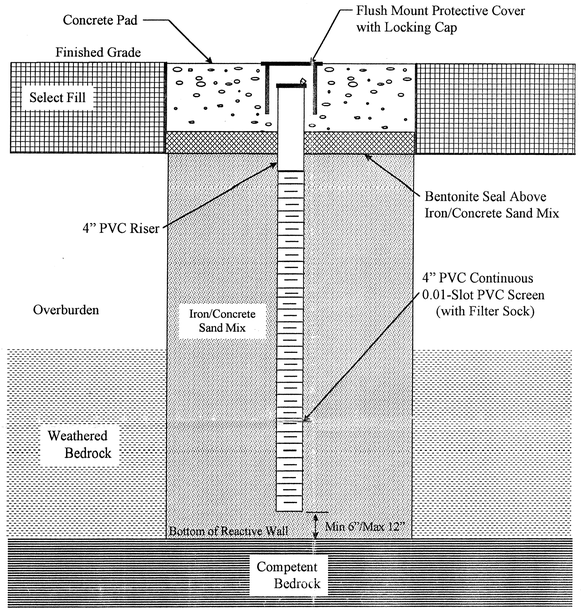
The profiles of the reactive walls are presented in Sheet 2. The bottom of trench elevations were determined by Kilby Brothers, Inc. during the excavation activities and the surface elevations were surveyed by Vollmer Associates. As shown on the profiles, the actual elevation of the bottom of the trenches differed somewhat from the anticipated elevations shown in the design drawings. In Trench A, the actual unweathered/competent bedrock interface was as much as 0.5 feet higher (i.e., at station 1+00′) and 2.0 feet lower (i.e., at station 2 +05′) than the extrapolated interface shown in the design. In Trench B, the actual unweathered/competent bedrock interface was as much as 2.0 feet higher (i.e., at station 0+60′) than the extrapolated interface shown in the design.

4.0 SUMMARY OF WORK AND CONCLUSIONS

The reactive wall pilot treatment system was generally completed as outlined in the approved Work Plan and construction documents with the following minor exceptions.

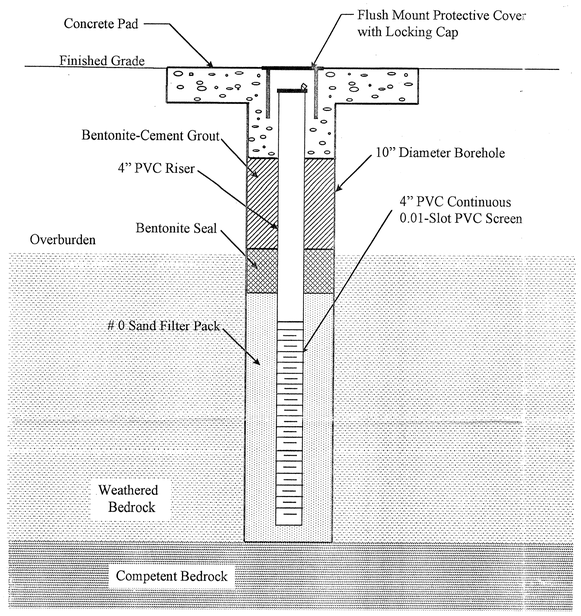
As noted in Section 2.6.1, unexpected site conditions on the west side of Wall B made it unfeasible to install two monitoring wells discretely screened in the overburden materials. Therefore a hybrid well, screened across the saturated overburden and weathered bedrock, was installed in lieu of the discrete overburden well hydraulically upgradient of the wall. As saturated overburden was not encountered downgradient of the west side of Wall B, only the discrete weathered bedrock monitoring well was installed in this location.

The monitoring wells located within the reactive walls were installed through drive casing after the placement of the granular iron and concrete sand instead of in the trenches before the placement of the iron and sand. The installation through the casing allowed for a more controlled placement of the well screen and riser resulting in plumb and straight monitoring wells within the walls. The advancement of the drive casing through the reactive materials and into the competent underlying bedrock (and subsequent flushing of the casing) resulted in minimal disturbance of the surrounding reactive materials. The relatively small annular space between the 5 inch inside diameter of the casing and 4-1/2 inch outside diameter of the screen and riser materials also resulted in the minimal disturbance of the surrounding reactive materials during the extraction of the casing.



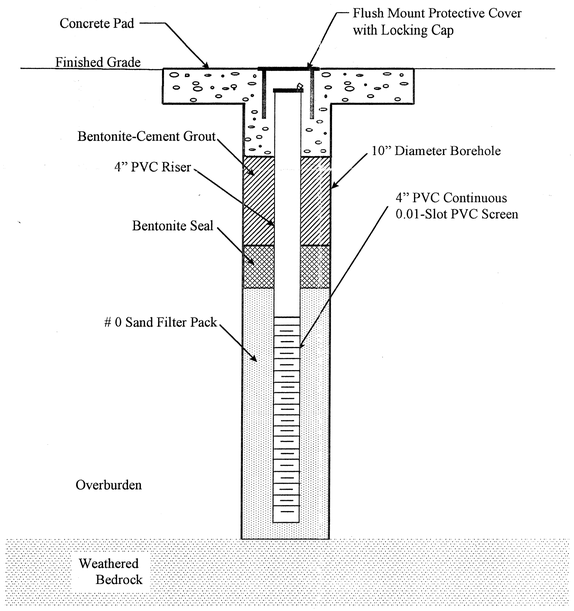
Typical In-Trench Monitoring Well Detail

NOT TO SCALE



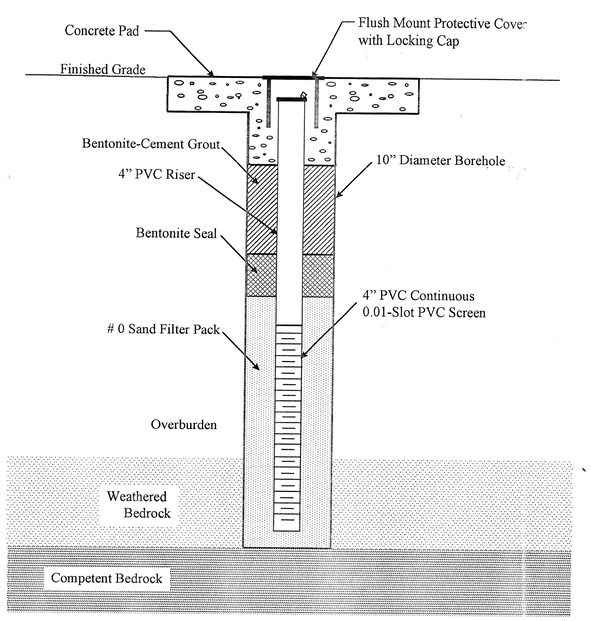
Typical Weathered Bedrock Monitoring Well Detail

NOT TO SCALE



Typical Overburden Monitoring Well Detail

NOT TO SCALE



Typical Supplemental Monitoring Well Detail

NOT TO SCALE

MONITORING SYSTEM SUMMARY

Monitoring Well Number	Station Location	Offset from center of trench		Total Depth (feet bgs)	Screened Interval (feet bgs)	Stratigraphy	Top of Protective Cover Elevation*	Top of Casing Elevation*	12/2/98 Groundwater Elevation*	12/14/98 Groundwater Elevation*
Trench B										
98 MPI-SA-MW- 45	0+ 8.76	6.36	south	9.4	7.4 - 8.8	bedrock	40.22	39.87	34.75	34.36
98 MPI-SA-MW- 46	0+ 12.26	5.99	south	6.0	2.4 -5.4	overburden	40.15	39.90	36.22	35.19
98 MPI-SA-MW- 47	0+ 10.22	0.00	-	9.0	4.0 - 8.4	iron/sand	40.03	39.31	34.70	34.30
98 MPI-SA-MW- 48	0+ 13.35	6.21	north	6.4	2.7 - 6.1	overburden	39.91	39.58	34.83	34.33
98 MPI-SA-MW- 49	0+ 9.34	6.92	north	9.5	7.5 - 8.9	bedrock	40.07	39.68	34.75	34.63
98 MPI-SA-MW- 50	0+ 37.56	6.70	south	7.5	5.5 - 6.9	bedrock	40.06	39.80	34.89	34.50
98 MPI-SA-MW- 51	0+ 41.47	7.15	south	4.7	3.0 - 4.4	overburden	40.13	39.89	35.80	35.68
98 MPI-SA-MW- 52	0+ 39.77	0.00	-	7.5	3.9 - 6.9	iron/sand	39.90	39.32	34.73	34.34
98 MPI-SA-MW- 53	0+ 42.22	5.61	north	4.7	3.0 - 4.4	overburden	39.90	39.68	35.72	35.63
98 MPI-SA-MW- 54	0+ 37.44	5.91	north	7.5	5.5 - 6.9	bedrock	39.83	39.40	34.79	34.69
98 MPI-SA-MW- 55	0+ 72.12	5.95	south	6.9	4.9 - 6.3	bedrock	39.71	39.45	34.91	34.41
98 MPI-SA-MW- 56	0+ 76.78	5.91	south	6.8	2.2 - 6.2	hybrid	39.87	39.61	34.74	34.25
98 MPI-SA-MW- 57	0+ 74.77	0.00	-	6.0	2.4 - 5.4	iron/sand	39.56	39.07	34.79	34.40
98 MPI-SA-MW- 59	0+ 73.78	6.41	north	6.8	3.2 - 6.2	bedrock	39.36	39.06	33.97	33.65
Trench A										
98 MPI-SA-MW- 60	0+ 6.59	6.21	south	10.5	8.5 - 9.9	bedrock	42.65	42.31	37.95	37.66
98 MPI-SA-MW- 61	0+ 10.76	6.39	south	7.0	2.4 - 6.4	overburden	42.58	42.27	37.99	37.73
98 MPI-SA-MW- 62	0+ 8.82	0.00	-	9.5	2.5 - 8.9	iron/sand	42.49	42.16	37.97	37.63
98 MPI-SA-MW- 63	0+ 10.36	6.64	north	8.1	3.1 - 7.5	overburden	42.36	42.04	37.67	37.63
98 MPI-SA-MW- 64	0+ 6.05	6.36	north	10.4	9.2 - 10.2	bedrock	42.47	42.08	37.74	37.59
98 MPI-SA-MW- 65	1+ 2.37	6.59	south	5.7	3.3 - 5.4	overburden	42.28	41.93	37.61	37.43
98 MPI-SA-MW- 66	1+ 6.74	6.52	south	8.5	6.9 - 7.9	bedrock	42.26	41.99	36.09	37.34
98 MPI-SA-MW- 67	1+ 3.98	0.00	-	8.0	3.0 - 7.4	iron/sand	42.06	41.56	37.77	37.17
98 MPI-SA-MW- 68	1+ 6.52	5.54	north	8.5	5.6 - 8.0	bedrock	41.96	41.71	36.27	36.45
98 MPI-SA-MW- 69	1+ 1.55	5.89	north	5.0	2.8 - 4.7	overburden	42.03	41.71	37.34	37.27
98 MPI-SA-MW- 70	1+ 93.76	6.00	south	7.1	2.3 - 6.7	overburden	41.25	40.79	38.03	37.63
98 MPI-SA-MW- 71	1+ 98.33	6.17	south	9.8	8.3 - 9.2	bedrock	41.15	40.91	36.96	37.08
98 MPI-SA-MW- 72	1+ 96.35	0.00	-	8.5	3.5 - 7.9	iron/sand	41.24	40.86	37.56	36.65
98 MPI-SA-MW- 73	1+ 97.84	6.26	north	10.0	8.5 - 9.4	bedrock	41.14	40.86	37.45	36.70
98 MPI-SA-MW- 74	1+ 93.76	6.59	north	7.8	3.0 - 7.4	overburden	41.12	40.84	37.35	36.51
Supplemental Wells										
98 MPI-SA-MW- 75				8.0	3.0 - 7.4	hybrid	39.85	39.57	-	33.44
98 MPI-SA-MW- 76				8.0	3.0 - 7.4	hybrid	39.19	38.89	-	32.70
98 MPI-SA-MW- 77				8.3	3.3 - 7.7	hybrid	40.05	39.76	-	33.70

* - Feet above mean sea level

US Army Corps of Engineers

MALCOLM PIRNIE

REVISIONS			
NO.	BY	DATE	REMARKS

DES
DWN
CKD JMC

WATERVLIET ARSENAL
PERMEABLE REACTION WALL PILOT TREATMENT SYSTEM CONSTRUCTION

AS BUILT
MONITORING SYSTEM

SCALE: AS SHOWN

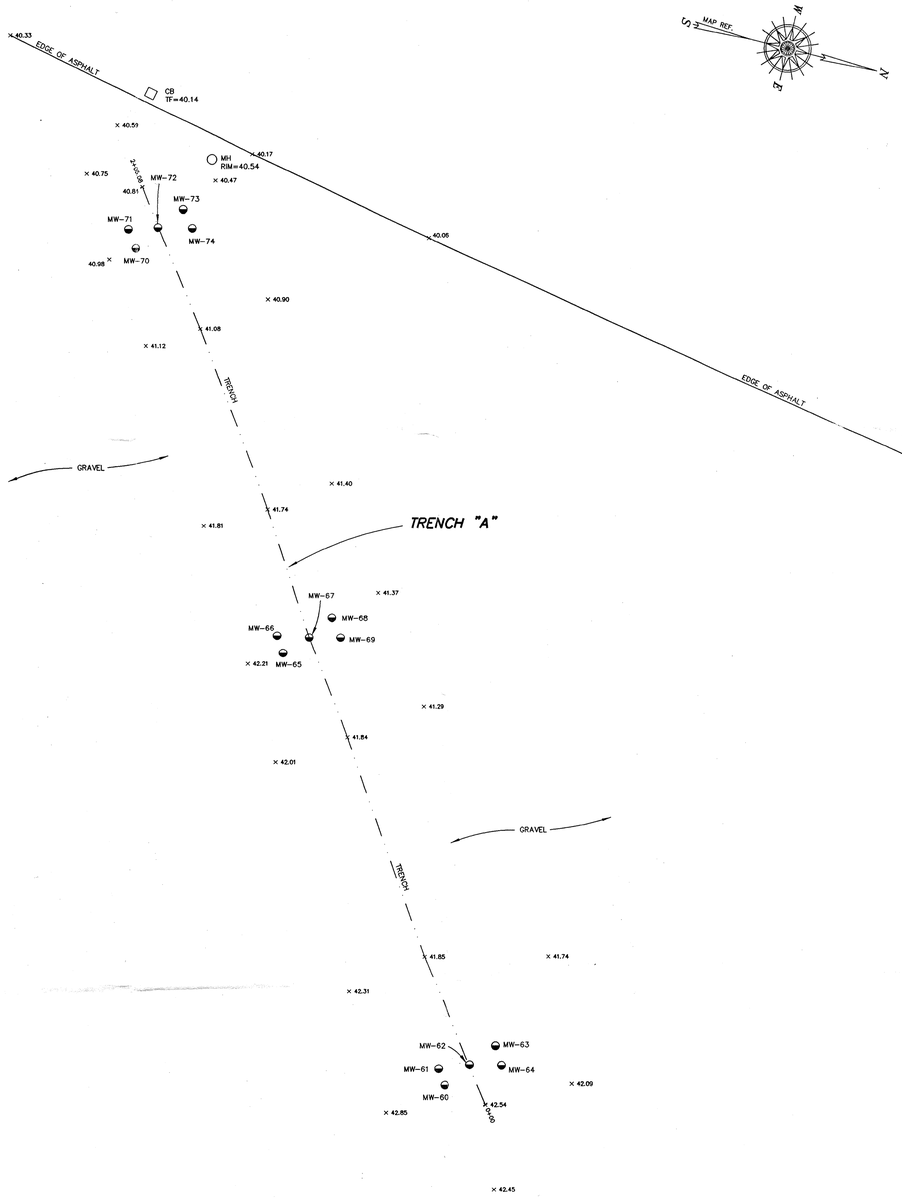
MALCOLM PIRNIE, INC.

DATE FEBRUARY 1999

SHEET 1 OF 2

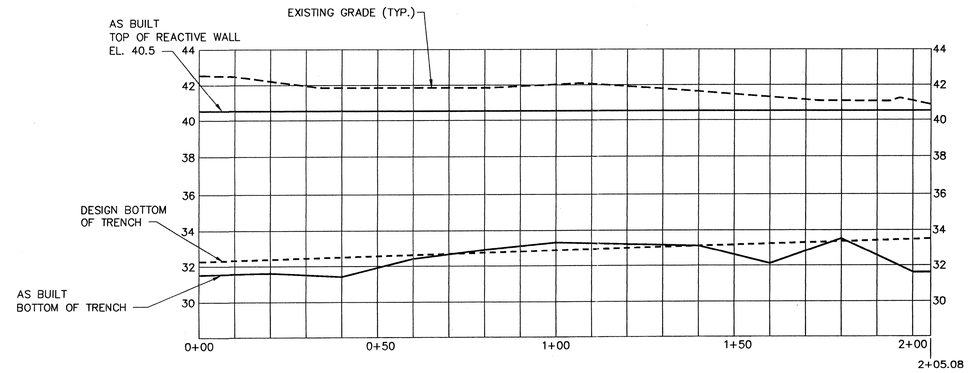
DWG. NO. MONSYS

5683 ADMIN I:\ACAD\PROJ\ADMIN\MONSYS Scale: 1:1 Date: 02/01/1999 Time: 07:07



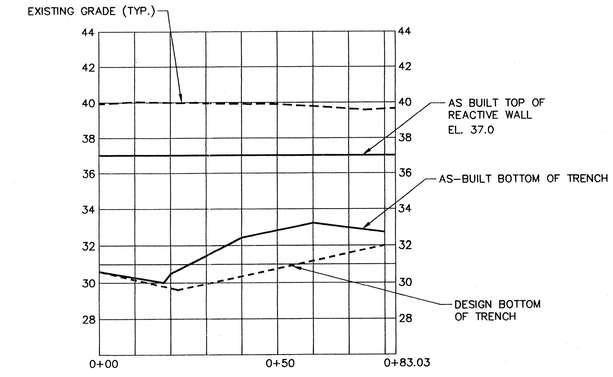
PLAN

SCALE: 1" = 15'



PROFILE – TRENCH "A"

SCALE: HORIZ. 1" = 20'
VERT. 1" = 4'



PROFILE – TRENCH "B"

SCALE: HORIZ. 1" = 20'
VERT. 1" = 4'

NOTES:

1. UNDERGROUND UTILITIES SHOWN HEREON BASED ON UTILITY EVIDENCE VISIBLE AT GROUND SURFACE AND RECORD DRAWINGS AND ARE SUBJECT TO FIELD VERIFICATION BY EXCAVATION. UTILITIES SHOWN DO NOT PURPORT TO CONSTITUTE OR REPRESENT ALL UTILITIES LOCATED UPON OR ADJACENT TO THE SURVEYED PREMISES.
2. THE OFFSETS OR DIMENSIONS SHOWN HEREON, FROM THE PROPERTY LINES TO THE STRUCTURES, ARE FOR A SPECIFIC PURPOSE AND USE; THEREFORE, THEY ARE NOT INTENDED TO MONUMENT THE PROPERTY LINES OR TO GUIDE THE ERECTION OF FENCES, ADDITIONAL STRUCTURES, OR ANY OTHER IMPROVEMENT.
3. EASEMENTS AND/OR SUBSURFACE STRUCTURES RECORDED OR UNRECORDED ARE NOT GUARANTEED UNLESS PHYSICALLY EVIDENT ON THE PREMISES AT THE TIME OF THE SURVEY.
4. SUBJECT TO ALL RIGHTS, EASEMENTS, COVENANTS AND RESTRICTIONS OF RECORD.

MAP REFERENCE:

MAP ENTITLED "WATERVLIET ARSENAL, PERMEABLE REACTION WALL, PILOT SYSTEM CONSTRUCTION, SITE PLAN" DATED AUGUST 1988 AND LAST REVISED 9/14/98 BY MALCOLM PIRNIE.

AS BUILT SUBMITTAL BY KILBY BROTHERS, INC. MAP ENTITLED "RECORD SURVEY FOR WATERVLIET ARSENAL PERMEABLE REACTION WALL PILOT SYSTEM CONSTRUCTION" DATED NOVEMBER 25, 1998 BY VOLLMER ASSOCIATES.

US Army Corps of Engineers

MALCOLM PIRNIE

REVISIONS			
NO.	BY	DATE	REMARKS

DES
DWN SMH
CKD JMC

WATERVLIET ARSENAL
PERMEABLE REACTION WALL PILOT TREATMENT SYSTEM CONSTRUCTION

AS BUILT TRENCH CONSTRUCTION DETAILS

SCALE: AS SHOWN

MALCOLM PIRNIE, INC.

DATE FEBRUARY 1999

PLATE 2 OF 2

DWG. NO. EX_98483

5683.ADMIN I:\ACAD\PROJ\ADMIN\EX_98483 Scale: 1:1 Date: 02/01/1999 Time: 10:16

PERMEABLE REACTION WALL
PILOT TREATMENT SYSTEM

APPENDIX A

REACTIVE MATERIALS PHYSICAL ANALYSES AND CERTIFICATIONS

SUBMITTAL DATA SHEET

PROJECT NAME: Watervliet Arsenal Reactive Trench DATE: 10/12/98
PROJECT NO.: 0285709
CONTRACTOR: Kilby Brothers, Inc.
SUBMITTAL NO: 3

☐ PROJECT DATA ☒ MAT. SAFETY DATA SHEET ☐ PERFORMANCE DATA
☐ SAMPLE ☐ COLOR CHART ☐ TEST REPORT
☐ SCHEDULE ☐ WARRANTY ☐ CERTIFICATION
☐ SHOP DRAWINGS ☐ SUBSTITUTION
☐ OTHER

DESCRIPTION OF SUBMITTAL: Granular Iron
PRODUCT NAME: Iron Aggregate ETI CC - 1004
MFG. Connelly - GPM, Inc.
SUBCONTRACTOR: -
SPEC SECTION: 02232 PARAGRAPH:
DRAWING NO. 709-08, 09

By submitting this information, I represent that I have determined and verified materials, field measurements and conditions and have checked the information contained here in with requirements of the work and the contract documents.

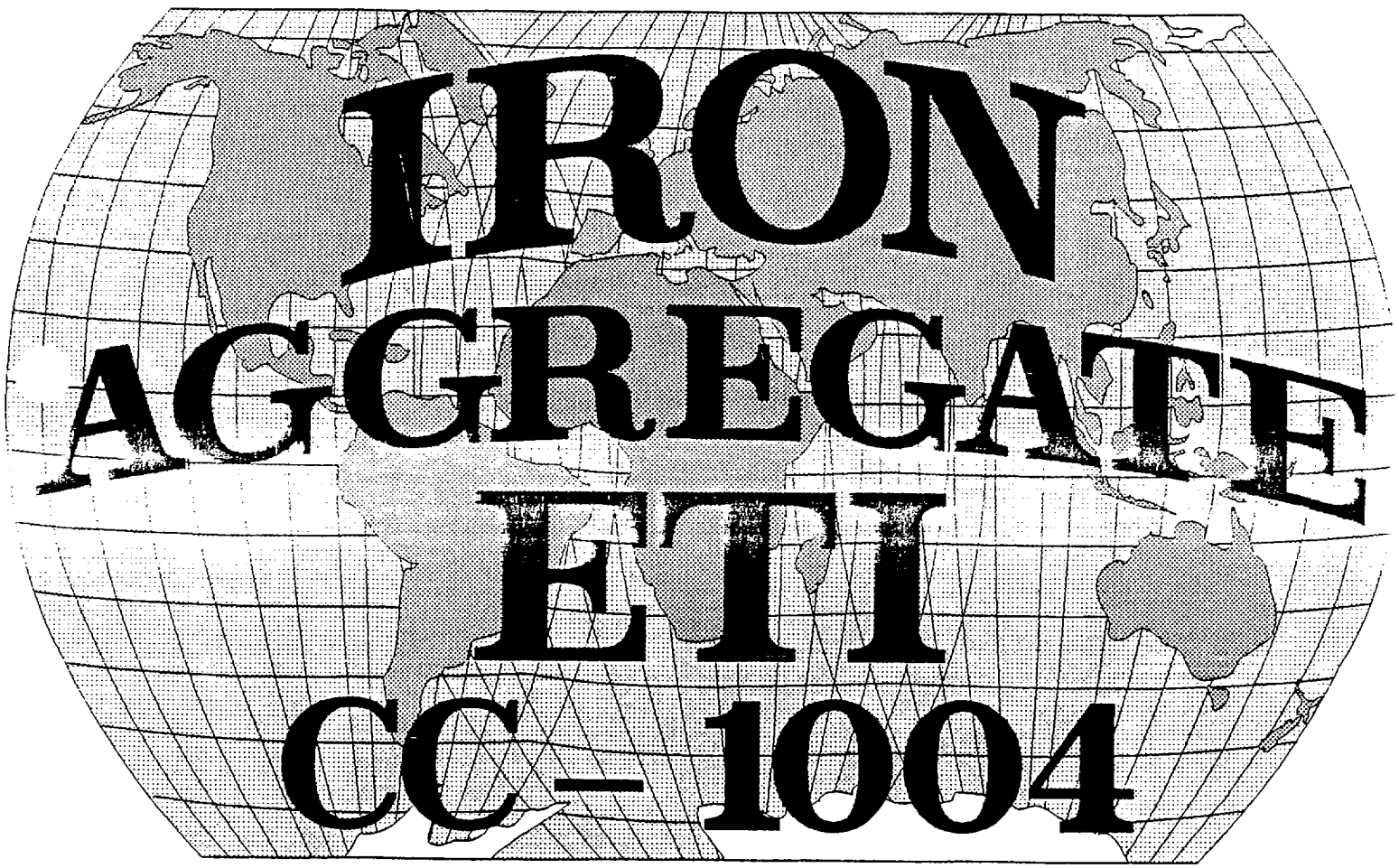
Reviewed by: Thomas W McClain
(Signature Required)

CONTRACTOR'S REVIEW AND APPROVAL	ENGINEER'S REVIEW AND APPROVAL
Subcontractor/Vendor Name Connelly - GPM Drawn By/Assembled By Steve Klein Approved By TWM Date 10-5-98	☒ APPROVED ☐ APPROVED AS CORRECTED ☐ REVISE AND RESUBMIT ☐ NOT APPROVED Checking is only for the conformance with the design concept of the Project and compliance with the information given in the Contract Documents. Contractor is responsible for dimensions to be confirmed and correlated at the job site; for information that pertains solely to the fabrication process or to techniques of construction; and for coordination of the work of all trades. MALCOLM PIRNIE, INC. Date 10/13/98 By

CONNELLY-GPM, INC.

ESTABLISHED 1875

3154 SO. CALIFORNIA AVE. - CHICAGO, IL. 60608-5176
PHONE (773) 247-7231 FAX (773) 247-7239



3000 LBS. NET

'TTION: IRON POWDER KEEP DRY AND PREVENT ACID CONTAMINATION WHILE STORAGE. SWEEP UP ANY SPILLAGE PROMPTLY. WEAR APPROVED DUST MASKS, AND SAFETY GLASSES/GOGGLES TO PREVENT INHALATION, INGESTION, AND INJURY TO THE EYES. IF ANY OF THE ABOVE OCCUR, GET PROMPT MEDICAL ATTENTION. KEEP OUT OF REACH OF CHILDREN.

NEWS RELEASE

CONNELLY - GPM, INC.

ESTABLISHED 1875

3154 SOUTH CALIFORNIA AVENUE • CHICAGO, ILLINOIS 60608-5176

PHONE: (773) 247-7231 FAX: (773) 247-7239

GROUND WATER REMEDIATION WITH ZERO -VALENT- IRON

Connelly-GPM's IRON AGGREGATE is currently being used for **in-situ** treatment of contaminated ground water at sites containing several chlorinated degreasing compounds, such as trichloroethylene (TCE), tetrachloroethylene (PCE), trichloroethane (TCA), and vinyl chloride (VC), which represent the most common volatile organic compounds (VOC's) contaminating groundwater.

In the past, cleanup often consisted of pumping the groundwater and treating it above ground then returning it to the environment. This pump-and-treat method is expensive, slow, and high maintenance. Now, there are also a variety of high tech approaches which involve trying to flush the pollutants with forced air or steam out where they can be brought up and treated at the surface.

By contrast, **in-situ reactive barriers** provide a passive remediation technique which, after installation, requires little maintenance. The natural flow of ground water does all the work. After the groundwater flow of a contaminated site is determined, a trench is dug across the downstream end of the site and filled with either **IRON AGGREGATE** alone or a mix of **IRON AGGREGATE** and coarse sand. By designing the wall to allow sufficient contact time with the **IRON AGGREGATE**, the contaminants are eliminated as the water passes through the treatment material. This process does not produce contaminated material, it destroys the contaminants completely.

This product, designed to meet standards developed using **EnviroMetal** Technologies, Inc. (ETI) patented technology, has been proven effective in laboratory testing and in full-scale treatment systems. **Connelly-GPM** produces the **IRON AGGREGATE** used in this, the most promising remediation system available for such contaminated sites.

ADVANTAGES

> Mechanically simple, long-term solution

> Cost effective compared to traditional pump & treat technology

> In-situ applications: no energy consumption, no costs to extract & dispose groundwater, minimal operations and maintenance costs

> Treatment destroys contaminants

> Does not transfer chemicals from one medium to another

> Nontoxic end products

> Can be combined with other remedial technologies for full treatment of a broad range of groundwater contaminants

Printed - January 1998

CONNELLY - GPM, INC.
ESTABLISHED 1875
3154 SOUTH CALIFORNIA AVENUE · CHICAGO, ILLINOIS 60608-5176
PHONE: (773) 247-7231 FAX: (773) 247-7239

April 22, 1998

SCREEN SPECIFICATION
ETI CC-1004

U.S. SCREEN NUMBER	
4	100% PASSING
8	95 - 100% PASSING
16	75 - 90
30	25 - 45
50	0 - 10
100	0 - 5

MATERIAL WEIGHS APPROXIMATELY 140 - 160 POUNDS PER CUBIC FOOT

Revised 10/97

TYPICAL ANALYSIS OF IRON AGGREGATE

Metallic Iron	89.82
Total Carbon	2.85
Manganese	0.60
Sulphur	0.107
Phosphorous	0.132
Silicon	1.85
Nickel	0.05 - 0.21
Chromium	0.03 - 0.17
Vanadium	Nil
Molybdenum	0.15
Titanium	0.004
Copper	0.15 - 0.20
Aluminum	Trace
Cobalt	0.003

CURTIS A. REVELL
Technical Director

D:\WORD\CI-CUSTO\WEB2.DOC

Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY *(As Used on Label and List)*: IRON AGGREGATE

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name: CONNELLY-GPM, INC.	Emergency Telephone Number: (773) 247-7231
Address *(Number, Street, City, State, and ZIP Code)*: 3154 S. California Avenue	Telephone Number for Information: (773) 247-7231
Chicago, IL. 60609-5176	Date Prepared: August 15, 1991
	Signature of Preparer *(optional)*

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))		OSHA PEL	ACGIH TLV	Other Limits Recommended (1)	% *(optional)*
IRON	CAS #1309-37-1	10 mg/m^3	5 mg/m^3	10 mg/m^3	
			(as Iron Oxide fume)		
CARBON	CAS #1333-86-4	3.5 mg/m^3	3.5 mg/m^3	7 mg/m^3	
			(as Carbon Black)		
SILICON	CAS #7440-21-3	(2)	(3)	20 mg/m^3	

*8 Hr. Time Weighted Average

1) ACGIH Stel (1984-1985)

2) < 1% Quartz 15 mg/m^3 of total dust or 5 mg/m^3 respirable dust

3) > 1% Quartz 10 mg/m^3 of total dust or 5 mg/m^3 respirable dust

Section III — Physical/Chemical Characteristics

Boiling Point: Iron Dust	3000°C	Specific Gravity (H_2O = 1): Approximate @ 60°F	7.8
Vapor Pressure (mm Hg.): @ 1787°C	1	Melting Point	1371 - 148
Vapor Density (AIR = 1)	N/A	Evaporation Rate (Butyl Acetate = 1)	N/A

Solubility in Water: Insoluble

Appearance and Odor: Odorless Gray/Black Powder

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
Not available			

Extinguishing Media: Dry chemicals or sand or Universal type foam

Special Fire Fighting Procedures: Firefighters should wear self-contained breathing apparatus and protective clothing.

Unusual Fire and Explosion Hazards: Dust can present fire and explosion hazards when exposed to fire, chemical reaction or contact with powerful oxidizers.

Section V — Reactivity Data

Stability	Unstable		Conditions to Avoid: Contact with powerful oxidizers such as strong acids.
	Stable	X	

Incompatibility (*Materials to Avoid*): Powerful oxidizers such as strong acids.

Hazardous Decomposition or Byproducts: Hydrogen, carbon monoxide, carbon dioxide

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	

Section VI — Health Hazard Data

Route(s) of Entry: Inhalation? Yes | Skin? No | Ingestion? Yes (not likely)

Health Hazards (*Acute and Chronic*):
Chronic overexposure to iron oxide fume may cause apparently benign pneumoconiosis.

Acute overexposure may cause eye, nose, mouth and skin irritation.

Carcinogenicity: NTP? NO INFORMATION AVAILABLE. | IARC Monographs? | OSHA Regulated?

Signs and Symptoms of Exposure: NO INFORMATION AVAILABLE.

Medical Conditions Generally Aggravated by Exposure: Inhalation - Remove to fresh air. Seek Medical Attention.
Ingestion - Seek Medical Attention.

Emergency and First Aid Procedures:
Skin Contact - Brush off excess. Wash with soap and water.
Eye Contact - Flush with running water - See Medical Attention.

Section VII — Precautions for Safe Handling and Use

Steps to Be Taken in Case Material Is Released or Spilled:
If large quantities of dust are spilled, remove by vacuuming or wet sweeping. To prevent large quantities of airborne dust, clean up personnel should wear respirators and protective clothing.

Waste Disposal Method:
Sanitary landfill
Follow Federal, State and local guidelines.

Precautions to Be Taken in Handling and Storing:
Do not store near powerful oxidizers such as strong acids.
Keep the material in a cool, dry location.

Other Precautions:

Section VIII — Control Measures

Respiratory Protection (*Specify Type*): NIOSH approved respirator for dusts and fumes

Ventilation	Local Exhaust: YES	Special
	Mechanical (*General*)	Other

Protective Gloves: Cloth | Eye Protection: OSHA approved safety glasses/Goggles

Other Protective Clothing or Equipment: Skull cap, hard hat to keep dust out of hair.

Work/Hygienic Practices: Use good housekeeping practices to keep dust to a minimum.

CONNELLY - GPM, INC.
ESTABLISHED 1875
3154 SOUTH CALIFORNIA AVENUE · CHICAGO, ILLINOIS 60608-5176
PHONE: (773) 247-7231 FAX: (773) 247-7239

April 22, 1998

COMPANY BACKGROUND

CONNELLY was founded in 1875, known as the CONNELLY IRON SPONGE & GOVERNOR COMPANY. In 1946, when they divested themselves of the Governor business, the Company name was changed to CONNELLY, INC. The primary business of the Company was to manufacture IRON SPONGE for the removal of hydrogen sulfide from illuminating gas and other gases.

GAS PURIFYING MATERIALS COMPANY, INC., was founded in 1919 and until 1958 manufactured an IRON SPONGE material, known as GPM IRON HYDROXIDE.

In the 1930's, CONNELLY also began producing Metallic and Non-Metallic Building Products on a private-label basis for the heavy construction industry, and Chemical Iron for reduction purposes in chemical plants. GAS PURIFYING MATERIALS COMPANY did likewise starting in 1950.

In 1956, GAS PURIFYING MATERIALS COMPANY, INC., purchased CONNELLY, INC. and operated CONNELLY as a wholly-owned subsidiary, with the GAS PURIFYING MATERIALS plant located in Long Island City, New York, and the CONNELLY plants in Elizabeth, New Jersey, and Chicago, Illinois - all three plants producing and selling Building Products, Iron Sponge and Chemical Iron.

In 1970, the parent company - GAS PURIFYING MATERIALS COMPANY, INC., was merged into the subsidiary, CONNELLY, INC., and the name changed to CONNELLY-GPM, INC. The GAS PURIFYING MATERIALS plant in Long Island City was shut down.

In 1991 it was determined that our customers' needs could be more efficiently served by consolidating our operations in the more centrally located Chicago plant and leasing the New Jersey site to other business interests.

CONNELLY-GPM, INC. manufactures the following products: METALLIC and NON-METALLIC BUILDING PRODUCTS for the industrial construction industry on a private-label basis only: IRON SPONGE for the removal of hydrogen sulfide from gases; CHEMICAL IRON for reduction purposes for the chemical industry, and IRON AGGREGATE for groundwater remediation.

The CHEMICAL IRON products and IRON AGGREGATE for groundwater remediation are the result of many years of research and development by our own Technical Department in conjunction with many governmental and private enterprises. Current environmental concerns have opened new and exciting uses for our IRON AGGREGATE. We have the capabilities to custom-grind IRON AGGREGATE to any specification for both the Chemical Iron and environmental markets.

In our many years of producing iron products (for Chemical Iron, Building Products, Environmental, or other uses) we have often found it necessary to sit down with our customers and design specific products to meet their needs. It is this experience, both in iron production and in the co-operative process itself which enable us to efficiently and effectively meet the needs of our customers. This flexibility is of particular value in the rapidly growing area of ground water remediation, which is marked by frequently changing and improving techniques and where each site provides unique design and implementation challenges.

The success of CONNELLY-GPM, INC. is based on the original policies of the founders of GAS PURIFYING MATERIALS COMPANY, INC. - Oliver H. Smith and Bernard D. Klein, and their successors, to offer to the Gas, Chemical, Building and Environmental industries the best products for the dollar, and to develop a relationship with our customers and suppliers which is based on respect and confidence. The logical thinking and extensive research and business acumen of the management and the efforts of its employees in the fields of research, manufacturing, purchasing, and sales have been devoted to realizing those goals.

Basically, our policy has been to concentrate on good solid products and pursue practical specialties which require repeat business. Our customers are very dependent on the quality of our products and services, as we play a very vital part in their operations.

Research and Development is currently working on new products for the Gas Industry, Building Products Industry, as well as working on new applications of its present products to the Petrochemical and Environmental industries.

In December 1986, Mr. B.L. Klein retired from the Company as President, after serving for fifty years. Upon Mr. B.L. Klein's retirement, Mr. Miles M. Klein became Chairman of the Board and Chief Executive Officer. In May 1994, Mr. Stephen M. Klein became President.

In 1997 Mr. Miles M. Klein, who had been with the Company since 1950, officially retired, and Mr. Stephen M. Klein succeeded his father to become the third generation to carry on Connelly-GPM's mission of fulfilling the needs of our customers in a broad range of industries. Mr. Stephen M. Klein has been with the Company in various management positions since 1971.

CONNELLY-GPM, INC.'s nucleus of well-trained, experienced people, with many years of accumulated knowledge and know-how, stands ready to direct that experience to help industries meet a variety of challenges in an ever-changing market.

CONNELLY - GPM, INC.
ESTABLISHED 1875
3154 SOUTH CALIFORNIA AVENUE · CHICAGO, ILLINOIS 60608-5176
PHONE: (773) 247-7231 FAX: (773) 247-7239

October 9, 1998

SENT VIA U.P.S. OVERNIGHT

Mr. Tom McClain
Kilby Brothers
9 Norman Drive
Albany, NY 12205

Dear Mr. McClain:

As per your phone call today, enclosed is a 10-lb. sample of ETI CC-1004 IRON AGGREGATE.

If you should need more samples or further information, please feel free to contact us again.

Sincerely,

CONNELLY-GPM, INC.

Stephen M Klein (sms)

STEPHEN M. KLEIN
President

SMK/sms

Encl:

D:\WORD\CI-CUSTO\KIL98109.DOC

envirometal technologies inc.

42 Arrow Road
Guelph, Ontario
Canada N1K 1S6
Tel (519) 824-0432
Fax (519) 763-2378

To: Tom McClaren
Kilby

Fax: 513 - 456 - 2733

Date: 9 Oct 98.

From: **Stephanie O'Hannesin, Senior Project Director Ext. 235**
Email: sohannesin@beak.com

Re: 31263.20 - MP.

Pages: 1 of 3

Tom: Please call if you need anything further.

Stephanie

Original To Follow: Mail Courier No

envirometal technologies inc.

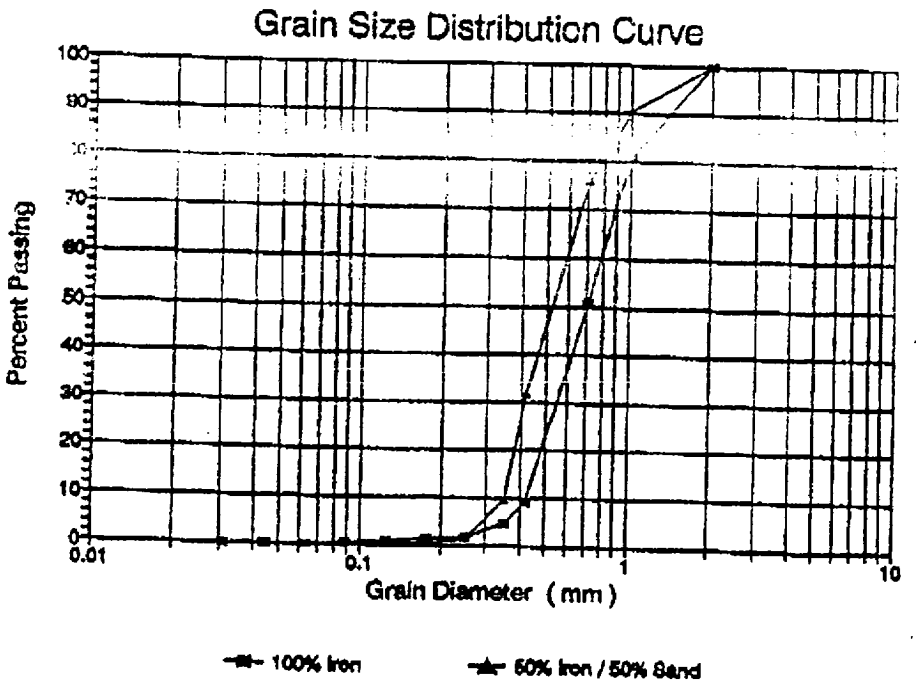
Typical Iron Properties for ETICC-1004

Source	Connelly-GPM, Inc., Chicago, IL
Identification Number	ETICC-1004
Grain Size	2.0 to 0.25 mm (-8 to +50 mesh)
Surface Area	1.4 to 1.6 m^2/g
Particle Density	6.3 to 6.5 g/cm^3
Hydraulic Conductivity (Average)	5.0×10^{-2} cm/sec (142 ft/day)
Porosity	0.4 to 0.5
Bulk Density	140 to 160 lb/ft^3

enviroMetal
technologies
inc.

Reactive Material Specifications

The reactive material to be placed in the treatment zone is a granular iron material. The iron has a grain size distribution of approximately −8 to −50 (2.0 to 0.25 mm) mesh US Std sieve size. The figure below shows the grain size distribution curves for a both a 100% iron and a 50% iron / 50% sand mixture. The iron has a field bulk density ranging from 140 to 160 lb/ft^3 (2,243 to 2,563 kg/m^3) . It can be shipped to the site in a variety of containers including plastic lined fiber superbags containing 3,000 lbs or by bulk in trucks. Overseas shipments can be shipped out in plastic lined fiber superbags placed in 20 ft containers to a total of 38,000 lbs (17,237 kg) per container. The choice of delivery method may be dependent on the preference of construction contractor selected. The only health and safety issues associated with this granular iron material is the iron dust particles. The appropriate dust masks and safety glasses/goggles are required. Material safety data sheets are available from the iron suppliers. Iron stored on site should be securely covered until required.



42 Arrow Road
Guelph, Ontario
Canada N1K 1S6
Tel (519) 824-0432
Fax (519) 763-2378

PROJECT NAME: Watervliet Arsenal Reactive Trench DATE: 10/12/98
PROJECT NO.: 0285709
CONTRACTOR: Kilby Brothers, Inc.
SUBMITTAL NO: 4

☐ PROJECT DATA ☐ MAT. SAFETY DATA SHEET ☐ PERFORMANCE DATA

☐ SAMPLE ☐ COLOR CHART ☒ TEST REPORT

☐ SCHEDULE ☐ WARRANTY ☐ CERTIFICATION

☐ SHOP DRAWINGS ☐ SUBSTITUTION

☐ OTHER

DESCRIPTION OF SUBMITTAL: Select Fill

PRODUCT NAME: Concrete Sand

MFG. -

SUBCONTRACTOR: Bonded Concrete, Inc.

SPEC SECTION: 02230 PARAGRAPH: 2.1

DRAWING NO.

By submitting this information, I represent that I have determined and verified materials, field measurements and conditions and have checked the information contained here in with requirements of the work and the contract documents.

Reviewed by: Thomas W McClain
(Signature Required)

CONTRACTOR'S REVIEW AND APPROVAL	ENGINEER'S REVIEW AND APPROVAL
Subcontractor/Vendor Name Bonded Concrete Drawn By/Assembled By Carl Clemente Approved By TWM Date 10-5-98	☒ APPROVED ☐ APPROVED AS CORRECTED ☐ REVISE AND RESUBMIT ☐ NOT APPROVED Checking is only for the conformance with the design concept of the Project and compliance with the information given in the Contract Documents. Contractor is responsible for dimensions to be confirmed and correlated at the job site; for information that pertains solely to the fabrication process or to techniques of construction; and for coordination of the work of all trades. MALCOLM PIRNIE, INC. Date 10/13/98 By

SOIL & MATERIAL TESTING, INC.

QUALITY CONTROL SECTION

REPORT OF ANALYSIS OF AGGREGATES

PROJECT NO. _____ SMT JOB NO. 73112

DATE: 01/24/95 REPORT NO. _____

ARCHITECT
ENGINEER _____ CONTRACTOR: TROY SAND & GRAVEL, INC.

PROJECT: TRIAL WASHED GRAIN SIZE ANALYSIS SOURCE: WEST SAND LAKE, NEW YORK

REPORT OF TESTS OF FINE AGGREGATE

SIEVE SIZE OR #	WEIGHT RETAINED	PERCENT RETAINED	PERCENT PASSING	SPECIFI-CATIONS
2 1/2-INCH				
2-INCH				
1 1/2-INCH				
1-INCH				
3/4-INCH				ASTM C-33
1/2 INCH				
3/8-INCH	0	0	100	100
NO.4	15.7	3.0	97.0	95/100
NO. 8	75.4	14.4	82.6	80/100
NO. 10				
NO. 16	91.1	17.4	65.2	50/85
NO. 30	116.2	22.2	43.0	25/60
NO. 40				
NO. 50	135.6	25.9	17.1	10/30
NO. 80				
NO. 100	49.7	9.5	7.6	2/10
NO. 200	25.1	4.8	2.8	
PAN				
FINENESS MODULUS		2.88		2.3/3.1

RECEIVED AT LABORATORY: 01/10/95

QUANTITY REPRESENTED: 100 LBS.

SUBMITTED BY: TORY CLEMENTE

SAMPLED FROM: STOCKPILE

IDENTIFICATION: NATURAL SAND

DATE SAMPLED: 01/10/95

INTENDED USE: CONCRETE AGGREGATE

ASTM C88 MAGNESIUM SULFATE SOUNDNESS

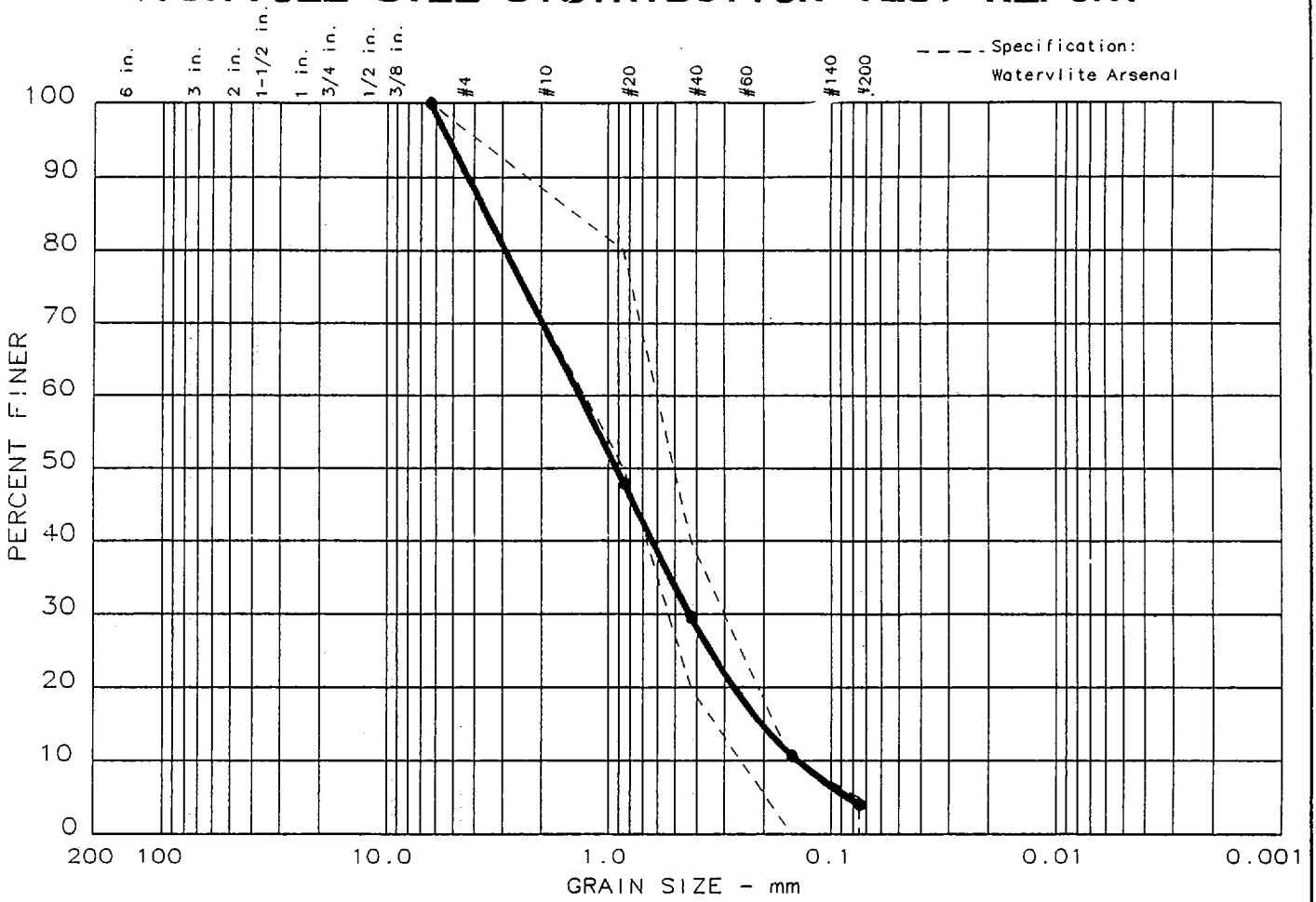
% CYCLE SIEVE SIZE	% LOSS	WEIGHTED % LOSS
3/8" - #4	4.29	0.13
#4 - #8	8.09	1.16
#8 - #16	7.82	1.36
#16 - #30	6.53	1.45
#30 - #50	4.03	1.04
TOTAL % LOSS =		5.14
MAXIMUM % LOSS ASTM C-33		15%

ASTM C128 SPECIFIC GRAVITY

BULK SPECIFIC GRAVITY = 2.580

% ABSORPTION = 1.9%

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	20	0.0	7.4	88.6	4.0		SP	N/a	N/A

SIEVE inches size	PERCENT FINER ●		
0.25	100.0		
	GRAIN SIZE		
D_{60}	1.33		
D_{30}	0.43		
D_{10}	0.14		
	COEFFICIENTS		
C_c	0.99		
C_u	9.5		

SIEVE number size	PERCENT FINER ●		
20	47.8		
40	29.6		
100	10.7		
200	4.0		

Sample information:

● Troy S & G 0 - 200 cy F-C SAND trace fine gravel trace silt

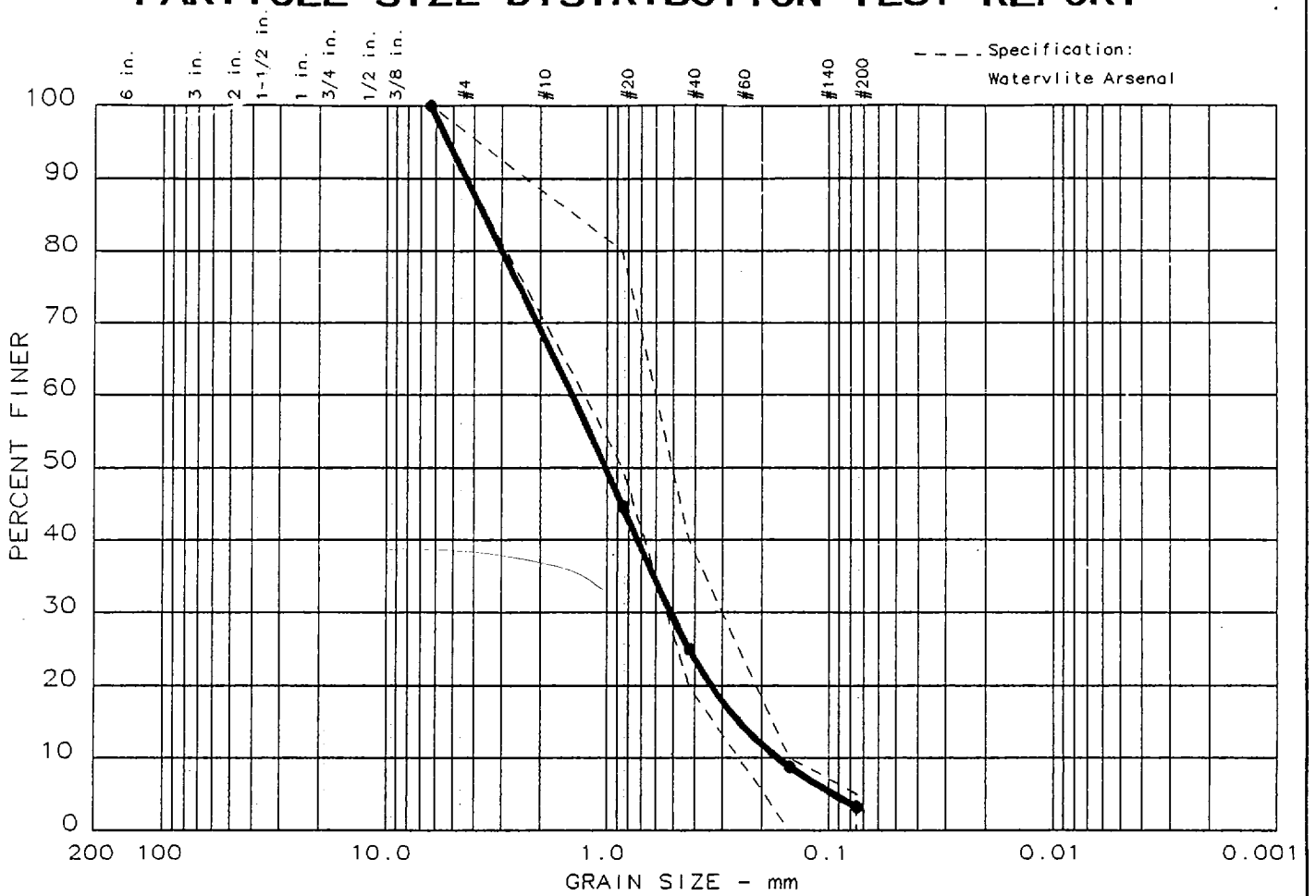
Remarks:
Sampled by Client
Tested by KF
Checked by FAD
CONCRETE SAND

EVERGREEN TESTING, INC.

Project No.: ETE-98-04
Project: Watervliet Arsenal

Date: 10-21-98 Data Sheet No. 357

PARTICLE SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY	USCS	LL	PI
●	19	0.0	7.7	89.1	3.2		SW	N/A	N/A

SIEVE inches size	PERCENT FINER ●		
0.25	100.0		
	GRAIN SIZE		
D_{60}	1.44		
D_{30}	0.52		
D_{10}	0.16		
	COEFFICIENTS		
C_c	1.09		
C_u	8.6		

SIEVE number size	PERCENT FINER ●
20	44.6
40	25.0
100	8.7
200	3.2

RECEIVED
NOV 2 1998
KILBY BROS., INC.

Sample information:
● Troy S & G 200 -400 cy F-C SAND trace fine gravel trace silt

Remarks:
Sampled by Client
Tested by KF
Checked by FAD
CONCRETE SAND

EVERGREEN TESTING, INC.

Project No.: ETE-98-04
Project: Watervliet Arsenal

Date: 10-21-98 Data Sheet No. 358

SOIL & MATERIAL TESTING, INC.
57 SOUTH MAIN STREET • CASTLETON, N.Y. 12033

Office	Telephone	Office	Telephone
Castleton	(518) 732-7205	Binghamton	(607) 722-1582
	Fax (518) 732-4516	Highland	(914) 691-4922
	WWW.SMTESTING.COM	Kingston	(914) 336-4471
		Pittsfield	(413) 499-5338

October 19, 1998

Mr. Tom McClain
Kilby Brothers, Inc.
PO Box 12003
Albany, NY 12212-2003

Re: *Watervliet Arsenal Project* SMT No.: 82268

Soil & Material Testing Inc. is pleased to submit test results for the above referenced project. The samples will be stored at SMT for 30 days. Please contact us for longer storage periods.

ASTM D 4253 and ASTM D 4254; Minimum and Maximum Density of Soil Using the Vibratory Table, Method A

SMT Sample ID	*Concrete Sand Sample #1*
Minimum Density Index	97.2 pcf
Maximum Density Index	126.5 pcf

If you have any questions or comments about these results or any other matter, please feel free to contact us.

Sincerely,

SOIL & MATERIAL TESTING, INC.

Jennifer A. Opar
President

SOIL & MATERIAL TESTING, INC.
57 SOUTH MAIN STREET • CASTLETON, N.Y. 12033

Office	Telephone	Office	Telephone
Castleton	(518) 732-7205	Binghamton	(607) 722-1582
	Fax (518) 732-4516	Highland	(914) 691-4922
	WWW.SMTESTING.COM	Kingston	(914) 336-4471
		Pittsfield	(413) 499-5338

October 19, 1998

Mr. Tom McClain
Kilby Brothers, Inc.
PO Box 12003
Albany, NY 12212-2003

Re: *Watervliet Arsenal Project* SMT No.: 82268

Soil & Material Testing Inc. is pleased to submit test results for the above referenced project. The samples will be stored at SMT for 30 days. Please contact us for longer storage periods.

ASTM D 4253 and ASTM D 4254; Minimum and Maximum Density of Soil Using the Vibratory Table, Method A

SMT Sample ID	*Concrete Sand Sample #2*
Minimum Density Index	102.9 pcf
Maximum Density Index	126.3 pcf

If you have any questions or comments about these results or any other matter, please feel free to contact us.

Sincerely,

SOIL & MATERIAL TESTING, INC.

Jennifer A. Opar
President

SOIL & MATERIAL TESTING, INC.
57 SOUTH MAIN STREET • CASTLETON, N.Y. 12033

Office	Telephone	Office	Telephone
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	Fax (518) 732-4516	Highland	(914) 691-4922
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PO Box 12003
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Re: *Watervliet Arsenal Project* SMT No.: 82268

Soil & Material Testing Inc. is pleased to submit test results for the above referenced project. The samples will be stored at SMT for 30 days. Please contact us for longer storage periods.

ASTM D 4253 and ASTM D 4254; Minimum and Maximum Density of Soil Using the Vibratory Table, Method A

SMT Sample ID	*Concrete Sand Sample #3*
Minimum Density Index	94.8 pcf
Maximum Density Index	125.1 pcf

If you have any questions or comments about these results or any other matter, please feel free to contact us.

Sincerely,

SOIL & MATERIAL TESTING, INC.

Jennifer A. Opar
President

PERMEABLE REACTION WALL
PILOT TREATMENT SYSTEM

APPENDIX B

REACTIVE MATERIALS
BATCH WEIGHT TICKETS

BONDED CONCRETE Incorporated

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

BONDED CONCRETE

TEL. 273-5800

ARE TRUCK TIMES AND WATER ADDED CORRECT?

THE STRENGTH OF THE CONCRETE APPEARING ON THE FACE OF THIS TICKET IS BASED ON A 5" MAXIMUM SLUMP WHEN TESTED IN ACCORDANCE WITH ASTM DESIGNATION C 94-80 SPECIFICATION FOR READY MIX CONCRETE. WATER ADDED TO MIX ONLY AT CUSTOMER'S AUTHORIZATION AND RISK.

SALES AND DELIVERY ARE SUBJECT TO CONDITIONS ON REVERSE SIDE.

TEST TAKEN_____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST_____ GAL.

RECEIVED BY_____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133526

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	10/26/98	1		12.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:
WATERVLIET ARSENAL

INSTRUCTIONS:

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
47	3.0		15:39	1	

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
ARRIVE PLANT	TOTAL TIME ON JOB		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	12.00	SAND		
		TOTAL OVERTIME		
			SUBTOTAL	
			TAX	
			TOTAL	

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL	%MST
SAND	18810	18500	LB	1500	-1.6	4.50o
KILBY S	37620	37400	LB	1500	-0.6	4.50o

KILBY BROS. INC.
DATE & TIME 10/26/98 15:40
PLANT No: 1 RTN: 109894
BATCH No: 61699 DROPS: 2
TRUCK 47 DRIVER:
QUAN 12.00Y MIX: KILBY

SLUMP 3.0 in
% HOT WATER 0
WAT ADJUST 0.0 GL
AGG ST -40
AGG ET -20
CEM ST
CEM ET
HI ST ADX NONE

TOL OK
MANUAL 15:31
NO MANUAL TRIM

WAT/CEM = 0.000T

NO. 133526

BONDED CONCRETE
Incorporated

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

BONDED CONCRETE

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

ARE TRUCK TIMES AND WATER ADDED CORRECT?

THE STRENGTH OF THE CONCRETE APPEARING ON THE FACE OF THIS TICKET IS BASED ON A 5" MAXIMUM SLUMP WHEN TESTED IN ACCORDANCE WITH ASTM DESIGNATION C 94-80 SPECIFICATION FOR READY MIX CONCRETE. WATER ADDED TO MIX ONLY AT CUSTOMER'S AUTHORIZATION AND RISK.

SALES AND DELIVERY ARE SUBJECT TO CONDITIONS ON REVERSE SIDE.

TEST TAKEN_____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST_____ GAL

RECEIVED BY_____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133548

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	10/27/98	1		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:
WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:

BLD TO UNDER RT155
WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
50	3.0		08:26	1	PM MC N

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
AF PLANT	TOTAL TIME ON JOB		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	10.00	SAND		
		TOTAL OVERTIME		
			SUBTOTAL	
			TAX	
			TOTAL	

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL	%MST.
SAND	15675	15560	LB	1500	-0.7	4.50o
K	31350	31320	LB	1500	-0.1	4.50o

KILBY BROS. INC.
DATE & TIME 10/27/98 8:28
PLANT No: 1 RTN: 109915
BATCH No: 61721 DROPS: 1
TRUCK 50 DRIVER: PM
QUAN 10.00Y MIX: KILBY

SLUMP 3.0 in
% HOT WATER 0
WAT ADJUST 0.0 GL
AGG ST -40
AGG ET -20
CEM ST
CEM ET
HI ST ADX NONE

OK
MANUAL 8:23
NO MANUAL TRIM

NO. 133548

WAT/CEM = 0.000T

BONDED CONCRETE
Incorporated

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

BONDED CONCRETE

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

ARE TRUCK TIMES AND WATER ADDED CORRECT?

THE STRENGTH OF THE CONCRETE APPEARING ON THE FACE OF THIS TICKET IS BASED ON A 5" MAXIMUM SLUMP WHEN TESTED IN ACCORDANCE WITH ASTM DESIGNATION C 94-80 SPECIFICATION FOR READY MIX CONCRETE. WATER ADDED TO MIX ONLY AT CUSTOMER'S AUTHORIZATION AND RISK.

SALES AND DELIVERY ARE SUBJECT TO CONDITIONS ON REVERSE SIDE.

TEST TAKEN_____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST_____ GAL

RECEIVED BY_____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133559

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	10/27/98	1		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:
WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:

BLD TO UNDER RT155
WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
50	3.0		10:05	1	PM MC N

10 06

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
AR PLANT	TOTAL TIME ON JOB		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	20.00	SAND		
		TOTAL OVERTIME		
			SUBTOTAL	
			TAX	
			TOTAL	

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL
SAND	15675	15500	LB	1500	-1.1
K	31350	31080	LB	1500	-0.9

%MST	
4.50o	KILBY BROS. INC.
4.50o	DATE & TIME 10/27/98 10:06
	PLANT No: 1 RTN: 109928
	BATCH No: 61731 DROPS: 1
	TRUCK 50 DRIVER: PM
	QUAN 10.00Y MIX: KILBY
	SLUMP 3.0 in
	% HOT WATER 0
	WAT ADJUST 0.0 GL
	AGG ST 20
	AGG ET 20
	CEM ST
	CEM ET
	HI ST ADX NONE

OK
MANUAL 10:00
NO MANUAL TRIM

NO. 133559

WAT/CEM = 0.000T

BONDED CONCRETE
Incorporated

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

BONDED CONCRETE

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

ARE TRUCK TIMES AND WATER ADDED CORRECT?

THE STRENGTH OF THE CONCRETE APPEARING ON THE FACE OF THIS TICKET IS BASED ON A 5" MAXIMUM SLUMP WHEN TESTED IN ACCORDANCE WITH ASTM DESIGNATION C 94-80 SPECIFICATION FOR READY MIX CONCRETE. WATER ADDED TO MIX ONLY AT CUSTOMER'S AUTHORIZATION AND RISK.

SALES AND DELIVERY ARE SUBJECT TO CONDITIONS ON REVERSE SIDE.

TEST TAKEN_____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST_____ GAL.

RECEIVED BY_____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133578

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	10/27/98	1		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:

WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:

BLD TO UNDER RT155
WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
50	3.0		12:46	1	PM MC N

LEAVE PLANT	ARRIVE JOB 12:50	START POURING	FINISH POURING	LEAVE JOB
AR. . PLANT	TOTAL TIME ON JOB		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	30.00	SAND		
		TOTAL OVERTIME		

SUBTOTAL
TAX
TOTAL

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL
SAND	15675	15600	LB	1500	-0.5
K	31350	30740	LB	1500	-1.9

%MST KILBY BROS. INC.
4.50o DATE & TIME 10/27/98 12:48
4.50o PLANT No: 1 RTN: 109957
BATCH No: 61751 DROPS: 1
TRUCK 50 DRIVER: PM
QUAN 10.00Y MIX: KILBY

SLUMP 3.0 in
% HOT WATER 0
WAT ADJUST 0.0 GL
AGG ST 20
AGG ET 0
CEM ST*
CEM ET
HI ST ADX NONE

TOL NOT OK
MANUAL 12:44
NO MANUAL TRIM

NO. 133578

WAT/CEM = 0.000T

BONDED CONCRETE
Incorporated

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS | BONDED CONCRETE | A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

ARE TRUCK TIMES AND WATER ADDED CORRECT?

THE STRENGTH OF THE CONCRETE APPEARING ON THE FACE OF THIS TICKET IS BASED ON A 5' MAXIMUM SLUMP WHEN TESTED IN ACCORDANCE WITH ASTM DESIGNATION C 94-80 SPECIFICATION FOR READY MIX CONCRETE. WATER ADDED TO MIX ONLY AT CUSTOMER'S AUTHORIZATION AND RISK.

SALES AND DELIVERY ARE SUBJECT TO CONDITIONS ON REVERSE SIDE.

TEST TAKEN

WATER ADDED ON JOB AT CUSTOMER'S REQUEST ________ GAL.

RECEIVED BY

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE
OF THIS TICKET

NO. 133588

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	10/27/98	1		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:
WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:
BLD TO UNDER RT155
WATERVLIET

1/4 mile
to Job

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
50	3.0		14:26	1	PM MC N

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
AR. PLANT	2:50 TOTAL TIME ON JOB		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	40.00	SAND		
		TOTAL OVERTIME		

SUBTOTAL
TAX
TOTAL

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL	%MST
SAND	15675	15540	LB	1500	-0.9	4.50o
K	31350	31400	LB	1500	0.2	4.50o

KILBY BROS. INC.
DATE & TIME 10/27/98 14:27
PLANT No: 1 RTN: 109969
BATCH No: 61763 DROPS: 1
TRUCK 50 DRIVER: PM
QUAN 10.00Y MIX: KILBY

SLUMP 3.0 in
% HOT WATER 0
WAT ADJUST 0.0 GL
AGG ST -40
AGG ET -40
CEM ST
CEM ET
HI ST ADX NONE

.OL OK
MANUAL 14:21
NO MANUAL TRIM

WAT/CEM = 0.000A

NO. 133588

BONDED CONCRETE
Incorporated

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

BONDED CONCRETE

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

THE STRENGTH OF THE CONCRETE APPEARING ON THE FACE OF THIS TICKET IS BASED ON A 5" MAXIMUM SLUMP WHEN TESTED IN ACCORDANCE WITH ASTM DESIGNATION C 94-80 SPECIFICATION FOR READY MIX CONCRETE. WATER ADDED TO MIX ONLY AT CUSTOMER'S AUTHORIZATION AND RISK.

SALES AND DELIVERY ARE SUBJECT TO CONDITIONS ON REVERSE SIDE.

TEST TAKEN _____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST _____ GAL.

RECEIVED BY _____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE
OF THIS TICKET

NO. 133655

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	10-28-98	a		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:
WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1st LEFT ALONG
INSTRUCTIONS: BLD TO UNDER RT155

WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
17	5.00		13:29		38

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
AP PLANT	TOTAL TIME ON JOB		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	40.00	SAND		
		TOTAL OVERTIME		
			SUBTOTAL	
			TAX	
			TOTAL	

COPY

BONDED CONCRETE
Incorporated

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

BONDED CONCRETE

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

ARE TRUCK TIMES AND WATER ADDED CORRECT?

THE STRENGTH OF THE CONCRETE APPEARING ON THE FACE OF THIS TICKET IS BASED ON A 5" MAXIMUM SLUMP WHEN TESTED IN ACCORDANCE WITH ASTM DESIGNATION C 94-80 SPECIFICATION FOR READY MIX CONCRETE. WATER ADDED TO MIX ONLY AT CUSTOMER'S AUTHORIZATION AND RISK.

SALES AND DELIVERY ARE SUBJECT TO CONDITIONS ON REVERSE SIDE.

TEST TAKEN_____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST_____ GAL

RECEIVED BY_____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133638

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	10/28/98	1		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:
WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:

BLD TO UNDER RT155
WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
47	3.0		12:06	1	DF FUSCO

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
AF PLANT	TOTAL TIME ON JOB		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	30.00	SAND		
		TOTAL OVERTIME		
			SUBTOTAL	
			TAX	
			TOTAL	

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL	%MST
SAND	15675	15380	LB	1500	-1.9	4.50o
K	31350	31340	LB	1500	-0.0	4.50o

KILBY BROS. INC.
DATE & TIME 10/28/98 12:07
PLANT No: 1 RTN: 110028
BATCH No: 61813 DROPS: 1
TRUCK 47 DRIVER: DF
QUAN 10.00Y MIX: KILBY

SLUMP 3.0 in
% HOT WATER 0
WAT ADJUST 0.0 GL
AGG ST -40
AGG ET -40
CEM ST
CEM ET
HI ST ADX NONE

JOB OK
MANUAL 12:02
NO MANUAL TRIM

NO. 133638

WAT/CEM = 0.000T

BONDED CONCRETE
Incorporated

"Performance"

TRANS-CENTRAL MIXED CONCRETE

BONDED CONCRETE

STATE SPECIFICATIONS

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

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SALES AND DELIVERY ARE SUBJECT TO CONDITIONS ON REVERSE SIDE.

TEST TAKEN _____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST _____ GAL

RECEIVED BY _____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133630

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	10/28/98	1		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:
WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:

BLD TO UNDER RT155
WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
47	3.0		11:20	1	DF FUSCO

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
AT PLANT	TOTAL TIME ON JOB		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	20.00	SAND		
		TOTAL OVERTIME		

SUBTOTAL
TAX
TOTAL

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL	%MST
SAND	15675	15900	LB	1500	1.4	4.50o
K	31350	31460	LB	1500	0.4	4.50o

KILBY BROS. INC.
DATE & TIME 10/28/98 11:22
PLANT No: 1 RTN: 110018
BATCH No: 61805 DROPS: 1
TRUCK 47 DRIVER: DF
QUAN 10.00Y MIX: KILBY

SLUMP 3.0 in
% HOT WATER 0
WAT ADJUST 0.0 GL
AGG ST -40
AGG ET 40
CEM ST
CEM ET
HI ST ADK NONE

JL OK
MANUAL 11:18
NO MANUAL TRIM

NO. 133630

WAT/CEM = 0.000A

BONDED CONCRETE
Incorporated

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

BONDED CONCRETE

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

ARE TRUCK TIMES AND WATER ADDED CORRECT?

THE STRENGTH OF THE CONCRETE APPEARING ON THE FACE OF THIS TICKET IS BASED ON A 5" MAXIMUM SLUMP WHEN TESTED IN ACCORDANCE WITH ASTM DESIGNATION C 94-80 SPECIFICATION FOR READY MIX CONCRETE. WATER ADDED TO MIX ONLY AT CUSTOMER'S AUTHORIZATION AND RISK.

SALES AND DELIVERY ARE SUBJECT TO CONDITIONS ON REVERSE SIDE.

TEST TAKEN_____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST_____ GAL

RECEIVED BY_____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133626

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	10/28/98	1		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:
WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:

BLD TO UNDER RT155
WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
47	3.0		10:39	1	DF FUSCO

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
AF PLANT	TOTAL TIME ON JOB 8	945	ALLOWED TIME 10:0	OVERTIME 10:5

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	10.00	SAND		
		TOTAL OVERTIME		
			SUBTOTAL	
			TAX	
			TOTAL	

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL	%MST
SAND	15675	15600	LB	1500	-0.5	4.50o
K	31350	31220	LB	1500	-0.4	4.50o

KILBY BROS. INC.
DATE & TIME 10/28/98 10:40
PLANT No: 1 RTN: 110012
BATCH No: 61800 DROPS: 1
TRUCK 47 DRIVER: DF
QUAN 10.00Y MIX: KILBY

SLUMP 3.0 in
% HOT WATER 0
WAT ADJUST 0.0 GL
AGG ST -40
AGG ET -40
CEM ST
CEM ET
HI ST ADX NONE

L OK
MANUAL 10:36
NO MANUAL TRIM

NO. 133626

WAT/CEM = 0.000T

BONDED CONCRETE
Incorporated

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

BONDED CONCRETE

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

ARE TRUCK TIMES AND WATER ADDED CORRECT?

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SALES AND DELIVERY ARE SUBJECT TO CONDITIONS ON REVERSE SIDE.

TEST TAKEN _____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST _____ GAL.

RECEIVED BY _____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133723

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	10/29/98	1		8.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:
WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:
BLD TO UNDER RT155
WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
39	3.0		14:16	1	

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
ARR PLANT	TOTAL TIME ON JOB		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	28.00	SAND		
		TOTAL OVERTIME		

SUBTOTAL
TAX
TOTAL

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL	%MST
SAND	12600	12500	LB	1500	-0.8	5.00o
K	25200	24980	LB	1500	-0.9	5.00o

KILBY BROS. INC.
DATE & TIME 10/29/98 14:17
PLANT No: 1 RTN: 110129
BATCH No: 61896 DROPS: 1
TRUCK 39 DRIVER:
QUAN 8.00Y MIX: KILBY

SLUMP 3.0 in
% HOT WATER 0
WAT ADJUST 0.0 GL
AGG ST -20
AGG ET 0
CEM ST
CEM ET
HI ST ADX NONE

TOL OK
MANUAL 14:16
NO MANUAL TRIM

WAT/CEM = 0.000T

NO. 133723

BONDED CONCRETE
• Incorporated •

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

BONDED CONCRETE

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

ARE TRUCK TIMES AND WATER ADDED CORRECT?

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SALES AND DELIVERY ARE SUBJECT TO CONDITIONS ON REVERSE SIDE.

TEST TAKEN_____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST_____ GAL

RECEIVED BY_____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133677

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	10/29/98	1		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:
WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:
BLD TO UNDER RT155
WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
39	3.0		07:33	1	

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
AR PLANT	TOTAL TIME ON JOB	Strd 2nd - 10:00	ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	10.00	SAND		
		TOTAL OVERTIME		
			SUBTOTAL	
			TAX	
			TOTAL	

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL	%MST
SAND	15675	15660	LB	1500	-0.1	4.50o
K	31350	31200	LB	1500	-0.5	4.50o

KILBY BROS. INC.
DATE & TIME 10/29/98 7:34
PLANT No: 1 RTN: 110089
BATCH No: 61851 DROPS: 1
TRUCK 39 DRIVER:
QUAN 10.00Y MIX: KILBY

SLUMP 3.0 in
% HOT WATER .0
WAT ADJUST 0.0 GL
AGG ST -40
AGG ET 40
CEM ST
CEM ET
HI ST ADX NONE

JL OK
MANUAL 7:30
NO MANUAL TRIM

WAT/CEM = 0.000T

NO. 133677

BONDED CONCRETE
Incorporated

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

BONDED CONCRETE

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

ARE TRUCK TIMES AND WATER ADDED CORRECT?

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TEST TAKEN _____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST _____ GAL.

RECEIVED BY _____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133704

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	10/29/98	1		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:
WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:

BLD TO UNDER RT155
WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
39	3.0		11:15	1	

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
ARR. PLANT	TOTAL TIME ON JOB		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	20.00	SAND		
		TOTAL OVERTIME		
			SUBTOTAL	
			TAX	
			TOTAL	

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL	%MST
SAND	15750	15580	LB	1500	-1.1	5.00o
K	31500	31260	LB	1500	-0.8	5.00o

KILBY BROS. INC.
DATE & TIME 10/29/98 11:16
PLANT No: 1 RTN: 110124
BATCH No: 61877 DROPS: 1
TRUCK 39 DRIVER:
QUAN 10.00Y MIX: KILBY

SLUMP 3.0 in
% HOT WATER 0
WAT ADJUST 0.0 GL
AGG ST 0
AGG ET 0.
CEM ST
CEM ET
HI ST ADX NONE

TOL OK
MANUAL 11:13
NO MANUAL TRIM

WAT/CEM = 0.000T

NO. 133704

BONDED CONCRETE
Incorporated

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

BONDED CONCRETE

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

ARE TRUCK TIMES AND WATER ADDED CORRECT?

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SALES AND DELIVERY ARE SUBJECT TO CONDITIONS ON REVERSE SIDE.

TEST TAKEN_____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST_____ GAL

RECEIVED BY_____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133779

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	10/30/98	1		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:
WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:

BLD TO UNDER RT155
WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
39	3.0		10:38	1	

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
AT PLANT	TOTAL TIME ON JOB		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	10.00	SAND		
		TOTAL OVERTIME		
			SUBTOTAL	
			TAX	
			TOTAL	

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL	%MST
SAND	15750	15660	LB	1500	-0.6	5.00o
K	31500	32680	LB	1500	3.7*	5.00o

KILBY BROS. INC.
DATE & TIME 10/30/98 10:39
PLANT No: 1 RTN: 110195
BATCH No: 61949 DROPS: 1
TRUCK 39 DRIVER:
QUAN 10.00Y MIX: KILBY

SLUMP 3.0 in
% HOT WATER 0
WAT ADJUST 0.0 GL
AGG ST -40
AGG ET -20
CEM ST
CEM ET
HI ST ADX NONE

.OL NOT OK
MANUAL 10:33
NO MANUAL TRIM

WAT/CEM = 0.000A

NO. 133779

BONDED CONCRETE
•Incorporated•

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

BONDED CONCRETE

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

ARE TRUCK TIMES AND WATER ADDED CORRECT?

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SALES AND DELIVERY ARE SUBJECT TO CONDITIONS ON REVERSE SIDE.

TEST TAKEN_____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST_____ GAL

RECEIVED BY_____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133789

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	10/30/98	1		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:

WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:

BLD TO UNDER RT155
WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
39	3.0		11:46	1	

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
AT PLANT	TOTAL TIME ON JOB 11:45		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	20.00	SAND		
		TOTAL OVERTIME		
			SUBTOTAL	
			TAX	
			TOTAL	

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL	%MST
SAND	15600	15520	LB	1500	-0.5	4.00o
K	31200	31160	LB	1500	-0.1	4.00o

KILBY BROS. INC.
DATE & TIME 10/30/98 11:47
PLANT No: 1 RTN: 110214
BATCH No: 61957 DROPS: 1
TRUCK 39 DRIVER:
QUAN 10.00Y MIX: KILBY

SLUMP 3.0 in
% HOT WATER 0
WAT ADJUST 0.0 GL
AGG ST -40
AGG ET 40
CEM ST
CEM ET
HI ST ADX NONE

JL OK
MANUAL 11:44
NO MANUAL TRIM

WAT/CEM = 0.000T

NO. 133789

BONDED CONCRETE
Incorporated

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

BONDED CONCRETE

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

ARE TRUCK TIMES AND WATER ADDED CORRECT?

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SALES AND DELIVERY ARE SUBJECT TO CONDITIONS ON REVERSE SIDE.

TEST TAKEN_____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST_____ GAL.

RECEIVED BY_____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133797

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	10/30/98	1		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:
WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:

BLD TO UNDER RT155
WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
39	3.0		12:49	1	TW

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
ARR PLANT	TOTAL TIME ON JOB 2:45		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	30.00	SAND		
		TOTAL OVERTIME		
			SUBTOTAL	
			TAX	
			TOTAL	

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL	%MST
SAND	15600	15540	LB	1500	-0.4	4.00o
K	31200	30980	LB	1500	-0.7	4.00o

KILBY BROS. INC.
DATE & TIME 10/30/98 12:50
PLANT No: 1 RTN: 110227
BATCH No: 61965 DROPS: 1
TRUCK 39 DRIVER:
QUAN 10.00Y MIX: KILBY

SLUMP 3.0 in
% HOT WATER 0
WAT ADJUST 0.0 GL
AGG ST 20
AGG ET 60
CEM ST
CEM ET
HI ST ADX NONE

TOL OK
MANUAL 12:47
NO MANUAL TRIM

NO. 133797

WAT/CEM = 0.000T

BONDED CONCRETE
Incorporated

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

BONDED CONCRETE

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

ARE TRUCK TIMES AND WATER ADDED CORRECT?

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TEST TAKEN_____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST_____ GAL.

RECEIVED BY_____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133806

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	10/30/98	1		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:

WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:

BLD TO UNDER RT155
WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
39	3.0		13:51	1	TM

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
AR PLANT	TOTAL TIME ON JOB		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	40.00	SAND		
		TOTAL OVERTIME		
			SUBTOTAL	
			TAX	
			TOTAL	

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL	%MST
SAND	15600	15300	LB	1500	-1.9	4.00o
K	31200	31280	LB	1500	0.3	4.00o

KILBY BROS. INC.
DATE & TIME 10/30/98 13:53
PLANT No: 1 RTN: 110231
BATCH No: 61973 DROPS: 1
TRUCK 39 DRIVER:
QUAN 10.00Y MIX: KILBY

SLUMP 3.0 in
% HOT WATER 0
WAT ADJUST 0.0 GL
AGG ST 20
AGG ET 40
CEM ST
CEM ET
HI ST ADX NONE

L OK
MANUAL 13:48
NO MANUAL TRIM

NO. 133806

WAT/CEM = 0.000A

BONDED CONCRETE
• Incorporated •

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

BONDED CONCRETE

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

ARE TRUCK TIMES AND WATER ADDED CORRECT?

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TEST TAKEN_____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST_____ GAL.

RECEIVED BY_____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133811

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	10/30/98	1		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:

WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:

BLD TO UNDER RT155
WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
39	3.0		14:42	1	

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
AF PLANT	TOTAL TIME ON JOB 2.40		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	50.00	SAND		
		TOTAL OVERTIME		

SUBTOTAL
TAX
TOTAL

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL		MST	
SAND	15600	15520	LB	1500	-0.5		4.00o	KILBY BROS. INC.
K	31200	32620	LB	1500	4.6*		4.00o	DATE & TIME 10/30/98 14:45
								PLANT No: 1 RTN: 110236
								BATCH No: 61977 DROPS: 1
								TRUCK 39 DRIVER:
								QUAN 10.00Y MIX: KILBY
								SLUMP 3.0 in
								% HOT WATER 0
								WAT ADJUST 0.0 GL
								AGG ST 20
								AGG ET 100
								CEM ST
								CEM ET
								HI ST ADX NONE

L NOT OK
MANUAL 14:40
NO MANUAL TRIM
MIXED 0 OF 90 ABORT'D WAT/CEM = 0.000A

NO. 1338

BONDED CONCRETE
Incorporated

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

BONDED CONCRETE

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

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TEST TAKEN_____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST_____ GAL

RECEIVED BY_____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133856

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	11/02/98	1		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:
WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:

BLD TO UNDER RT155
WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
47	3.0		08:07	1	DF FUSCO

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
A . PLANT	TOTAL TIME ON JOB		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	10.00	SAND		
		TOTAL OVERTIME		

SUBTOTAL
TAX
TOTAL

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL	%MST
SAND	15600	15540	LB	1500	-0.4	4.00o
K	31200	30860	LB	1500	-1.1	4.00o

KILBY BROS. INC.
DATE & TIME 11/02/98 8:08
PLANT No: 1 RTN: 110280
BATCH No: 62021 DROPS: 1
TRUCK 47 DRIVER: DF
QUAN 10.00Y MIX: KILBY

SLUMP 3.0 in
% HOT WATER 0
WAT ADJUST 0.0 GL
AGG ST -40
AGG ET 40
CEM ST
CEM ET
HI ST ADX NONE

JL OK
MANUAL 7:53
NO MANUAL TRIM

NO. 133856

WAT/CEM = 0.000T

BONDED CONCRETE
Incorporated

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

BONDED CONCRETE

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

ARE TRUCK TIMES AND WATER ADDED CORRECT?

THE STRENGTH OF THE CONCRETE APPEARING ON THE FACE OF THIS TICKET IS BASED ON A 5" MAXIMUM SLUMP WHEN TESTED IN ACCORDANCE WITH ASTM DESIGNATION C 94-80 SPECIFICATION FOR READY MIX CONCRETE. WATER ADDED TO MIX ONLY AT CUSTOMER'S AUTHORIZATION AND RISK.

SALES AND DELIVERY ARE SUBJECT TO CONDITIONS ON REVERSE SIDE.

TEST TAKEN _____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST _____ GAL

RECEIVED BY _____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133928

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	11/03/98	1		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:
WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:

BLD TO UNDER RT155
WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
48	3.0		08:01	1	RP ~~ZIMMER~~

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
AF PLANT	TOTAL TIME ON JOB 800		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	10.00	SAND		
		TOTAL OVERTIME		
			SUBTOTAL	
			TAX	
			TOTAL	

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL
SAND	15600	15440	LB	1500	-1.0
K	31200	31040	LB	1500	-0.5

%MST KILBY BROS. INC.
4.00o DATE & TIME 11/03/98 8:03
4.00o PLANT No: 1 RTN: 110354
BATCH No: 62092 DROPS: 1
TRUCK 48 DRIVER: RP
QUAN 10.00Y MIX: KILBY

SLUMP 3.0 in
% HOT WATER 0
WAT ADJUST 0.0 GL
AGG ST -40
AGG ET 0
CEM ST*
CEM ET
HI ST ADX NONE

L NOT OK
MANUAL 7:57
NO MANUAL TRIM

WAT/CEM = 0.000T

NO. 133928

BONDED CONCRETE
Incorporated

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

BONDED CONCRETE

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

ARE TRUCK TIMES AND WATER ADDED CORRECT?

THE STRENGTH OF THE CONCRETE APPEARING ON THE FACE OF THIS TICKET IS BASED ON A 5" MAXIMUM SLUMP WHEN TESTED IN ACCORDANCE WITH ASTM DESIGNATION C 94-80 SPECIFICATION FOR READY MIX CONCRETE. WATER ADDED TO MIX ONLY AT CUSTOMER'S AUTHORIZATION AND RISK.

SALES AND DELIVERY ARE SUBJECT TO CONDITIONS ON REVERSE SIDE.

TEST TAKEN _____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST _____ GAL

RECEIVED BY _____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133939

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	11/03/98	1		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:

WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:

BLD TO UNDER RT155
WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
48	3.0		09:30	1	RP P

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
A' PLANT	TOTAL TIME ON JOB		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	20.00	SAND		
		TOTAL OVERTIME		
			SUBTOTAL	
			TAX	
			TOTAL	

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL	%MST
SAND	15600	15460	LB	1500	-0.9	4.00o
K	31200	31080	LB	1500	-0.4	4.00o

KILBY BROS. INC.
DATE & TIME 11/03/98 9:32
PLANT No: 1 RTN: 110371
BATCH No: 62103 DROPS: 1
TRUCK 48 DRIVER: RP
QUAN 10.00Y MIX: KILBY

SLUMP 3.0 in
% HOT WATER 0
WAT ADJUST 0.0 GL
AGG ST -40
AGG ET 20
CEM ST
CEM ET
HI ST ADX NONE

L OK
MANUAL 9:28
NO MANUAL TRIM

NO. 133939

WAT/CEM = 0.000T

BONDED CONCRETE
Incorporated

"Performance"

TRANS-CENTRAL MIXED CONCRETE

STATE SPECIFICATIONS

BONDED CONCRETE

A.S.T.M. SPECIFICATIONS

P.O. BOX 189
WATERVLIET, N.Y. 12189

TEL. 273-5800

ARE TRUCK TIMES AND WATER ADDED CORRECT?

THE STRENGTH OF THE CONCRETE APPEARING ON THE FACE OF THIS TICKET IS BASED ON A 5" MAXIMUM SLUMP WHEN TESTED IN ACCORDANCE WITH ASTM DESIGNATION C 94-80 SPECIFICATION FOR READY MIX CONCRETE. WATER ADDED TO MIX ONLY AT CUSTOMER'S AUTHORIZATION AND RISK.

SALES AND DELIVERY ARE SUBJECT TO CONDITIONS ON REVERSE SIDE.

TEST TAKEN_____

WATER ADDED ON JOB AT CUSTOMER'S REQUEST_____ GAL.

RECEIVED BY_____

CHECK YOUR LOAD

WARNING: KEEP OUT OF REACH OF CHILDREN
SEE WARNING ON REVERSE SIDE OF THIS TICKET

NO. 133946

CUSTOMER NO.	DATE	PLANT	MIX	LOAD SIZE	C.T.	CU YDS
	11/03/98	1		10.00		

SOLD TO:

KILBY BROS. INC.
PO BOX 12003
ALBANY NY 12212

DELIVERY ADDRESS:
WATERVLIET ARSENAL IN
GATE BY GALLGER FISH
FRY 1ST LEFT ALONG

INSTRUCTIONS:

BLD TO UNDER RT155
WATERVLIET

P.O. NO.	ORDER NO.	TIME DUE

TRUCK	SLUMP	USE	BATCH TIME	TX CD	DRIVER
48	3.0		10:19	1	RP P

LEAVE PLANT	ARRIVE JOB	START POURING	FINISH POURING	LEAVE JOB
AI PLANT	TOTAL TIME ON JOB		ALLOWED TIME	OVERTIME

PRODUCT NO.	SHIPPED QUANTITY	PRODUCT DESCRIPTION	UNIT PRICE	AMOUNT
KILBY	30.00	SAND		
		TOTAL OVERTIME		
			SUBTOTAL	
			TAX	
			TOTAL	

COPY

MATERIAL	REQ'D	BAT'D		MIX	TOL	%MST
SAND	15600	15460	LB	1500	-0.9	4.00o
K	31200	31000	LB	1500	-0.6	4.00o

KILBY BROS. INC.
DATE & TIME 11/03/98 10:22
PLANT No: 1 RTN: 110375
BATCH No: 62110 DROPS: 1
TRUCK 48 DRIVER: RP
QUAN 10.00Y MIX: KILBY

SLUMP 3.0 in
% HOT WATER 0
WAT ADJUST 0.0 GL
AGG ST 40
AGG ET 20
CEM ST
CEM ET
HI ST ADX NONE

.OL OK
MANUAL 10:06
NO MANUAL TRIM

NO. 133946

WAT/CEM = 0.000T

PERMEABLE REACTION WALL
PILOT TREATMENT SYSTEM

APPENDIX C

PHOTOGRAPHIC LOG

Permeable Reaction Wall Pilot Treatment System
Photographic Log

Description: Granular iron sample from batching plant stockpile.

Permeable Reaction Wall Pilot Treatment System
Photographic Log

Description: Bonded Concrete, Inc. transit mix plant used for off-site batching of reactive materials.

Permeable Reaction Wall Pilot Treatment System
Photographic Log

Description: Concrete hoppers at batch plant. Covered hopper used for temporary storage of granular iron. Hopper on right used for concrete sand storage.

Permeable Reaction Wall Pilot Treatment System
Photographic Log

Description: Batching QA/QC including magnetic separation of granular and concrete sand to check weight ratio.

Permeable Reaction Wall Pilot Treatment System
Photographic Log

Description: Trench excavation operations: Steel shoring plates in-place with reactive materials up to approximate design elevation in foreground. Conventional track-mounted excavator advancing the trench in the background.

Permeable Reaction Wall Pilot Treatment System
Photographic Log

Description: Measurement at the bottom of excavated and shored trench to verify width.

Permeable Reaction Wall Pilot Treatment System
Photographic Log

Description: Determination of the bottom of the trench elevation.

Permeable Reaction Wall Pilot Treatment System
Photographic Log

Description: Placement of sand between trench sidewall and shoring plate to fill voids.

Permeable Reaction Wall Pilot Treatment System
Photographic Log

Description: Placement of granular iron and concrete sand mixture into trench from transit truck.

Permeable Reaction Wall Pilot Treatment System
Photographic Log

Description: Dewatering shored trench using electric submersible pump.

Permeable Reaction Wall Pilot Treatment System
Photographic Log

Description: Flushing of the five-inch drive casing for the installation of an in-trench monitoring well.

Permeable Reaction Wall Pilot Treatment System
Photographic Log

Description: Installation of monitoring well through hollow stem augers outside of reactive wall.

PERMEABLE REACTION WALL
PILOT TREATMENT SYSTEM

APPENDIX D

MAGNETIC SEPARATION RESULTS

WATERVLIET ARSENAL PERMEABLE REACTION WALL PILOT PROJECT

Granular Iron/Concrete Sand Mixing
Test Results

Date: 10/27/98

Sample Indent. 10/26/98 Fe/Sand [1st Load]

Test By: JBM / TM

	Total Incl. Plate	Wt. of Pan	Weight.
Initial Weight of Sample of Mixed Material (gm.)	576.9	6.8	570.1
Weight of Iron Component (gm.)	293.1	6.8	286.3
Weight of Concrete Sand Component (gm.)	290.6	6.8	283.8
Sum of Iron and Sand Components (gm)			570.1
Difference from Initial Weight (gm.)			0
Proportion of Iron to Concrete Sand*	286.3 / 283.8 = 1.01		1.01 : 1.00

* Proportion based on ratio of iron to sand.

Procedure:
1. Weigh initial sample of mixed material.
2. Spread material thinly on clean paper, remove iron component with magnet, and place on a second piece of clean paper. Remove iron component with magnet a second time and place iron in pan. Weigh iron and pan.
3. Combine sand components from step 2 and weigh.
4. Clean Pan and weigh.

Notes
1. If mix is visible moist, allow to air dry.
2. If a substantial amount of sand remains after second separation with magnet, do additional separations until the amount of sand remaining on the paper is negligible (less than 5 grams.)
3. Be sure to remove as much iron as possible from the mix. Pass magnet over the thinly spread mix a number of times and stir mix between passes.

WATERVLIET ARSENAL PERMEABLE REACTION WALL PILOT PROJECT

Granular Iron/Concrete Sand Mixing
Test Results

Date: 10/28/98

Sample Indent. TRENCH 3, COMP 2

Test By: TJM

	Total Incl. Plate	Wt. of Pan	Weight.
Initial Weight of Sample of Mixed Material (gm.)	443.0	6.8	436.2
Weight of Iron Component (gm.)	206.7	6.8	199.9
Weight of Concrete Sand Component (gm.)	240.1	6.8	233.2
Sum of Iron and Sand Components (gm)			433.1
Difference from Initial Weight (gm.)			−3.4 g.
Proportion of Iron to Concrete Sand*	$\frac{199.9}{233.2} = 0.86$		0.86 : 1.0

* Proportion based on ratio of iron to sand.

Procedure:

1. Weigh initial sample of mixed material.
2. Spread material thinly on clean paper, remove iron component with magnet, and place on a second piece of clean paper. Remove iron component with magnet a second time and place iron in pan. Weigh iron and pan.
3. Combine sand components from step 2 and weigh.
4. Clean Pan and weigh.

Notes

1. If mix is visible moist, allow to air dry.
2. If a substantial amount of sand remains after second separation with magnet, do additional separations until the amount of sand remaining on the paper is negligible (less than 5 grams.)
3. Be sure to remove as much iron as possible from the mix. Pass magnet over the thinly spread mix a number of times and stir mix between passes.

WATERVLIET ARSENAL PERMEABLE REACTION WALL PILOT PROJECT

Granular Iron/Concrete Sand Mixing
Test Results

Date: 10/29/98

Sample Indent. TRENCH B - LOAD 3

Test By: Tom

	Total Incl. Plate	Wt. of Pan	Weight.
Initial Weight of Sample of Mixed Material (gm.)	372.9	6.8	366.1
Weight of Iron Component (gm.)	163.7	6.8	156.9
Weight of Concrete Sand Component (gm.)	~~210~~ 212.7	6.8	205.9
Sum of Iron and Sand Components (gm)			362.8
Difference from Initial Weight (gm.)			-3.3
Proportion of Iron to Concrete Sand*	$\frac{156.9}{205.9} = 0.762$		0.76 : 1.00

* Proportion based on ratio of iron to sand.

Procedure:

1. Weigh initial sample of mixed material.
2. Spread material thinly on clean paper, remove iron component with magnet, and place on a second piece of clean paper. Remove iron component with magnet a second time and place iron in pan. Weigh iron and pan.
3. Combine sand components from step 2 and weigh.
4. Clean Pan and weigh.

Notes

1. If mix is visible moist, allow to air dry.
2. If a substantial amount of sand remains after second separation with magnet, do additional separations until the amount of sand remaining on the paper is negligible (less than 5 grams.)
3. Be sure to remove as much iron as possible from the mix. Pass magnet over the thinly spread mix a number of times and stir mix between passes.

WATERVLIET ARSENAL PERMEABLE REACTION WALL PILOT PROJECT

Granular Iron/Concrete Sand Mixing
Test Results

Date: 10/28/98

Sample Indent. Trench B Loc. 4

Test By: T[illegible] / J[illegible]

	Total Incl. Plate	Wt. of Pan	Weight.
Initial Weight of Sample of Mixed Material (gm.)	519.3	6.8	512.5
Weight of Iron Component (gm.)	241.7	6.8	234.9
Weight of Concrete Sand Component (gm.)	270.4	6.8	263.6
Sum of Iron and Sand Components (gm)			498.5
Difference from Initial Weight (gm.)			20.8 *
Proportion of Iron to Concrete Sand*	$\frac{234.9}{263.6} = 0.891$		0.89 : 1.00

* Proportion based on ratio of iron to sand.

There was ~ 45 min. delay between weighing the initial sample and separating the iron and sand. The mix dried visibly during the period. — J[illegible]

Procedure:

1. Weigh initial sample of mixed material.
2. Spread material thinly on clean paper, remove iron component with magnet, and place on a second piece of clean paper. Remove iron component with magnet a second time and place iron in pan. Weigh iron and pan.
3. Combine sand components from step 2 and weigh.
4. Clean Pan and weigh.

Notes

1. If mix is visible moist, allow to air dry.
2. If a substantial amount of sand remains after second separation with magnet, do additional separations until the amount of sand remaining on the paper is negligible (less than 5 grams.)
3. Be sure to remove as much iron as possible from the mix. Pass magnet over the thinly spread mix a number of times and stir mix between passes.

WATERVLIET ARSENAL PERMEABLE REACTION WALL PILOT PROJECT

Granular Iron/Concrete Sand Mixing
Test Results

Date: 10/30/98

Sample Indent. TRENCH A- LOAD

Test By: TRM

	Total Incl. Plate	Wt. of Pan	Weight.
Initial Weight of Sample of Mixed Material (gm.)	457.3	6.8	450.5
Weight of Iron Component (gm.)	231.1	6.8	224.3
Weight of Concrete Sand Component (gm.)	231.1	6.8	224.3
Sum of Iron and Sand Components (gm)			448.6
Difference from Initial Weight (gm.)			1.9
Proportion of Iron to Concrete Sand*			1:1

* Proportion based on ratio of iron to sand.

Procedure:

1. Weigh initial sample of mixed material.
2. Spread material thinly on clean paper, remove iron component with magnet, and place on a second piece of clean paper. Remove iron component with magnet a second time and place iron in pan. Weigh iron and pan.
3. Combine sand components from step 2 and weigh.
4. Clean Pan and weigh.

Notes

1. If mix is visible moist, allow to air dry.
2. If a substantial amount of sand remains after second separation with magnet, do additional separations until the amount of sand remaining on the paper is negligible (less than 5 grams.)
3. Be sure to remove as much iron as possible from the mix. Pass magnet over the thinly spread mix a number of times and stir mix between passes.

WATERVLIET ARSENAL PERMEABLE REACTION WALL PILOT PROJECT

Granular Iron/Concrete Sand Mixing
Test Results

Date: 10/30/98

Sample Indent. TRENCH A - LOAD 1

Test By: TAM

	Total Incl. Plate	Wt. of Pan	Weight.
Initial Weight of Sample of Mixed Material (gm.)	370.5	6.8	363.7
Weight of Iron Component (gm.)	192.2	6.8	185.4
Weight of Concrete Sand Component (gm.)	183.5	6.8	176.7
Sum of Iron and Sand Components (gm)			362.1
Difference from Initial Weight (gm.)			1.6
Proportion of Iron to Concrete Sand*			1.05 : 1

* Proportion based on ratio of iron to sand.

Procedure:

1. Weigh initial sample of mixed material.
2. Spread material thinly on clean paper, remove iron component with magnet, and place on a second piece of clean paper. Remove iron component with magnet a second time and place iron in pan. Weigh iron and pan.
3. Combine sand components from step 2 and weigh.
4. Clean Pan and weigh.

Notes

1. If mix is visible moist, allow to air dry.
2. If a substantial amount of sand remains after second separation with magnet, do additional separations until the amount of sand remaining on the paper is negligible (less than 5 grams.)
3. Be sure to remove as much iron as possible from the mix. Pass magnet over the thinly spread mix a number of times and stir mix between passes.

WATERVLIET ARSENAL PERMEABLE REACTION WALL PILOT PROJECT

Granular Iron/Concrete Sand Mixing
Test Results

Date: 10/30/98

Sample Indent. TRENCH A - LOAD 8

Test By: TAM

	Total Incl. Plate	Wt. of Pan	Weight.
Initial Weight of Sample of Mixed Material (gm.)	505.4	6.8	498.6
Weight of Iron Component (gm.)	337.9	6.8	331.1
Weight of Concrete Sand Component (gm.)	172.7	6.8	165.9
Sum of Iron and Sand Components (gm)			497.0
Difference from Initial Weight (gm.)			1.6
Proportion of Iron to Concrete Sand*			2.0 : 1

* Proportion based on ratio of iron to sand.

Procedure:

1. Weigh initial sample of mixed material.
2. Spread material thinly on clean paper, remove iron component with magnet, and place on a second piece of clean paper. Remove iron component with magnet a second time and place iron in pan. Weigh iron and pan.
3. Combine sand components from step 2 and weigh.
4. Clean Pan and weigh.

Notes

1. If mix is visible moist, allow to air dry.
2. If a substantial amount of sand remains after second separation with magnet, do additional separations until the amount of sand remaining on the paper is negligible (less than 5 grams.)
3. Be sure to remove as much iron as possible from the mix. Pass magnet over the thinly spread mix a number of times and stir mix between passes.

WATERVLIET ARSENAL PERMEABLE REACTION WALL PILOT PROJECT

Granular Iron/Concrete Sand Mixing
Test Results

Date: 10/30/98

Sample Indent. TRENCH A - LOAD 7

Test By: DAM

	Total Incl. Plate	Wt. of Pan	Weight.
Initial Weight of Sample of Mixed Material (gm.)	468.2	6.8	461.4
Weight of Iron Component (gm.)	238.2	6.8	231.4
Weight of Concrete Sand Component (gm.)	235.3	6.8	228.5
Sum of Iron and Sand Components (gm)			459.9
Difference from Initial Weight (gm.)			1.5
Proportion of Iron to Concrete Sand*			1.01:1

* Proportion based on ratio of iron to sand.

Procedure:

1. Weigh initial sample of mixed material.
2. Spread material thinly on clean paper, remove iron component with magnet, and place on a second piece of clean paper. Remove iron component with magnet a second time and place iron in pan. Weigh iron and pan.
3. Combine sand components from step 2 and weigh.
4. Clean Pan and weigh.

Notes

1. If mix is visible moist, allow to air dry.
2. If a substantial amount of sand remains after second separation with magnet, do additional separations until the amount of sand remaining on the paper is negligible (less than 5 grams.)
3. Be sure to remove as much iron as possible from the mix. Pass magnet over the thinly spread mix a number of times and stir mix between passes.

WATERVLIET ARSENAL PERMEABLE REACTION WALL PILOT PROJECT

Granular Iron/Concrete Sand Mixing
Test Results

Date: 11/2/98

Sample Indent. Trench A Load 9

Test By: Joe Claypoole

	Total Incl. Plate	Wt. of Pan	Weight.
Initial Weight of Sample of Mixed Material (gm.)	262.4	6.8	255.6
Weight of Iron Component (gm.)	146.7	6.8	139.9
Weight of Concrete Sand Component (gm.)	119.7	6.8	112.9
Sum of Iron and Sand Components (gm)			252.8
Difference from Initial Weight (gm.)			2.8
Proportion of Iron to Concrete Sand*	139.9/112.9		1.24 : 1

* Proportion based on ratio of iron to sand.

Procedure:

1. Weigh initial sample of mixed material.
2 Spread material thinly on clean paper, remove iron component with magnet, and place on a second piece of clean paper. Remove iron component with magnet a second time and place iron in pan. Weigh iron and pan.
3. Combine sand components from step 2 and weigh.
4. Clean Pan and weigh.

Notes

1. If mix is visible moist, allow to air dry.
2. If a substantial amount of sand remains after second separation with magnet, do additional separations until the amount of sand remaining on the paper is negligible (less than 5 grams.)
3. Be sure to remove as much iron as possible from the mix. Pass magnet over the thinly spread mix a number of times and stir mix between passes.

WATERVLIET ARSENAL PERMEABLE REACTION WALL PILOT PROJECT

Granular Iron/Concrete Sand Mixing
Test Results

Date: 11/2/98

Sample Indent. Trench A Load 10

Test By: Joe Claypoole

	Total Incl. Plate	Wt. of Pan	Weight.
Initial Weight of Sample of Mixed Material (gm.)	230.3	6.8	223.5
Weight of Iron Component (gm.)	127.0	6.8	120.2
Weight of Concrete Sand Component (gm.)	107.5	6.8	100.7
Sum of Iron and Sand Components (gm)			220.9
Difference from Initial Weight (gm.)			2.6
Proportion of Iron to Concrete Sand*			1.19 : 1

120.2/100.7

* Proportion based on ratio of iron to sand.

Procedure:

1. Weigh initial sample of mixed material.
2. Spread material thinly on clean paper, remove iron component with magnet, and place on a second piece of clean paper. Remove iron component with magnet a second time and place iron in pan. Weigh iron and pan.
3. Combine sand components from step 2 and weigh.
4. Clean Pan and weigh.

Notes

1. If mix is visible moist, allow to air dry.
2. If a substantial amount of sand remains after second separation with magnet, do additional separations until the amount of sand remaining on the paper is negligible (less than 5 grams.)
3. Be sure to remove as much iron as possible from the mix. Pass magnet over the thinly spread mix a number of times and stir mix between passes.

WATERVLIET ARSENAL PERMEABLE REACTION WALL PILOT PROJECT

Granular Iron/Concrete Sand Mixing
Test Results

Date: 11/2/98

Sample Indent. Trench A Load 12

Test By: Joe Claypoole

	Total Incl. Plate	Wt. of Pan	Weight.
Initial Weight of Sample of Mixed Material (gm.)	290.5	6.8	283.7
Weight of Iron Component (gm.)	167.9	6.8	161.1
Weight of Concrete Sand Component (gm.)	136.4	13.6 ~~6.8~~	122.8
Sum of Iron and Sand Components (gm)			283.9
Difference from Initial Weight (gm.)			0.2
Proportion of Iron to Concrete Sand*			1.3 : 1

161.1 / 122.8

* Proportion based on ratio of iron to sand.

Procedure:

1. Weigh initial sample of mixed material.
2. Spread material thinly on clean paper, remove iron component with magnet, and place on a second piece of clean paper. Remove iron component with magnet a second time and place iron in pan. Weigh iron and pan.
3. Combine sand components from step 2 and weigh.
4. Clean Pan and weigh.

Notes

1. If mix is visible moist, allow to air dry.
2. If a substantial amount of sand remains after second separation with magnet, do additional separations until the amount of sand remaining on the paper is negligible (less than 5 grams.)
3. Be sure to remove as much iron as possible from the mix. Pass magnet over the thinly spread mix a number of times and stir mix between passes.

WATERVLIET ARSENAL PERMEABLE REACTION WALL PILOT PROJECT

Granular Iron/Concrete Sand Mixing
Test Results

Date: 11/2/98

Sample Indent. Trench A Load 13

Test By: Joe Clapoole

	Total Incl. Plate	Wt. of Pan	Weight.
Initial Weight of Sample of Mixed Material (gm.)	208.5	6.8	201.7
Weight of Iron Component (gm.)	100.8	6.8	94.0
Weight of Concrete Sand Component (gm.)	111.9	6.8	105.1
Sum of Iron and Sand Components (gm)			199.1
Difference from Initial Weight (gm.)			2.6
Proportion of Iron to Concrete Sand*	94.0/105.1		0.89 : 1

* Proportion based on ratio of iron to sand.

Procedure:

1. Weigh initial sample of mixed material.
2. Spread material thinly on clean paper, remove iron component with magnet, and place on a second piece of clean paper. Remove iron component with magnet a second time and place iron in pan. Weigh iron and pan.
3. Combine sand components from step 2 and weigh.
4. Clean Pan and weigh.

Notes

1. If mix is visible moist, allow to air dry.
2. If a substantial amount of sand remains after second separation with magnet, do additional separations until the amount of sand remaining on the paper is negligible (less than 5 grams.)
3. Be sure to remove as much iron as possible from the mix. Pass magnet over the thinly spread mix a number of times and stir mix between passes.

WATERVLIET ARSENAL PERMEABLE REACTION WALL PILOT PROJECT

Granular Iron/Concrete Sand Mixing
Test Results

Date: 11/2/98

Sample Indent. Trench A Load 14

Test By: Joe Claypole

	Total Incl. Plate	Wt. of Pan	Weight.
Initial Weight of Sample of Mixed Material (gm.)	317.1	6.8	310.3
Weight of Iron Component (gm.)	162.1	6.8	155.3
Weight of Concrete Sand Component (gm.)	159.0	6.8	152.2
Sum of Iron and Sand Components (gm)			307.5
Difference from Initial Weight (gm.)			2.8
Proportion of Iron to Concrete Sand*	155.3/152.2		1.02 : 1

* Proportion based on ratio of iron to sand.

Procedure:

1. Weigh initial sample of mixed material.
2. Spread material thinly on clean paper, remove iron component with magnet, and place on a second piece of clean paper. Remove iron component with magnet a second time and place iron in pan. Weigh iron and pan.
3. Combine sand components from step 2 and weigh.
4. Clean Pan and weigh.

Notes

1. If mix is visible moist, allow to air dry.
2. If a substantial amount of sand remains after second separation with magnet, do additional separations until the amount of sand remaining on the paper is negligible (less than 5 grams.)
3. Be sure to remove as much iron as possible from the mix. Pass magnet over the thinly spread mix a number of times and stir mix between passes.

PERMEABLE REACTION WALL
PILOT TREATMENT SYSTEM

APPENDIX E

SOIL AND GROUNDWATER
ANALYTICAL DATA

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LABORATORY REPORT

for

Kilby Brothers, Inc
P.O. Box 12003
Albany, NY 12212

Attention: Thomas McClain

Report date: 11/04/98
Number of samples analyzed: 1
AES Project ID: 981027 M
Invoice #: 193354

ELAP ID#: 10709

AIHA ID#: 7866

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CLIENT: Kilby Brothers, Inc
CLIENT'S SAMPLE ID: Short Trench
AES sample #: 981027 M01
Samples taken by: T. McClain
MATRIX: Soil
Date Sampled: 10/27/98
Date sample received: 10/27/98
Location: Waterv. Arsenal
grab

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
TCLP Extraction (ZHE)	EPA-1311	Complete		MG-BR-24	10/28/98
Benzene - TCLP Extract	EPA-8240	<0.085	mg/l	MG-BR-24	11/02/98
Carbon Tetrachloride-TCLP Ext.	EPA-8240	<0.085	mg/l	MG-BR-24	11/02/98
Chlorobenzene-TCLP Extract	EPA-8240	<0.085	mg/l	MG-BR-24	11/02/98
Chloroform-TCLP Extract	EPA-8240	<0.085	mg/l	MG-BR-24	11/02/98
1,2-Dichloroethane-TCLP Ext.	EPA-8240	<0.085	mg/l	MG-BR-24	11/02/98
1,1-Dichloroethene-TCLP Ext.	EPA-8240	<0.085	mg/l	MG-BR-24	11/02/98
Methyl Ethyl Ketone-TCLP Ext.	EPA-8240	<0.17	mg/l	MG-BR-24	11/02/98
Tetrachlorethylene-TCLP Ext.	EPA-8240	<0.085	mg/l	MG-BR-24	11/02/98
Trichloroethylene-TCLP Extract	EPA-8240	<0.085	mg/l	MG-BR-24	11/02/98
Vinyl Chloride-TCLP Extraction	EPA-8240	<0.17	mg/l	MG-BR-24	11/02/98
TCLP Extraction	EPA-1311	Complete		TCLP-C-10	10/27/98
Nitrobenzene-TCLP Extract	EPA-8270	<0.10	mg/l	MT-BS-29	10/29/98
Pyridine-TCLP Extract	EPA-8270	<0.10	mg/l	MT-BS-29	10/29/98
Cresols (Total) TCLP Extract.	EPA-8270	<0.10	mg/l	MT-BS-29	10/29/98
1,4-Dichlorobenzene-TCLP Ext.	EPA-8270	<0.10	mg/l	MT-BS-29	10/29/98
2,4-Dinitrotoluene-TCLP Ext.	EPA-8270	<0.10	mg/l	MT-BS-29	10/29/98
Hexachlorobenzene-TCLP Extract	EPA-8270	<0.10	mg/l	MT-BS-29	10/29/98
Hexachlorobutadiene-TCLP Ext.	EPA-8270	<0.10	mg/l	MT-BS-29	10/29/98
Hexachloroethane-TCLP Extract	EPA-8270	<0.10	mg/l	MT-BS-29	10/29/98

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CLIENT: Kilby Brothers, Inc — Date Sampled: 10/27/98
CLIENT'S SAMPLE ID: Short Trench — Date sample received: 10/27/98
AES sample #: 981027 MC1 — Samples taken by: T. McClain — Location: Waterv. Arsenal
MATRIX: Soil — grab

continued:

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
Pentachlorophenol-TCLP Extract	EPA-8270	<0.50	mg/l	MT-BS-29	10/29/98
2,4,5-Trichlorophenol-TCLP Ext	EPA-8270	<0.10	mg/l	MT-BS-29	10/29/98
2,4,6-Trichlorophenol-TCLP Ext	EPA-8270	<0.10	mg/l	MT-BS-29	10/29/98
Chlordane -TCLP Extract	EPA-8080	<0.005	mg/l	TN-TAC-22	10/29/98
Endrin-TCLP Extract	EPA-8080	<0.005	mg/l	TN-TAC-22	10/29/98
Heptachlor-TCLP Extract	EPA-8080	<0.005	mg/l	TN-TAC-22	10/29/98
Heptachlor Epoxide-TCLP Ext.	EPA-8080	<0.005	mg/l	TN-TAC-22	10/29/98
Lindane-TCLP Extract	EPA-8080	<0.005	mg/l	TN-TAC-22	10/29/98
Methoxychlor-TCLP Extract	EPA-8080	<0.05	mg/l	TN-TAC-22	10/29/98
Toxaphene-TCLP Extract	EPA-8080	<0.05	mg/l	TN-TAC-22	10/29/98
2,4-D TCLP Extract	EPA-8150	<2	mg/l	TN-TAC-22	10/29/98
2,4,5-TP (Silvex)-TCLP Extract	EPA-8150	<0.2	mg/l	TN-TAC-22	10/29/98
Arsenic-TCLP Extraction	EPA-6010	<0.5	mg/l	SM-I2D-38	11/02/98
Barium-TCLP Extraction	EPA-6010	0.70	mg/l	SM-I2D-38	11/02/98
Cadmium-TCLP Extraction	EPA-6010	<0.01	mg/l	SM-I2D-38	11/02/98
Chromium-TCLP Extraction	EPA-6010	<0.05	mg/l	SM-I2D-38	11/02/98
Lead-TCLP Extraction	EPA-6010	<0.5	mg/l	SM-I2D-38	11/02/98
Mercury-TCLP Extraction	EPA-7470	<0.02	mg/l	SM-PSM-26	11/02/98
Selenium-TCLP Extraction	EPA-6010	0.1	mg/l	SM-I2D-38	11/02/98
Silver-TCLP Extraction	EPA-6010	0.02	mg/l	SM-I2D-38	11/02/98

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CLIENT: Kilby Brothers, Inc
CLIENT'S SAMPLE ID: Short Trench
AES sample #: 981027 M01
Samples taken by: T. McClain
MATRIX: Soil
Date Sampled: 10/27/98
Date sample received: 10/27/98
Location: Waterv. Arsenal
grab

continued:

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
PCB	EPA-8082	<1	ug/g	KF-PCB-231	11/03/98

APPROVED BY: Sara D. G.
Report date: 11/04/98

Adirondack Environmental Services, Inc.
314 North Pearl Street
Albany, New York 12207
518-434-4546/434-0891 FAX

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CHAIN OF CUSTODY RECORD

CLIENT NAME	PROJECT NAME (Location)	SAMPLERS: (Names)
KILBY BROS. INC.	WATERVLIET ARSENAL	Thomas McClain
ADDRESS: P.O. Box 12003 ALBANY, NY 12212	PO NUMBER	SAMPLERS: (Signature) McClain

AES SAMPLE NUMBER	CLIENT SAMPLE IDENTIFICATION & LOCATION	DATE SAMPLED	TIME A=a.m. P=p.m.	SAMPLE TYPE MATRIX	COMP	GRAB	NUMBER OF CONT'S	ANALYSIS REQUIRED
1 A	Short Trench	10-27-98	1:25 P	Soil		✓	1	Full TCLP
1 B	" "	"	1:26 P	↓		✓	1	with Pest. / Herb.
			A P					
			A P					
			A P					
			A P					
			A P					
			A P					
			A P					
			A P					
			A P					
			A P					
			A P					

981027 M01

Report Milligrams per liter

Turnaround Time: 4 days results by 11/2/98 MONDAY **Laboratory Approval:**

Relinquished by: (Signature)	**Received by:** (Signature)	**Date/Time**
Relinquished by: (Signature)	**Received by:** (Signature)	**Date/Time**
Relinquished by: (Signature) McClain	**Received by:** (Signature)	**Date/Time**

Dispatched by: (Signature)	**Date/Time**	**Received for Laboratory by:** M.L	**Date/Time** 10/27/98 3:01
Method of Shipment:	**Send Report To:** Tom McClain		**Client Phone No.:** 456-2094

The Laboratory reserves the right to return hazardous samples to the client or may levy an appropriate fee per container for disposal.

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LABORATORY REPORT

for

Kilby Brothers, Inc
P.O. Box 12003
Albany, NY 12212

Attention: Thomas McClain

Report date: 11/04/98
Number of samples analyzed: 1
AES Project ID: 981029 H
Invoice #: 193443

ELAP ID#: 10709

AIHA ID#: 7866

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CLIENT: Kilby Brothers, Inc
CLIENT'S SAMPLE ID: Long Trench
AES sample #: 981029 H01 Samples taken by: T. McClain
MATRIX: Soil

Date Sampled: 10/29/98
Date sample received: 10/29/98
Location: Waterv. Arsenal
grab

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
TCLP Extraction (ZHE)	EPA-1311	Complete		MG-BR-27	10/30/98
Benzene - TCLP Extract	EPA-8240	<0.085	mg/l	MG-BR-27	11/03/98
Carbon Tetrachloride-TCLP Ext.	EPA-8240	<0.085	mg/l	MG-BR-27	11/03/98
Chlorobenzene-TCLP Extract	EPA-8240	<0.085	mg/l	MG-BR-27	11/03/98
Chloroform-TCLP Extract	EPA-8240	<0.085	mg/l	MG-BR-27	11/03/98
1,2-Dichloroethane-TCLP Ext.	EPA-8240	<0.085	mg/l	MG-BR-27	11/03/98
1,1-Dichloroethene-TCLP Ext.	EPA-8240	<0.085	mg/l	MG-BR-27	11/03/98
Methyl Ethyl Ketone-TCLP Ext.	EPA-8240	<0.17	mg/l	MG-BR-27	11/03/98
Tetrachlorethylene-TCLP Ext.	EPA-8240	<0.085	mg/l	MG-BR-27	11/03/98
Trichloroethylene-TCLP Extract	EPA-8240	<0.085	mg/l	MG-BR-27	11/03/98
Vinyl Chloride-TCLP Extraction	EPA-8240	<0.17	mg/l	MG-BR-27	11/03/98
TCLP Extraction	EPA-1311	Complete		TCLP-C-11	10/29/98
Nitrobenzene-TCLP Extract	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98
Pyridine-TCLP Extract	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98
Cresols (Total) TCLP Extract.	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98
1,4-Dichlorobenzene-TCLP Ext.	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98
2,4-Dinitrotoluene-TCLP Ext.	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98
Hexachlorobenzene-TCLP Extract	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98
Hexachlorobutadiene-TCLP Ext.	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98
Hexachloroethane-TCLP Extract	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98

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CLIENT: Kilby Brothers, Inc
CLIENT'S SAMPLE ID: Long Trench
AES sample #: 981029 H01 Samples taken by: T. McClain
MATRIX: Soil

Date Sampled: 10/29/98
Date sample received: 10/29/98
Location: Waterv. Arsenal
grab

continued:

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
Pentachlorophenol-TCLP Extract	EPA-8270	<0.50	mg/l	MT-BS-32	11/04/98
2,4,5-Trichlorophenol-TCLP Ext	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98
2,4,6-Trichlorophenol-TCLP Ext	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98
Chlordane -TCLP Extract	EPA-8080	<0.005	mg/l	TN-TG-C-23	11/02/98
Endrin-TCLP Extract	EPA-8080	<0.005	mg/l	TN-TG-C-23	11/02/98
Heptachlor-TCLP Extract	EPA-8080	<0.005	mg/l	TN-TG-C-23	11/02/98
Heptachlor Epoxide-TCLP Ext.	EPA-8080	<0.005	mg/l	TN-TG-C-23	11/02/98
Lindane-TCLP Extract	EPA-8080	<0.005	mg/l	TN-TG-C-23	11/02/98
Methoxychlor-TCLP Extract	EPA-8080	<0.05	mg/l	TN-TG-C-23	11/02/98
Toxaphene-TCLP Extract	EPA-8080	<0.05	mg/l	TN-TG-C-23	11/02/98
2,4-D TCLP Extract	EPA-8150	<2	mg/l	TN-TG-C-23	11/02/98
2,4,5-TP (Silvex)-TCLP Extract	EPA-8150	<0.2	mg/l	TN-TG-C-23	11/02/98
Arsenic-TCLP Extraction	EPA-6010	<0.5	mg/l	SM-I-1M-98	11/04/98
Barium-TCLP Extraction	EPA-6010	1.14	mg/l	SM-I-1M-98	11/04/98
Cadmium-TCLP Extraction	EPA-6010	<0.01	mg/l	SM-I-1M-98	11/04/98
Chromium-TCLP Extraction	EPA-6010	<0.05	mg/l	SM-I-1M-98	11/04/98
Lead-TCLP Extraction	EPA-6010	<0.5	mg/l	SM-I-1M-98	11/04/98
Mercury-TCLP Extraction	EPA-7470	<0.02	mg/l	SM-PSM-26	11/02/98
Selenium-TCLP Extraction	EPA-6010	<0.1	mg/l	SM-I-1M-98	11/04/98
Silver-TCLP Extraction	EPA-6010	<0.02	mg/l	SM-I-1M-98	11/04/98

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CLIENT: Kilby Brothers, Inc
CLIENT'S SAMPLE ID: Long Trench
AES sample #: 981029 H01
Samples taken by: T. McClain
MATRIX: Soil
Date Sampled: 10/29/98
Date sample received: 10/29/98
Location: Waterv. Arsenal
grab

continued:

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
PCB	EPA-8082	<1	ug/g	KF-PCB-Z31	11/03/98

APPROVED BY: Christopher Hess
Report date: 11/04/98

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314 North Pearl Street
Albany, New York 12207
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CHAIN OF CUSTODY RECORD

CLIENT NAME	PROJECT NAME (Location)	SAMPLERS: (Names)
KEY [illegible] ENG	WATERVLIET ARSENAL	Thomas McClain
ADDRESS	PO NUMBER	SAMPLERS: (Signature)
P.O. Box 1000 ALBANY NY 12212		Thomas McClain

AES SAMPLE NUMBER	CLIENT SAMPLE IDENTIFICATION & LOCATION	DATE SAMPLED	TIME A=a.m. P=p.m.	SAMPLE TYPE MATRIX	COMP	GRAB	NUMBER OF CONT'S	ANALYSIS REQUIRED
2 A	Long Trench [illegible]	10-29-98	[illegible] A	Soil		✓	2	FULL TCLP
2 B	"	"	[illegible] A			✓		with Pest/Herbs
			A P					
			A P					
			A P					
			A P					
			A P					
			A P					
			A P					
			A P					
			A P					
			A P					
			A P					
			A P					

78029 H01

Due ON 11/4/98 → 4day TAT

Turnaround Time:

Laboratory Approval:

Relinquished by: (Signature)	**Received by:** (Signature)	**Date/Time**
Relinquished by: (Signature) Thomas McClain	**Received by:** (Signature)	**Date/Time**
Relinquished by: (Signature)	**Received by:** (Signature)	**Date/Time**

Dispatched by: (Signature)	**Date/Time**	**Received for Laboratory by:** M. L	**Date/Time** 10/29/98 947

Method of Shipment:	**Send Report To:**	**Client Phone No.:**

The Laboratory reserves the right to return hazardous samples to the client or may levy an appropriate fee per container for disposal.

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LABORATORY REPORT

for

Kilby Brothers, Inc
P.O. Box 12003
Albany, NY 12212

Attention: Thomas McClain

Report date: 11/05/98
Number of samples analyzed: 1
AES Project ID: 981030AK
Invoice #: 193529

ELAP ID#: 10709

AIHA ID#: 7866

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CLIENT: Kilby Brothers, Inc
CLIENT'S SAMPLE ID: Long Trench
AES sample #: 981030AK01 Samples taken by: T. McClain
MATRIX: Soil

Date Sampled: 10/30/98
Date sample received: 10/30/98
Location: Waterv. Arsenal
grab

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
TCLP Extraction (ZHE)	EPA-1311	Complete		MG-BR-27	11/03/98
Benzene - TCLP Extract	EPA-8240	<0.085	mg/l	MG-BR-27	11/04/98
Carbon Tetrachloride-TCLP Ext.	EPA-8240	<0.085	mg/l	MG-BR-27	11/04/98
Chlorobenzene-TCLP Extract	EPA-8240	<0.085	mg/l	MG-BR-27	11/04/98
Chloroform-TCLP Extract	EPA-8240	<0.085	mg/l	MG-BR-27	11/04/98
1,2-Dichloroethane-TCLP Ext.	EPA-8240	<0.085	mg/l	MG-BR-27	11/04/98
1,1-Dichloroethene-TCLP Ext.	EPA-8240	<0.085	mg/l	MG-BR-27	11/04/98
Methyl Ethyl Ketone-TCLP Ext.	EPA-8240	<0.17	mg/l	MG-BR-27	11/04/98
Tetrachlorethylene-TCLP Ext.	EPA-8240	<0.085	mg/l	MG-BR-27	11/04/98
Trichloroethylene-TCLP Extract	EPA-8240	<0.085	mg/l	MG-BR-27	11/04/98
Vinyl Chloride-TCLP Extraction	EPA-8240	<0.17	mg/l	MG-BR-27	11/04/98
TCLP Extraction	EPA-1311	Complete		TCLP-C-11	10/30/98
Nitrobenzene-TCLP Extract	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98
Pyridine-TCLP Extract	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98
Cresols (Total) TCLP Extract.	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98
1,4-Dichlorobenzene-TCLP Ext.	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98
2,4-Dinitrotoluene-TCLP Ext.	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98
Hexachlorobenzene-TCLP Extract	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98
Hexachlorobutadiene-TCLP Ext.	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98
Hexachloroethane-TCLP Extract	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98

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CLIENT: Kilby Brothers, Inc
CLIENT'S SAMPLE ID: Long Trench
AES sample #: 981030AK01 Samples taken by: T. McClain
MATRIX: Soil

Date Sampled: 10/30/98
Date sample received: 10/30/98
Location: Waterv. Arsenal
grab

continued:

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
Pentachlorophenol-TCLP Extract	EPA-8270	<0.50	mg/l	MT-BS-32	11/04/98
2,4,5-Trichlorophenol-TCLP Ext	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98
2,4,6-Trichlorophenol-TCLP Ext	EPA-8270	<0.10	mg/l	MT-BS-32	11/04/98
Chlordane -TCLP Extract	EPA-8080	<0.005	mg/l	TN-TG-C-23	11/02/98
Endrin-TCLP Extract	EPA-8080	<0.005	mg/l	TN-TG-C-23	11/02/98
Heptachlor-TCLP Extract	EPA-8080	<0.005	mg/l	TN-TG-C-23	11/02/98
Heptachlor Epoxide-TCLP Ext.	EPA-8080	<0.005	mg/l	TN-TG-C-23	11/02/98
Lindane-TCLP Extract	EPA-8080	<0.005	mg/l	TN-TG-C-23	11/02/98
Methoxychlor-TCLP Extract	EPA-8080	<0.05	mg/l	TN-TG-C-23	11/02/98
Toxaphene-TCLP Extract	EPA-8080	<0.05	mg/l	TN-TG-C-23	11/02/98
2,4-D TCLP Extract	EPA-8150	<2	mg/l	TN-TG-C-23	11/02/98
2,4,5-TP (Silvex)-TCLP Extract	EPA-8150	<0.2	mg/l	TN-TG-C-23	11/02/98
Arsenic-TCLP Extraction	EPA-6010	<0.5	mg/l	SM-I-2D-39	11/03/98
Barium-TCLP Extraction	EPA-6010	1.25	mg/l	SM-I-2D-39	11/03/98
Cadmium-TCLP Extraction	EPA-6010	<0.01	mg/l	SM-I-2D-39	11/03/98
Chromium-TCLP Extraction	EPA-6010	<0.05	mg/l	SM-I-2D-39	11/03/98
Lead-TCLP Extraction	EPA-6010	<0.5	mg/l	SM-I-2D-39	11/03/98
Mercury-TCLP Extraction	EPA-7470	<0.02	mg/l	SM-PSM-27	11/03/98
Selenium-TCLP Extraction	EPA-6010	<0.1	mg/l	SM-I-2D-39	11/03/98
Silver-TCLP Extraction	EPA-6010	<0.02	mg/l	SM-I-2D-39	11/03/98

Adirondack Environmental Services, Inc.
Experience is the solution
314 North Pearl Street • Albany, New York 12207 • 800-848-4983 • (518) 434-4546 • Fax (518) 434-0891

CLIENT: Kilby Brothers, Inc
CLIENT'S SAMPLE ID: Long Trench
AES sample #: 981030AK01 Samples taken by: T. McClain
MATRIX: Soil
Date Sampled: 10/30/98
Date sample received: 10/30/98
Location: Waterv. Arsenal
grab

continued:

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
PCB	EPA-8082	<1	ug/g	KF-PCB-231	11/03/98

APPROVED BY: Christopher Hess
Report date: 11/05/98

Adirondack Environmental Services, Inc.
314 North Pearl Street
Albany, New York 12207
518-434-4546/434-0891 FAX

A full service analytical research laboratory offering solutions to environmental concerns

CHAIN OF CUSTODY RECORD

CLIENT NAME	PROJECT NAME (Location)	SAMPLERS: (Names)
KILBY BROS. INC.	Watervliet Arsenal	Thomas McClain
ADDRESS: PO Box 12-30 ALBANY NY 12212	PO NUMBER	SAMPLERS: (Signature) Thomas McClain

AES SAMPLE NUMBER	CLIENT SAMPLE IDENTIFICATION & LOCATION	DATE SAMPLED	TIME A=a.m. P=p.m.		SAMPLE TYPE MATRIX	COMP	GRAB	NUMBER OF CONT'S	ANALYSIS REQUIRED
181030 AK01 2 A	Long Reach [illegible] 1-10	10-2-98	2:44	A / P	Soil		✓	2	Full TCLP [illegible]
2 B	0-6"		2:45	A / P	↓		✓		[illegible]
				A / P					
				A / P					
				A / P					
				A / P					
				A / P					
				A / P					
				A / P					
				A / P					
				A / P					
	4 day TAT			A / P					
				A / P					

Turnaround Time: Due 11/5/98 | **Laboratory Approval:**

Relinquished by: *(Signature)*	Received by: *(Signature)*	Date/Time
Relinquished by: *(Signature)*	**Received by:** *(Signature)*	**Date/Time**
Relinquished by: *(Signature)* Thomas McClain	**Received by:** *(Signature)*	**Date/Time**

Dispatched by: *(Signature)*	Date/Time	Received for Laboratory by:	Date/Time
		M. [illegible]	10/30/98 3:05

Method of Shipment:	Send Report To:	Client Phone No.:

The Laboratory reserves the right to return hazardous samples to the client or may levy an appropriate fee per container for disposal.

WHITE - Lab Copy YELLOW - Sampler Copy PINK - Generator Copy

Adirondack Environmental Services, Inc.

Experience is the solution
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LABORATORY REPORT

for

Kilby Brothers, Inc
P.O. Box 12003
Albany, NY 12212

Attention: Thomas McClain

☑ APPROVED
☐ APPROVED AS CORRECTED
☐ REVISE AND RESUBMIT
☐ NOT APPROVED

Checking is only for the conformance with the design concept of the Project and compliance with the information given in the Contract Documents. Contractor is responsible for dimensions to be confirmed and correlated at the job site; for information that pertains solely to the fabrication process or to techniques of construction; and for coordination of the work of all trades.

MALCOLM PIRNIE, INC.

Date 11/13/98 By [signature]

Report date: 11/09/98
Number of samples analyzed: 1
AES Project ID: 981103 B
Invoice #: 193599

ELAP ID#: 10709

AIHA ID#: 7866

Experience is the solution
314 North Pearl Street • Albany, New York 12207 • 800-848-4983 • (518) 434-4546 • Fax (518) 434-0891

CLIENT: Kilby Brothers, Inc
CLIENT'S SAMPLE ID: Long Trench
AES sample #: 981103 B01 Samples taken by: T. McClain
MATRIX: Soil

Date Sampled: 11/03/98
Date sample received: 11/03/98
Location: Waterv. Arsenal
grab

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
TCLP Extraction (ZHE)	EPA-1311	Complete		MG-BR-29	11/03/98
Benzene - TCLP Extract	EPA-8240	<0.085	mg/l	MG-BR-29	11/04/98
Carbon Tetrachloride-TCLP Ext.	EPA-8240	<0.085	mg/l	MG-BR-29	11/04/98
Chlorobenzene-TCLP Extract	EPA-8240	<0.085	mg/l	MG-BR-29	11/04/98
Chloroform-TCLP Extract	EPA-8240	<0.085	mg/l	MG-BR-29	11/04/98
1,2-Dichloroethane-TCLP Ext.	EPA-8240	<0.085	mg/l	MG-BR-29	11/04/98
1,1-Dichloroethene-TCLP Ext.	EPA-8240	<0.085	mg/l	MG-BR-29	11/04/98
Methyl Ethyl Ketone-TCLP Ext.	EPA-8240	<0.170	mg/l	MG-BR-29	11/04/98
rachlorethylene-TCLP Ext.	EPA-8240	<0.085	mg/l	MG-BR-29	11/04/98
Trichloroethylene-TCLP Extract	EPA-8240	<0.085	mg/l	MG-BR-29	11/04/98
Vinyl Chloride-TCLP Extraction	EPA-8240	<0.170	mg/l	MG-BR-29	11/04/98
TCLP Extraction	EPA-1311	Complete		TCLP-C-11	11/03/98
Nitrobenzene-TCLP Extract	EPA-8270	<0.100	mg/l	MT-BS-33	11/05/98
Pyridine-TCLP Extract	EPA-8270	<0.100	mg/l	MT-BS-33	11/05/98
Cresols (Total) TCLP Extract.	EPA-8270	<0.100	mg/l	MT-BS-33	11/05/98
1,4-Dichlorobenzene-TCLP Ext.	EPA-8270	<0.100	mg/l	MT-BS-33	11/05/98
2,4-Dinitrotoluene-TCLP Ext.	EPA-8270	<0.100	mg/l	MT-BS-33	11/05/98
Hexachlorobenzene-TCLP Extract	EPA-8270	<0.100	mg/l	MT-BS-33	11/05/98
Hexachlorobutadiene-TCLP Ext.	EPA-8270	<0.100	mg/l	MT-BS-33	11/05/98
Hexachloroethane-TCLP Extract	EPA-8270	<0.100	mg/l	MT-BS-33	11/05/98

Experience is the solution
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CLIENT: Kilby Brothers, Inc
CLIENT'S SAMPLE ID: Long Trench
AES sample #: 981103 E01 Samples taken by: T. McClain Location: Waterv. Arsenal
MATRIX: Soil grab
Date Sampled: 11/03/98
Date sample received: 11/03/98

continued:

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
Pentachlorophenol-TCLP Extract	EPA-8270	<0.500	mg/l	MT-BS-33	11/05/98
2,4,5-Trichlorophenol-TCLP Ext	EPA-8270	<0.100	mg/l	MT-BS-33	11/05/98
2,4,6-Trichlorophenol-TCLP Ext	EPA-8270	<0.100	mg/l	MT-BS-33	11/05/98
Chlordane -TCLP Extract	EPA-8080	<0.005	mg/l	TN-TG-C-23	11/04/98
Endrin-TCLP Extract	EPA-8080	<0.005	mg/l	TN-TG-C-23	11/04/98
Heptachlor-TCLP Extract	EPA-8080	<0.005	mg/l	TN-TG-C-23	11/04/98
Heptachlor Epoxide-TCLP Ext.	EPA-8080	<0.005	mg/l	TN-TG-C-23	11/04/98
Lindane-TCLP Extract	EPA-8080	<0.005	mg/l	TN-TG-C-23	11/04/98
Methoxychlor-TCLP Extract	EPA-8080	<0.05	mg/l	TN-TG-C-23	11/04/98
Toxaphene-TCLP Extract	EPA-8080	<0.05	mg/l	TN-TG-C-23	11/04/98
2,4-D TCLP Extract	EPA-8150	<2	mg/l	TN-TG-C-23	11/04/98
2,4,5-TP (Silvex)-TCLP Extract	EPA-8150	<0.2	mg/l	TN-TG-C-23	11/04/98
Arsenic-TCLP Extraction	EPA-6010	<0.5	mg/l	SM-I-2D-42	11/06/98
Barium-TCLP Extraction	EPA-6010	0.59	mg/l	SM-I-2D-42	11/06/98
Cadmium-TCLP Extraction	EPA-6010	<0.01	mg/l	SM-I-2D-42	11/06/98
Chromium-TCLP Extraction	EPA-6010	<0.05	mg/l	SM-I-2D-42	11/06/98
Lead-TCLP Extraction	EPA-6010	<0.5	mg/l	SM-I-2D-42	11/06/98
Mercury-TCLP Extraction	EPA-7470	<0.02	mg/l	SM-PSM-31	11/06/98
Selenium-TCLP Extraction	EPA-6010	<0.1	mg/l	SM-I-1M-42	11/06/98
Silver-TCLP Extraction	EPA-6010	<0.02	mg/l	SM-I-1M-42	11/06/98

Experience is the solution
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CLIENT: Kilby Brothers, Inc
CLIENT'S SAMPLE ID: Long Trench
AES sample #: 981103 B01 Samples taken by: T. McClain MATRIX: Soil
Date Sampled: 11/03/98
Date sample received: 11/03/98
Location: Waterv. Arsenal grab

continued:

PARAMETER PERFORMED	METHOD	RESULT	UNITS	NOTEBK REF	TEST DATE
PCB	EPA-8082	<1	ug/g	KF-PCB-231	11/03/98

APPROVED BY:
Report date: 11/09/98

Adirondack Environmental Services, Inc.
314 North Pearl Street
Albany, New York 12207
518-434-4546/434-0891 FAX

A full service analytical research laboratory offering solutions to environmental concerns

CHAIN OF CUSTODY RECORD

CLIENT NAME	PROJECT NAME (Location)	SAMPLERS: (Names)
Kilby Bros. Inc	Watervliet Arsenal	Thomas McClain
ADDRESS P.O. Box 12002 ALBANY NY 12212	PO NUMBER	SAMPLERS: (Signature) Thomas McClain

AES SAMPLE NUMBER	CLIENT SAMPLE IDENTIFICATION & LOCATION	DATE SAMPLED	TIME A=a.m. P=p.m.		SAMPLE TYPE MATRIX	COMP	GRAB	NUMBER OF CONT'S	ANALYSIS REQUIRED
4 A	Long Trench	11-3-98	7:04	A	Soil		✓	2	Full TCLP
4 B	1+40 to 2+05		9:06	A	↓		✓	1	Herb Pest.
				A P					
				A P					
				A P					
				A P					
				A P					
				A P					
				A P					
				A P					
				A P					
				A P					
				A P					

981103 B01

Turnaround Time: 11/9/98 | 4 days

Laboratory Approval:

Relinquished by: (Signature)	**Received by:** (Signature)	**Date/Time**
Relinquished by: (Signature)	**Received by:** (Signature)	**Date/Time**
Relinquished by: (Signature)	**Received by:** (Signature)	**Date/Time**
Dispatched by: (Signature) / **Date/Time**	**Received for Laboratory by:** M. L	**Date/Time** 11/3/98 | 951
Method of Shipment:	**Send Report To:**	**Client Phone No.:**

The Laboratory reserves the right to return hazardous samples to the client or may levy an appropriate fee per container for disposal.

WHITE - Lab Copy YELLOW - Sampler Copy PINK - Generator Copy

TABLE VO-1.0
7098-2355A
MALCOLM PIRNIE
MISCELLANEOUS VOLATILE ORGANICS

Aqueous

All values are ug/L.

Client Sample I.D. Lab Sample I.D. Method Blank I.D. Quant. Factor	Method Blank VBLKMG VBLKMG 1.00	FRAC TANK 1 982355A-01 VBLKMG 1.00		Quant. Limits with no Dilution
Benzene	U	U		0.70
Bromodichloromethane	U	U		5.0
Bromoform	U	U		5.0
Bromomethane	U	U		5.0
2-Butanone	U	U		10
Carbon Disulfide	U	U		5.0
Carbon Tetrachloride	U	U		5.0
Chlorobenzene	U	U		5.0
Chloroethane	U	U		5.0
2-Chloroethylvinylether	U	U		5.0
Chloroform	U	U		5.0
Chloromethane	U	U		10
Dibromochloromethane	U	U		5.0
1,1-Dichloroethane	U	U		5.0
1,2-Dichloroethane	U	U		5.0
1,1-Dichloroethene	U	U		5.0
·ans-1,2-Dichloroethene	U	U		5.0
2-Dichloropropane	U	U		5.0
cis-1,3-Dichloropropene	U	U		5.0
trans-1,3-Dichloropropene	U	U		5.0
Ethylbenzene	U	U		5.0
Methylene Chloride	.6J	U		5.0
4-Methyl-2-Pentanone	U	U		12
1,1,2,2-Tetrachloroethane	U	U		5.0
Tetrachloroethene	U	U		5.0
Toluene	U	U		5.0
1,1,1-Trichloroethane	U	U		5.0
1,1,2-Trichloroethane	U	U		5.0
Trichloroethene	U	U		5.0
Trichlorofluoromethane	U	U		4.6
Vinyl Chloride	U	3		2.0
Xylene (total)	U	U		5.0
Date Received		11/04/98		
Date Extracted	N/A	N/A		
Date Analyzed	11/04/98	11/04/98		

See Appendix for qualifier definitions
Note: Compound detection limit = quantitation limit x quantitation factor
Quant. Factor = a numerical value which takes into account any variation in sample weight/volume, % moisture and sample dilution.

INORGANICS APPENDIX

C - Concentration qualifiers

U - Indicates analyte was not detected at method reporting limit.

B - Indicates analyte result between IDL and contract required detection limit (CRDL)

Q - QC qualifiers

E - Reported value is estimated because of the presence of interference

M - Duplicate injection precision not met

N - Spiked sample recovery not within control limits

S - The reported value was determined by the method of standard additions (MSA)

W - Post-digest spike recovery furnace analysis was out of 85-115 percent control limit, while sample absorbance was less than 50 percent of spike absorbance

* - Duplicate analysis not within control limit

+ - Correlation coefficient for MSA is less than 0.995

M - Method codes

P - ICP

A - Flame AA

F - Furnace AA

CV - Cold vapor AA (manual)

C - Cyanide

NR - Not Required

NC - Not Calculated as per protocols

7098-2355A
MALCOLM PIRNIE

Case Narrative

Volatile Organics - Volatile organics were determined by purge and trap GC/MS using guidance provided in Method 8260B. The instrumentation used was a Tekmar Dynamic Headspace Concentrator interfaced with a Hewlett-Packard Model 5970A GC/MS/DS.

Sample Calculation:

Sample ID - FRAC TANK 1
Compound - Vinyl Chloride

$$\frac{(242909)(250)(1)}{(5110150)(.720)(5)} = 3.3 = 3 \text{ UG/L.}$$

No problems were encountered.

STATE CERTIFICATIONS

In some instances it may be necessary for environmental data to be reported to a regulatory authority with reference to a certified laboratory. For your convenience, the laboratory identification numbers for the AEN-Connecticut laboratory are provided in the following table. Many states certify laboratories for specific parameters or tests within a category (i.e. method 325.2 for wastewater). The information in the following table indicates the lab is certified in a general category of testing such as drinking water or wastewater analysis. The laboratory should be contacted directly if parameter-specific certification information is required.

AEN-Connecticut
Certification Summary (as of September 1997)

State	Responsible Agency	Certification	Lab Number
Connecticut	Department of Health Services	Drinking Water, Wastewater	PH-0497
Maine	Department of Human Services	Wastewater	CT023
Massachusetts	Department of Environmental Protection	Potable/Non-Potable Water	CT023
New Hampshire	Department of Environmental Services	Drinking Water, Wastewater	2528
New Jersey	Department of Environmental Protection	Drinking Water, Wastewater	46410
New York	Department of Health	CLP, Drinking Water, Wastewater, Solid/ Hazardous Waste	10602
North Carolina	Division of Environmental Management	Wastewater Hazardous Waste	388
North Dakota	Department of Health and Consolidated Laboratories	Non-Potable/Potable Hazardous Waste	R-138
Oklahoma	Department of Environmental Quality	General Water Quality/ Sludge Testing	9614
Rhode Island	Department of Health	Chemistry...Non-Potable Water and Wastewater	A43
Washington	Department of Ecology	Wastewater/ Hazardous Waste	C231
West Virginia	Division of Environmental Protection	Wastewater/ Hazardous Waste	263
Wisconsin	Department of Natural Resources	Wastewater/ Hazarous Waste	998355710

7098-2355A
MALCOLM PIRNIE
SAMPLE SUMMARY

CLIENT ID	LAB ID	MATRIX	DATE COLLECTED	DATE RECEIVED
FRAC TANK 1	982355A-01	WATER	11/03/98	11/04/98

PERMEABLE REACTION WALL
PILOT TREATMENT SYSTEM

APPENDIX F

SOIL DISPOSAL WEIGHT TICKETS
AND BILLS OF LADING

ORIGINAL - NOT NEGOTIABLE

MANGIARDI BROS. TRUCKING
1960 Pittsfield Road
Castleton, New York 12033
(Name of Carrier)

Shipper No. 4A-209
Carrier No. B 14076
Date 11-12-98

TO:
Consignee colonie land fill

FROM:
Shipper Watervliet Arsenal

Street

Destination colonie

Origin Watevliet Arsenal

Route 9

Emergency Response Phone No.

Vehicle Number M-27

No. Shipping Units	HM*	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (subject to correction)	Rate	CHARGES
1		load cont soil (non haz)			

When transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Communication Standard (HM-126C). Provide emergency response phone number in case of incident or accident in box above.

REMIT C.O.D. TO:
ADDRESS:

COD Amt: $

C.O.D. FEE:
PREPAID ☐ $
COLLECT ☐

TOTAL CHARGES: $

FREIGHT CHARGES:
FREIGHT PREPAID except when box at right is checked
Check box if charges are to be collect ☐

NOTE - Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ _____ per _____

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.
_____ Signature

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
_____ (Signature of Consignor)

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of this Bill of Lading. This notice supersedes and negates any claimed, alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract.

SHIPPER Kirby Bros

CARRIER MANGIARDI BROS. TRUCKING

PER

PER M Mitchell

DATE 11-12-98

1

*HAZARDOUS MATERIALS - MARK WITH X TO DESIGNATE HAZARDOUS MATERIALS AS REFERENCED IN 49CFR § 172.202.

TOWN OF COLONIE

DEPARTMENT OF ENVIRONMENTAL SERVICES
RT 9 COHOES, NY 12047-4894
PHONE (518) 783-2826

WASTE DISPOSAL WEIGHT TICKET

DATE	TICKET NUMBER
12NOV98	486790

FOR DISPOSAL OF WASTE AT
TOWN OF COLONIE

VEHICLE
0

CUSTOMER

VEHICLE TYPE
ALL OTHER

SOURCE OF WASTE
OUT SIDE TOWN OF COLONIE

WEIGH IN TIME	WEIGH IN GROSS POUNDS	WEIGH IN WEIGHMASTER ID	WEIGH OUT TIME	WEIGH OUT TARE POUNDS	WEIGH OUT WEIGHMASTER ID	NET WEIGHT
08:25	89,420	T	08:40	37,360	T	52,060 LBS 26.030 TONS

WASTE TYPE
SOIL CONTAINING PETROLEUM

RATE PER TON
MINIMUM 10.00
FLAT 0.00

FEE

AMOUNT PAID
PAID BY CHEQUE

MANUAL WT INBOUND;
THIS LOAD CONTAINS NON-HAZARDOUS MATERIALS ONLY

WEIGHMASTER'S SIGNATURE
STEVE GEURDS

DRIVER'S SIGNATURE
M Whelply

334681

TOWN HALL'S COPY

STRAIGHT BILL OF LADING

ORIGINAL - NOT NEGOTIABLE

MANGIARDI BROS. TRUCKING
1960 Pittsfield Road
Castleton, New York 12033
(Name of Carrier)

Shipper No. 4A-209
Carrier No. B 14070
Date 11-12-98

TO: Consignee Colonie Landfill
Street:
Destination Cohoes N.Y.
Route 9

FROM: Shipper Watervliet Arsenal
Street
Origin Watervliet N.Y.
Emergency Response Phone No.
Vehicle Number M-27

No. Shipping Units	HM*	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (subject to correction)	Rate	CHARGES
1		1 load sand soil non Haz			

*When transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Communication Standard (HM-126C). Provide emergency response phone number in case of incident or accident in box above.

REMIT C.O.D. TO:
ADDRESS:

COD Amt: $

C.O.D. FEE:
PREPAID ☐ $
COLLECT ☐

NOTE – Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ _____ per _____

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.
_____ Signature

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
_____ (Signature of Consignor)

TOTAL CHARGES: $

FREIGHT CHARGES:
FREIGHT PREPAID except when box at right is checked
Check box if charges are to be collect ☐

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of this Bill of Lading. This notice supersedes and negates any claimed, alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract.

SHIPPER PER _____

CARRIER MANGIARDI BROS. TRUCKING
PER _____
DATE 11-12-98

*HAZARDOUS MATERIALS – MARK WITH 'X' TO DESIGNATE HAZARDOUS MATERIALS AS REFERENCED IN 49CFR § 172.202.

TOWN OF COLONIE

DATE	TICKET NUMBER
12NOV98	486856

FOR DISPOSAL OF WASTE AT
TOWN OF COLONIE

CUSTOMER

VEHICLE
A

VEHICLE TYPE
ALL OTHER

SOURCE OF WASTE
OUT SIDE TOWN OF COLONIE

WEIGH IN TIME	GROSS POUNDS	WEIGHMASTER ID	WEIGH OUT TIME	TARE POUNDS	WEIGHMASTER ID	NET WEIGHT
09:57	111,440	T	10:09	37,300	T	74,140 LBS 37.070 TONS

WASTE TYPE	RATE PER TON	MINIMUM / FLAT	FEE	AMOUNT PAID
SOIL CONTAINING PETROLEUM		10.00 0.00		

PAID BY CHEQUE

THIS LOAD CONTAINS NON-HAZARDOUS MATERIALS ONLY

WEIGHMASTER'S SIGNATURE
STEVE GEURDS

DRIVER'S SIGNATURE
Mike Foley

334747 TOWN HALL'S COPY

STRAIGHT BILL OF LADING

ORIGINAL - NOT NEGOTIABLE

MANGIARDI BROS. TRUCKING
1960 Pittsfield Road
Castleton, New York 12033
(Name of Carrier)

Shipper No. 4A-209
Carrier No. B 14077
Date 11-12-98

TO: Consignee Colonie landfill
FROM: Shipper Watervliet Arsenal

Street
Street

Destination Colonie N.Y.
Origin Watervliet N.Y.

Route 9
Emergency Response Phone No.
Vehicle Number M-27

No. Shipping Units	HM*	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (subject to correction)	Rate	CHARGES
1		load comt soil (non Haz)			

*When transporting hazardous materials, include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Communication Standard (HM-126C). Provide emergency response phone number. In case of incident or accident, in box above.

REMIT C.O.D. TO:
ADDRESS:

COD Amt: $

C.O.D. FEE:
PREPAID ☐ $
COLLECT ☐

NOTE – Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ _____ per _____

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.
_____ Signature

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
_____ (Signature of Consignor)

TOTAL CHARGES: $

FREIGHT CHARGES:
FREIGHT PREPAID except when box at right is checked
Check box if charges are to be collect ☐

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of this Bill of Lading. This notice supersedes and negates any claimed, alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract.

SHIPPER _____

CARRIER MANGIARDI BROS. TRUCKING

PER _____

PER _____
DATE 11-12-98

*HAZARDOUS MATERIALS – MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIALS AS REFERENCED IN 49CFR § 172.202.

DATE: 12NOV98

TICKET NUMBER: 486902

FOR DISPOSAL OF WASTE AT: TOWN OF COLONIE

CUSTOMER:

VEHICLE: A

VEHICLE TYPE: ALL OTHER

SOURCE OF WASTE: OUT SIDE TOWN OF COLONIE

TIME	WEIGH IN GROSS POUNDS	WEIGHMASTER ID	TIME	WEIGH OUT TARE POUNDS	WEIGHMASTER ID	NET WEIGHT
10:57	118,360	T	11:11	37,460	T	80,900 LBS 40.450 TONS

WASTE TYPE	RATE PER TON	MINIMUM / FLAT	FEE	AMOUNT PAID
SOIL CONTAINING PETROLEUM		10.00 0.00		

PAID BY CHEQUE

THIS LOAD CONTAINS NON-HAZARDOUS MATERIALS ONLY

WEIGHMASTER'S SIGNATURE: STEVE GEURDS

DRIVER'S SIGNATURE: M Mike Pluy

334793

TOWN HALL'S COPY

STRAIGHT BILL OF LADING

ORIGINAL - NOT NEGOTIABLE

MANGIARDI BROS. TRUCKING
1960 Pittsfield Road
Castleton, New York 12033

(Name of Carrier)

Shipper No. 4A-209
Carrier No. B 1407[illegible]
Date 11-12-98

T[illegible] [illegible]nee Colonie Landfill
Street /
Destination
Route 9

FROM:
Shipper Watervliet Ar.
Street Siberia
Origin Watervliet N.Y.
Emergency Response Phone No.

Vehicle Number M-27

No. Shipping Units	HM*	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (subject to correction)	Rate	CHARGES
1		load cont soil (non Haz)			

...n transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Communication Standard (HM-126C). ...ide emergency response phone number in case of incident or accident in box above.

...MIT
...O.D. TO:
...DRESS:

...TE – Where the rate is dependent on value, shippers ...equired to state specifically in writing the agreed or ...ared value of the property. ...agreed or declared value of the property is hereby ...ically stated by the shipper to be not exceeding ________ per ________

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

________ Signature

COD Amt: $

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

________ (Signature of Consignor)

C.O.D. FEE:
PREPAID ☐
COLLECT ☐ $

TOTAL CHARGES: $

FREIGHT CHARGES:
FREIGHT PREPAID except when box at right is checked
Check box if charges are to be collect ☐

...EIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of ...ill of Lading, the property described above in apparent good order, except as noted (contents ...ondition of contents of packages unknown), marked, consigned and destined as indicated above ...said carrier (the word carrier being understood throughout this contract as meaning any person ...poration in possession of the property under the contract) agrees to carry to its usual place of ...at s... destination, if on its route, otherwise to deliver to another carrier on the route to said ...tion. ...mutually agreed as to each carrier of all or any of said property over all or any ...of sa... to destination and as to each party at any time interested in all or any ...that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of this Bill of Lading. This notice supersedes and negates any claimed, alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract.

[signature] K. Kirby Bros For

CARRIER **MANGIARDI BROS. TRUCKING**
PER Mulholey
DATE 11-12-98

...US MATERIALS – MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIALS AS REFERENCED IN 49CFR § 172.202.

2025

1

TOWN OF COLONIE
DEPARTMENT OF ENVIRONMENTAL SERVICES
[illegible]
PHONE [illegible]

WASTE DISPOSAL WEIGH TICKET

DATE	TICKET NUMBER
12NOV98	486938

FOR DISPOSAL OF WASTE AT	VEHICLE
TOWN OF COLONIE	5

CUSTOMER

VEHICLE TYPE: DUMP TRUCK - LARGE

SOURCE OF WASTE: OUT SIDE TOWN OF COLONIE

WEIGH IN TIME	WEIGH IN GROSS POUNDS	WEIGH IN WEIGHMASTER ID	WEIGH OUT TIME	WEIGH OUT TARE POUNDS	WEIGH OUT WEIGHMASTER ID	NET WEIGHT
12:15	112,640	T	12:26	37,160	T	75,480 LBS 37.740 TONS

WASTE TYPE	RATE PER TON	MINIMUM / FLAT	FEE	AMOUNT PAID
SOIL CONTAINING PETROLEUM		MINIMUM 10.00 FLAT 0.00		

PAID BY CHEQUE

THIS LOAD CONTAINS NON-HAZARDOUS MATERIALS ONLY

WEIGHMASTER'S SIGNATURE	DRIVER'S SIGNATURE
STEVE GEURDS	M Mkelpley

334829 TOWN HALL'S COPY

STRAIGHT BILL OF LADING

ORIGINAL - NOT NEGOTIABLE
MANGIARDI BROS. TRUCKING
1960 Pittsfield Road
Castleton, New York 12033
(Name of Carrier)

Shipper No. 4A-209
Carrier No. B 14081
Date 11-12-98

TO:
Consignee Colonie landfill
Street
Destination Cahoes N.Y.
Route 9

FROM:
Shipper Watervliet Arsenal
Street
Origin Watervliet N.Y.
Emergency Response Phone No.
Vehicle Number M-27

No. Shipping Units	HM*	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (subject to correction)	Rate	CHARGES
1		load cont. Soil (non Haz)			

When transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Communication Standard (HM-126C. Provide emergency response phone number in case of incident or accident in box above.

REMIT C.O.D. TO: ADDRESS:

COD Amt: $

C.O.D. FEE: PREPAID ☐ COLLECT ☐ $

NOTE – Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding $ ______ per ______

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. ______ Signature

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges. ______ (Signature of Consignor)

TOTAL CHARGES: $

FREIGHT CHARGES: FREIGHT PREPAID except when box at right is checked. Check box if charges are to be collect ☐

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of this Bill of Lading. This notice supersedes and negates any claimed, alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract.

SHIPPER [signature]
PER [signature]

CARRIER MANGIARDI BROS. TRUCKING
PER [signature]
DATE 11-12-98

*HAZARDOUS MATERIALS MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIALS AS REFERENCED IN 49CFR § 172.202.

DATE	TICKET NUMBER
12NOV98	486975

FOR DISPOSAL OF WASTE AT
TOWN OF COLONIE

CUSTOMER

VEHICLE
3

VEHICLE TYPE
ALL OTHER

SOURCE OF WASTE
OUT SIDE TOWN OF COLONIE

WEIGH IN TIME	WEIGH IN GROSS POUNDS	WEIGH IN WEIGHMASTER ID	WEIGH OUT TIME	WEIGH OUT TARE POUNDS	WEIGH OUT WEIGHMASTER ID	NET WEIGHT
13:23	104,980	T	13:33	37,100	T	67,880 LBS 33,940 TONS

WASTE TYPE	RATE PER TON	MINIMUM / FLAT	FEE	AMOUNT PAID
SOIL CONTAINING PETROLEUM		MINIMUM 10.00 FLAT 0.00		

PAID BY CHEQUE

THIS LOAD CONTAINS NON-HAZARDOUS MATERIALS ONLY

WEIGHMASTER'S SIGNATURE
STEVE GEURDS

DRIVER'S SIGNATURE
M Whelpley

334866 TOWN HALL'S COPY

STRAIGHT BILL OF LADING

ORIGINAL - NOT NEGOTIABLE

MANGIARDI BROS. TRUCKING
1960 Pittsfield Road
Castleton, New York 12033
(Name of Carrier)

Shipper No. 4A-209
Carrier No. B 1099c
Date 11-12-98

TO:
Consignee colonie landfill

FROM:
Shipper Watervliet Arsenal

Street

Destination Cohoes NY

Origin Watervliet N.Y.

Route 9

Emergency Response Phone No.

Vehicle Number M-27

No. Shipping Units	HM*	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (subject to correction)	Rate	CHARGES
1		load cont soil non haz			

When transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Communication Standard (HM-126...
Provide emergency response phone number in case of incident or accident in box above.

REMIT C.O.D. TO:
ADDRESS:

COD Amt: $

C.O.D. FEE:
PREPAID ☐ $
COLLECT ☐

TOTAL CHARGES: $

FREIGHT CHARGES:
FREIGHT PREPAID except when box at right is checked
Check box if charges are to be collect ☐

NOTE – Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ _____ per _____

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.
_____ Signature

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
_____ (Signature of Consignor)

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of this Bill of Lading. This notice supersedes and negates any claimed alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract.

SHIPPER [signature] by Bro Studio

PER

CARRIER MANGIARDI BROS. TRUCKING

PER M Mikolajczyk

DATE 11-12-98

1

*HAZARDOUS MATERIALS MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIALS AS REFERENCED IN 49CFR § 172.202.

TOWN OF COLONIE

DEPARTMENT OF ENVIRONMENTAL SERVICES
RT 9 COHOES, NY 12047-4894
PHONE: (518) 785-2826

WASTE DISPOSAL WEIGHT TICKET

DATE	TICKET NUMBER
12NOV98	487020

FOR DISPOSAL OF WASTE AT
TOWN OF COLONIE

VEHICLE
B

CUSTOMER

VEHICLE TYPE
ALL OTHER

SOURCE OF WASTE
OUT SIDE TOWN OF COLONIE

WEIGH IN			WEIGH OUT			NET WEIGHT	
TIME	GROSS POUNDS	WEIGHMASTER ID	TIME	TARE POUNDS	WEIGHMASTER ID		
14:35	109,060	T	14:48	37,060	T	72,000 36,000	LBS TONS

WASTE TYPE	RATE PER TON		FEE	AMOUNT PAID
SOIL CONTAINING PETROLEUM		MINIMUM 10.00 FLAT 0.00		

PAID BY CHEQUE

THIS LOAD CONTAINS NON-HAZARDOUS MATERIALS ONLY

WEIGHMASTER'S SIGNATURE
STEVE GEURDS

DRIVER'S SIGNATURE
M Whelpley

334911 TOWN HALL'S COPY

STRAIGHT BILL OF LADING

ORIGINAL - NOT NEGOTIABLE

MANGIARDI BROS. TRUCKING
1960 Pittsfield Road
Castleton, New York 12033
(Name of Carrier)

Shipper No. 48289
Carrier No. B 12008
Date 4-12-98

TO:
Consignee COLONIE Landfill
Street Rt 9
Destination COLONIE NY
Route

FROM:
Shipper Watervliet Arsenal
Street Rt 32
Origin Watervliet NY
Emergency Response Phone No.
Vehicle Number M-18

No. Shipping Units	HM*	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (subject to correction)	Rate	CHARGES
1		NON Haz contaminated soil	37.95 TONS		

*When transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Communication Standard (HM-126C). Provide emergency response phone number in case of incident or accident in box above.

REMIT C.O.D. TO:
ADDRESS:

COD Amt: $

C.O.D. FEE:
PREPAID ☐ $
COLLECT ☐

TOTAL CHARGES: $

FREIGHT CHARGES:
FREIGHT PREPAID except when box at right is checked
Check box if charges are to be collect ☐

NOTE - Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ _____ per _____

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.
_____ Signature

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
_____ (Signature of Consignor)

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of this Bill of Lading. This notice supersedes and negates any claimed, alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract.

SHIPPER _____
PER _____

CARRIER MANGIARDI BROS. TRUCKING
PER _____
DATE 4-12-98

*HAZARDOUS MATERIALS - MARK WITH * TO DESIGNATE HAZARDOUS MATERIALS AS REFERENCED IN 49CFR § 172.202.

FOR DISPOSAL OF WASTE AT

TOWN OF COLONIE

CUSTOMER

VEHICLE
1

VEHICLE TYPE
ALL OTHER

SOURCE OF WASTE
OUT SIDE TOWN OF COLONIE

DATE
12NOV98

TICKET NUMBER
486971

TIME	WEIGH IN GROSS POUNDS	WEIGHMASTER ID	TIME	WEIGH OUT TARE POUNDS	WEIGHMASTER ID	NET WEIGHT
3:17	114,100	T	13:26	38,200	T	75,900 LBS 37.950 TONS

WASTE TYPE
IL CONTAINING PETROLEUM

RATE PER TON	MINIMUM	FLAT	FEE	AMOUNT PAID
	10.00	0.00		

LOAD CONTAINS NON HAZARDOUS MATERIALS ONLY

PAID BY CHEQUE

WEIGHMASTER'S SIGNATURE
VE GEURDS

DRIVER'S SIGNATURE
[signature]

334862

TOWN HALL'S COPY

STRAIGHT BILL OF LADING

ORIGINAL - NOT NEGOTIABLE

MANGIARDI BROS. TRUCKING
1960 Pittsfield Road
Castleton, New York 12033
(Name of Carrier)

Shipper No. 14209
Carrier No. B 12007
Date 11-12-98

TO:
Consignee Colonie Land Fill
Set R.T.9
Destination Colonie NY
Route

FROM:
Shipper Waterlist
Street Rt 32
Origin Waterviet NY
Emergency Response Phone No.
Vehicle Number MM-18

No. Shipping Units	HM*	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (subject to correction)	Rate	CHARGES
1		Non Haz contaminated soil			
		34.80 Tons			

When transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Communication Standard (HM-126C Provide emergency response phone number in case of incident or accident in box above.

REMIT
C.O.D. TO:
ADDRESS:

COD Amt: $

C.O.D. FEE:
PREPAID ☐ $
COLLECT ☐

NOTE – Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ _____ per _____

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.
_____ Signature

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
_____ (Signature of Consignor)

TOTAL CHARGES: $

FREIGHT CHARGES:
FREIGHT PREPAID except when box at right is checked
Check box if charges are to be collect ☐

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of this Bill of Lading. This notice supersedes and negates any claimed alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract

SHIPPER Mangiardi Kilby Bros Inc.
PER Mark Brenow

CARRIER MANGIARDI BROS. TRUCKING
PER
DATE 11-12-98

*HAZARDOUS MATERIALS MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIALS AS REFERENCED IN 49CFR § 172.202.

DATE	TICKET NUMBER
12NOV98	486935

FOR DISPOSAL OF WASTE AT	VEHICLE
TOWN OF COLONIE	8
CUSTOMER	**VEHICLE TYPE**
	TRUCK - PICKUP
	SOURCE OF WASTE
	OUT SIDE TOWN OF COLONIE

WEIGH IN			WEIGH OUT			NET WEIGHT	
TIME	GROSS POUNDS	WEIGHMASTER ID	TIME	TARE POUNDS	WEIGHMASTER ID		
12:09	107,860	T	12:19	38,260	T	69,600 34.800	LBS TONS

WASTE TYPE	RATE PER TON	MINIMUM / FLAT	FEE	AMOUNT PAID
SOIL CONTAINING PETROLEUM		10.00 0.00		

PAID BY CHEQUE

THIS LOAD CONTAINS NON-HAZARDOUS MATERIALS ONLY

WEIGHMASTER'S SIGNATURE	DRIVER'S SIGNATURE
STEVE GEURDS	

334826 TOWN HALL'S COPY

STRAIGHT BILL OF LADING

ORIGINAL - NOT NEGOTIABLE
MANGIARDI BROS. TRUCKING
1960 Pittsfield Road
Castleton, New York 12033
(Name of Carrier)

Shipper No. 4A209
Carrier No. B 12006
Date 11-12-98

Consignee Colonie Landfill	FROM: Shipper Watervliet Arsenal
Street Rt 9	Street Rt 32
Destination Colonie NY	Origin Watervliet NY
Route	Emergency Response Phone No.
	Vehicle Number M-18

No. Shipping Units	HM*	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (subject to correction)	Rate	CHARGES
1		Non Haz contaminated soil			
		34.91 Tons			

When transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Communication Standard (HM-126). Provide emergency response phone number in case of incident or accident in box above.

REMIT C.O.D. TO: ADDRESS:

COD Amt: $

C.O.D. FEE: PREPAID ☐ COLLECT ☐ $

TOTAL CHARGES: $

NOTE – Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding

$ ________ per ________

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

________ Signature

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

________ (Signature of Consignor)

FREIGHT CHARGES: FREIGHT PREPAID except when box at right is checked. Check box if charges are to be collect ☐

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

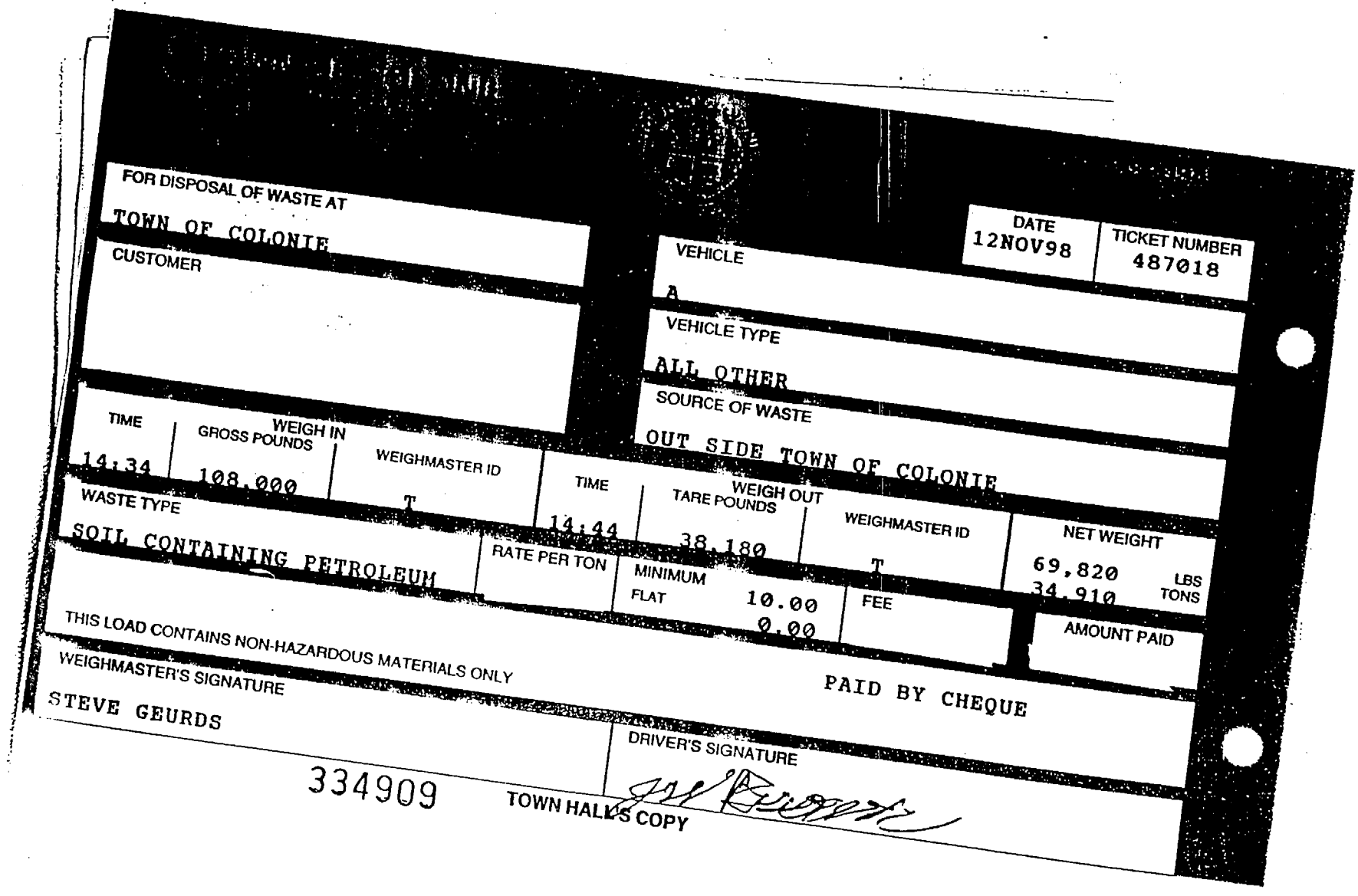
Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of this Bill of Lading. This notice supersedes and negates any claimed, alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract.

SHIPPER [signature] Kilby Bros For Q
PER

CARRIER MANGIARDI BROS. TRUCKING
PER J W Brown
DATE 11-12-98

HAZARDOUS MATERIALS MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIALS AS REFERENCED IN 49CFR § 172.202.



FOR DISPOSAL OF WASTE AT
TOWN OF COLONIE

DATE
12NOV98

TICKET NUMBER
487018

CUSTOMER

VEHICLE
A

VEHICLE TYPE
ALL OTHER

SOURCE OF WASTE
OUT SIDE TOWN OF COLONIE

TIME	WEIGH IN GROSS POUNDS	WEIGHMASTER ID	TIME	WEIGH OUT TARE POUNDS	WEIGHMASTER ID	NET WEIGHT
14:34	108,000	T	14:44	38,180	T	69,820 LBS 34.910 TONS

WASTE TYPE
SOIL CONTAINING PETROLEUM

RATE PER TON

MINIMUM
FLAT 10.00
0.00

FEE

AMOUNT PAID
PAID BY CHEQUE

THIS LOAD CONTAINS NON-HAZARDOUS MATERIALS ONLY

WEIGHMASTER'S SIGNATURE
STEVE GEURDS

DRIVER'S SIGNATURE

334909 TOWN HALL'S COPY

STRAIGHT BILL OF LADING

ORIGINAL - NOT NEGOTIABLE

MANGIARDI BROS. TRUCKING
1960 Pittsfield Road
Castleton, New York 12033
(Name of Carrier)

Shipper No. 4A209
Carrier No. B 14355
Date 11/12/98

TO:
Consignee Colonie Landfill
Street Rt 9
Destination Colonie NY
Route

FROM:
Shipper Watervliet Arsenal
Street Rt 32
Origin Watervliet NY
Emergency Response Phone No.
Vehicle Number 16/6

No. Shipping Units	HM*	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (subject to correction)	Rate	CHARGES
1		Non Hazardous Contaminated Soil			

When transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Communication Standard (HM-126C. Provide emergency response phone number in case of incident or accident in box above.

REMIT C.O.D. TO: ADDRESS:

COD Amt: $

C.O.D. FEE: PREPAID ☐ COLLECT ☐ $

NOTE – Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding $ ______ per ______

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.
______ Signature

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
______ (Signature of Consignor)

TOTAL CHARGES: $

FREIGHT CHARGES:
FREIGHT PREPAID except when box at right is checked. Check box if charges are to be collect ☐

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of this Bill of Lading. This notice supersedes and negates any claimed, alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract.

SHIPPER [signature] Kirby Brosky
PER

CARRIER **MANGIARDI BROS. TRUCKING**
PER [signature]
DATE 11/12/98

*HAZARDOUS MATERIALS MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIALS AS REFERENCED IN 49CFR § 172.202.

DATE	TICKET NUMBER
12NOV98	487001

FOR DISPOSAL OF WASTE AT	VEHICLE
TOWN OF COLONIE	R
CUSTOMER	**VEHICLE TYPE**
	ALL OTHER
	SOURCE OF WASTE
	OUT SIDE TOWN OF COLONIE

WEIGH IN			WEIGH OUT			NET WEIGHT	
TIME	GROSS POUNDS	WEIGHMASTER ID	TIME	TARE POUNDS	WEIGHMASTER ID	86,960	LBS
14:04	125,740	T	14:11	38,780	T	43,480	TONS

WASTE TYPE	RATE PER TON	MINIMUM / FLAT	FEE	AMOUNT PAID
SOIL CONTAINING PETROLEUM		10.00 / 0.00		

REPLACES 486925 SCALE ERROR

PAID BY CHEQUE

MANUAL WT INBOUND;

THIS LOAD CONTAINS NON-HAZARDOUS MATERIALS ONLY

WEIGHMASTER'S SIGNATURE	DRIVER'S SIGNATURE
STEVE GEURDS	

334892

TOWN HALL'S COPY

ORIGINAL - NOT NEGOTIABLE

MANGIARDI BROS. TRUCKING
1960 Pittsfield Road
Castleton, New York 12033

(Name of Carrier)

Shipper No. 4A209
Carrier No. B 14195
Date 11/12/98

TO: Consignee [illegible]

FROM: Shipper [illegible]

Route 32, 787, 9, 7

Emergency Response Phone No.

Vehicle Number 16 / 6

No. Shipping Units	HM*	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (subject to correction)	Rate	CHARGES
		Non Hazardous Contaminated Soil			

REMIT C.O.D. TO: ADDRESS:

COD Amt: $

C.O.D. FEE: PREPAID ☐ COLLECT ☐ $

TOTAL CHARGES: $

FREIGHT CHARGES: FREIGHT PREPAID except when box at right is checked. Check box if charges are to be collect ☐

NOTE – Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding $ ______ per ______

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation. Signature

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges. Signature of Consignor

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of this Bill of Lading. This notice supersedes and negates any claimed alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract.

SHIPPER Kilby Bros. Inc. | CARRIER **MANGIARDI BROS. TRUCKING**

PER | PER [signature]

DATE 11/12/98

HAZARDOUS MATERIALS MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIALS AS REFERENCED IN 49CFR § 172.202.

TOWN OF COLONIE

WASTE DISPOSAL
WEIGH TICKET

DATE	TICKET NUMBER
12NOV98	487000

FOR DISPOSAL OF WASTE AT
TOWN OF COLONIE

VEHICLE
A

CUSTOMER

VEHICLE TYPE
ALL OTHER

SOURCE OF WASTE
OUT SIDE TOWN OF COLONIE

WEIGH IN			WEIGH OUT			NET WEIGHT	
TIME	GROSS POUNDS	WEIGHMASTER ID	TIME	TARE POUNDS	WEIGHMASTER ID		
14:02	114,680	T	14:10	38,800	T	75,880	LBS
						37.940	TONS

WASTE TYPE	RATE PER TON	MINIMUM / FLAT	FEE	AMOUNT PAID
SOIL CONTAINING PETROLEUM		10.00 / 0.00		

PAID BY CHEQUE

THIS LOAD CONTAINS NON-HAZARDOUS MATERIALS ONLY

WEIGHMASTER'S SIGNATURE	DRIVER'S SIGNATURE
STEVE GEURDS	

334891 TOWN HALL'S COPY

STRAIGHT BILL OF LADING

ORIGINAL - NOT NEGOTIABLE

MANGIARDI BROS. TRUCKING

1960 Pittsfield Road

Castleton, New York 12033

(Name of Carrier)

Shipper No. 4A209

Carrier No. B 14352

Date 11/12/98

TO: Consignee	Colonie Landfill	FROM: Shipper	Watervliet Arsenal
Street		Street	
Destination	Colonie	Origin	Watervliet
Route		Emergency Response Phone No.	Vehicle Number 16/6

No. Shipping Units	HM*	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (subject to correction)	Rate	CHARGES
1		Non Hazardous Contaminated Soil			

When transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Communication Standard (HM-126C). Provide emergency response phone number in case of incident or accident in box above.

REMIT C.O.D. TO: ADDRESS:

COD Amt: $

C.O.D. FEE: PREPAID ☐ COLLECT ☐ $

NOTE – Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding $ ______ per ______

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

______ Signature

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

______ (Signature of Consignor)

TOTAL CHARGES: $

FREIGHT CHARGES: FREIGHT PREPAID except when box at right is checked. Check box if charges are to be collect ☐

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of this Bill of Lading. This notice supersedes and negates any claimed, alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract.

SHIPPER Kilby Bros Inc

PER

CARRIER **MANGIARDI BROS. TRUCKING**

PER Greg Brown

DATE 11/12/98

*HAZARDOUS MATERIALS MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIALS AS REFERENCED IN 49CFR § 172.202.

DATE	TICKET NUMBER
12NOV98	486891

FOR DISPOSAL OF WASTE AT

TOWN OF COLONIE

VEHICLE

A

CUSTOMER

VEHICLE TYPE

ALL OTHER

SOURCE OF WASTE

OUT SIDE TOWN OF COLONIE

WEIGH IN			WEIGH OUT			NET WEIGHT	
TIME	GROSS POUNDS	WEIGHMASTER ID	TIME	TARE POUNDS	WEIGHMASTER ID		
10:40	116,780	T	10:54	39,140	T	77,640	LBS
						38,820	TONS

WASTE TYPE	RATE PER TON	MINIMUM / FLAT	FEE	AMOUNT PAID
SOIL CONTAINING PETROLEUM		10.00 / 0.00		

PAID BY CHEQUE

THIS LOAD CONTAINS NON-HAZARDOUS MATERIALS ONLY

WEIGHMASTER'S SIGNATURE

STEVE GEURDS

DRIVER'S SIGNATURE

334782 TOWN HALL'S COPY

STRAIGHT BILL OF LADING

ORIGINAL - NOT NEGOTIABLE
MANGIARDI BROS. TRUCKING
1960 Pittsfield Road
Castleton, New York 12033
(Name of Carrier)

Shipper No. 44208
Carrier No. B 14354
Date 11/12/88

Consignee	[illegible]	FROM: Shipper	[illegible]
Street	Rt 9	Street	Rt 32
Destination	Cohoes	Origin	Watervliet
Route		Emergency Response Phone No.	Vehicle Number 16/6

No. Shipping Units	HM*	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (subject to correction)	Rate	CHARGES
1		Non Hazardous Contaminated Soil			

When transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Communication Standard (HM-126). Provide emergency response phone number in case of incident or accident in box above.

REMIT C.O.D. TO:
ADDRESS:

COD Amt: $

C.O.D. FEE: PREPAID ☐ COLLECT ☐ $

NOTE – Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding

$ ______ per ______

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

______ Signature

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

______ (Signature of Consignor)

TOTAL CHARGES: $

FREIGHT CHARGES:
FREIGHT PREPAID except when box at right is checked
Check box if charges are to be collect ☐

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of this Bill of Lading. This notice supersedes and negates any claimed, alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract.

SHIPPER [signature] Killey Bros Rd
PER

CARRIER **MANGIARDI BROS. TRUCKING**
PER [signature]
DATE 11/12/88

*HAZARDOUS MATERIALS — MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIALS AS REFERENCED IN 49CFR § 172.202.

TOWN OF COLONIE

WASTE DISPOSAL

DATE	TICKET NUMBER
12NOV98	486838

FOR DISPOSAL OF WASTE AT
TOWN OF COLONIE

CUSTOMER

VEHICLE
A

VEHICLE TYPE
ALL OTHER

SOURCE OF WASTE
OUT SIDE TOWN OF COLONIE

TIME	WEIGH IN GROSS POUNDS	WEIGHMASTER ID	TIME	WEIGH OUT TARE POUNDS	WEIGHMASTER ID	NET WEIGHT	
09:33	102,160	T	09:46	38,980	T	63,180 31.590	LBS TONS

WASTE TYPE	RATE PER TON	MINIMUM / FLAT	FEE	AMOUNT PAID
SOIL CONTAINING PETROLEUM		10.00 0.00		

PAID BY CHEQUE

THIS LOAD CONTAINS NON-HAZARDOUS MATERIALS ONLY

WEIGHMASTER'S SIGNATURE
STEVE GEURDS

DRIVER'S SIGNATURE

334729 TOWN HALL'S COPY

STRAIGHT BILL OF LADING

ORIGINAL - NOT NEGOTIABLE

MANGIARDI BROS. TRUCKING
1960 Pittsfield Road
Castleton, New York 12033
(Name of Carrier)

Shipper No. 44208
Carrier No. B 14353
Date 11/12/88

TO: Consignee: Colonie Landfill
2 C

FROM: Shipper: Watervliet Arsenal

Street: Rt 2

Destination: Colonie 7

Origin: Watervliet 7

Route:

Emergency Response Phone No.:

Vehicle Number: 16/6

No. Shipping Units	HM*	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (subject to correction)	Rate	CHARGES
1		Non Hazardous Contaminated Soil			

When transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Communication Standard. Provide emergency response phone number and contact in box above.

REMIT C.O.D. TO:
ADDRESS:

COD Amt: $

C.O.D. FEE: PREPAID ☐ $ COLLECT ☐

NOTE - Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property. The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding

$ _____ per _____

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

_____ Signature

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

_____ (Signature of Consignor)

TOTAL CHARGES: $

FREIGHT CHARGES:
FREIGHT PREPAID except when box at right is checked ☐
Check box if charges are to be collect ☐

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of this Bill of Lading. This notice supersedes and negates any claimed alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract.

SHIPPER: Kirby Frost

PER: Mark Brennan

CARRIER: MANGIARDI BROS. TRUCKING

PER: Greg Brown

DATE: 11/12/88

*HAZARDOUS MATERIALS MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIALS AS REFERENCED IN 49CFR § 172.202.

TOWN OF COLONIE

WASTE DISPOSAL

DATE	TICKET NUMBER
12NOV98	486957

FOR DISPOSAL OF WASTE AT: TOWN OF COLONIE

VEHICLE: A

CUSTOMER:

VEHICLE TYPE: ALL OTHER

SOURCE OF WASTE: OUT SIDE TOWN OF COLONIE

WEIGH IN TIME	WEIGH IN GROSS POUNDS	WEIGH IN WEIGHMASTER ID	WEIGH OUT TIME	WEIGH OUT TARE POUNDS	WEIGH OUT WEIGHMASTER ID	NET WEIGHT
12:49	117,920	T	13:01	38,820	T	79,100 LBS / 39.550 TONS

WASTE TYPE	RATE PER TON	MINIMUM / FLAT	FEE	AMOUNT PAID
SOIL CONTAINING PETROLEUM		10.00 / 0.00		

PAID BY CHEQUE

THIS LOAD CONTAINS NON-HAZARDOUS MATERIALS ONLY

WEIGHMASTER'S SIGNATURE: STEVE GEURDS

DRIVER'S SIGNATURE:

334848 TOWN HALL'S COPY

MANGIARDI BROS. TRUCKING

1960 Pittsfield Road
Castleton, New York 12033
(Name of Carrier)

Shipper No. 4R209
Carrier No. B 12005
Date 11-13-98

TO: Consignee COHOES LANDFILL
FROM: Shipper Watervliet Basement
Street 2-32
Destination COHOES, NY
Origin Watervliet, NY
Route
Emergency Response Phone No.
Vehicle Number 174-18

No. Shipping Units	HM*	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (subject to correction)	Rate	CHARGES
1		NON HAZ CONTAMINATED SOIL			
		23.54 TON A			

When transporting hazardous materials, include the technical or chemical name for n.o.s. not otherwise specified or generic description of material with appropriate UN or NA number as defined by U.S. DOT Emergency Communication Standard, HM-126C. Provide emergency response phone number in case of accident or spill box above.

REMIT C.O.D. TO:
ADDRESS:

C.O.D. Amt: $

C.O.D. FEE: PREPAID ☐ COLLECT ☐ $

NOTE - Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ _____ per _____

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

Signature

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

Signature of Consignor

TOTAL CHARGES. $

FREIGHT CHARGES.
FREIGHT PREPAID except when box at right is checked ☐
Check box if charges are to be collect ☐

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of this Bill of Lading. This notice supersedes and negates any claimed, alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract.

SHIPPER Watervliet Kitchen Bros Inc
PER

CARRIER MANGIARDI BROS. TRUCKING
PER
DATE 11-13-98

2

*HAZARDOUS MATERIALS MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIALS AS REFERENCED IN 49CFR § 172.202.

Agent must detach and retain this Shipping Order and must sign the Original Bill of Lading.

STRAIGHT BILL OF LADING

ORIGINAL - NOT NEGOTIABLE

MANGIARDI BROS. TRUCKING
1960 Pittsfield Road
Castleton, New York 12033
(Name of Carrier)

Shipper No. 4A204
Carrier No. B 12019
Date 11-13-95

TO: Consignee COLONIE LandFill
2 LC
Destination COLONIE NY

FROM: Shipper Waterviliet Arsenal
Street 2-52
Origin Watervliet NY

Route

Emergency Response Phone No.

Vehicle Number M-18

No. Shipping Units	HM*	Kind of Packaging, Description of Articles, Special Marks and Exceptions	Weight (subject to correction)	Rate	CHARGES
1		NON HAZ CONTAMINATED SOIL			
		33.29 TONS			

When transporting hazardous materials include the technical or chemical name for n.o.s. (not otherwise specified) or generic description of material with appropriate UN or NA number as defined in US DOT Emergency Communication Standard (HM-126C). Provide emergency response phone number in case of incident or accident in box above.

REMIT C.O.D. TO:
ADDRESS:

COD Amt: $

C.O.D. FEE: PREPAID ☐ COLLECT ☐ $

TOTAL CHARGES: $

NOTE – Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
$ ______ per ______

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.
______ Signature

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
______ (Signature of Consignor)

FREIGHT CHARGES:
FREIGHT PREPAID except when box at right is checked
Check box if charges are to be collect ☐

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the Bill of Lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the Bill of Lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

NOTICE: Freight moving under this Bill of Lading is subject to the classifications and lawfully filed tariffs in effect on the date of this Bill of Lading. This notice supersedes and negates any claimed, alleged or asserted oral or written contract, promise, representation or understanding between the parties with respect to this freight, except to the extent of any written contract which establishes lawful contract carriage and is signed by authorized representatives of both parties to the contract.

SHIPPER Watervliet Arsenal Bros. Fox
PER Mark Bannon

CARRIER **MANGIARDI BROS. TRUCKING**
PER J W Brown
DATE 11-13-95

1

*HAZARDOUS MATERIALS MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIALS AS REFERENCED IN 49CFR § 172.202.

DATE	TICKET NUMBER
13NOV98	487087

FOR DISPOSAL OF WASTE AT	VEHICLE
TOWN OF COLONIE	3

CUSTOMER	VEHICLE TYPE
	ALL OTHER
	SOURCE OF WASTE
	OUT SIDE TOWN OF COLONIE

WEIGH IN			WEIGH OUT			NET WEIGHT	
TIME	GROSS POUNDS	WEIGHMASTER ID	TIME	TARE POUNDS	WEIGHMASTER ID	66,180	LBS
09:09	104,680	B	09:09	38,500	B	33.090	TONS

WASTE TYPE	RATE PER TON	MINIMUM / FLAT	FEE	AMOUNT PAID
SOIL CONTAINING PETROLEUM		10.00 / 0.00		

PAID BY CHEQUE

MANUAL WT INBOUND;

THIS LOAD CONTAINS NON-HAZARDOUS MATERIALS ONLY

WEIGHMASTER'S SIGNATURE	DRIVER'S SIGNATURE
)HN BONCARO	

334978 TOWN HALL'S COPY

PERMEABLE REACTION WALL
PILOT TREATMENT SYSTEM

APPENDIX G

MONITORING WELL CONSTRUCTION LOGS

DATE

STARTED 11/4/98

'NISHED 11/4/98

IEET 1 OF 1

MAXIM TECHNOLOGIES INC **SUBSURFACE LOG**

PJT. NO. 9850293

HOLE NO. **MW-45**

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

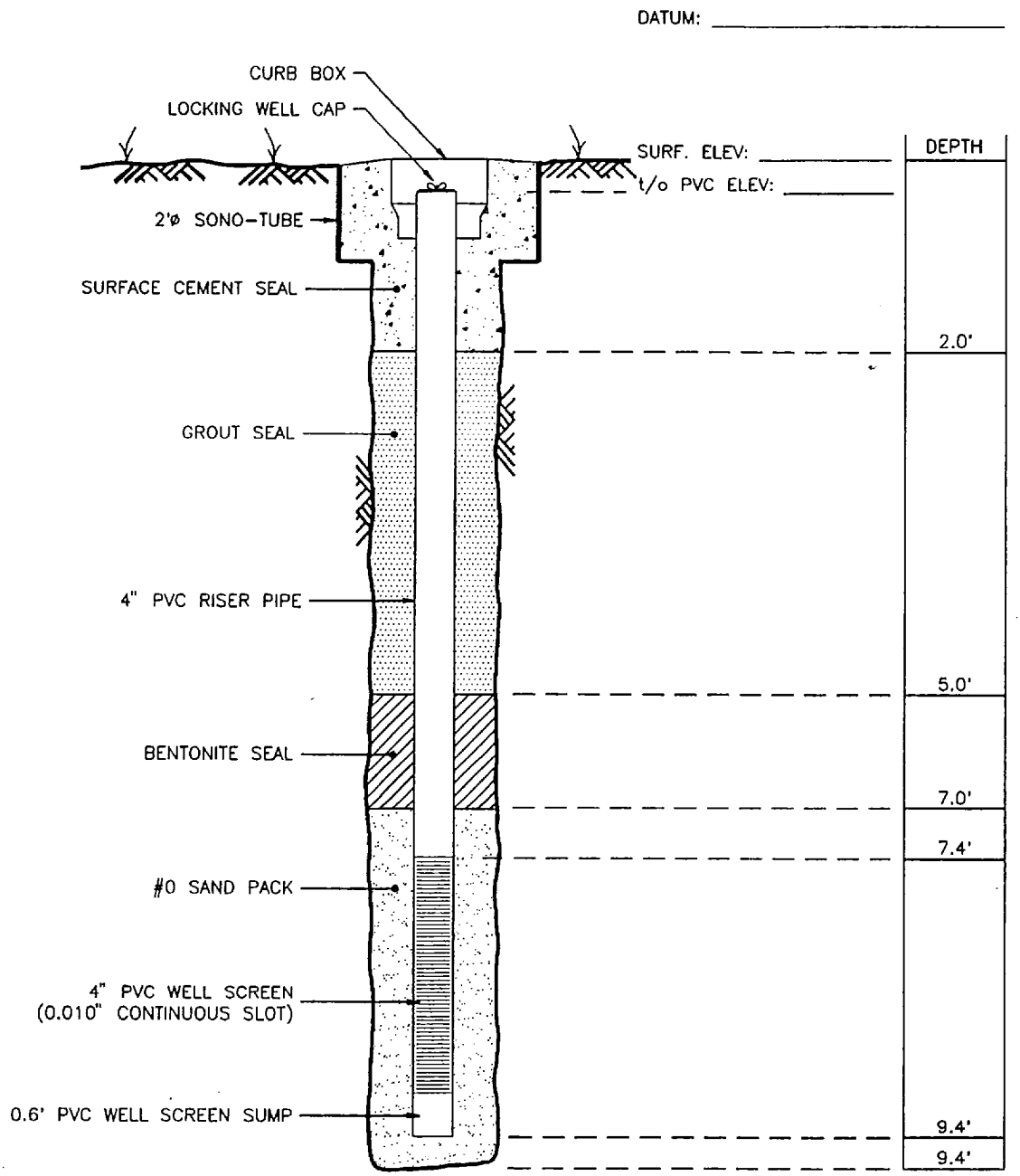
LOCATION Watervliet Arsenal
Watervliet, New York

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
									Note #1: See attached well diagram.
	1	6	5	6	6	11	1.0	Brown SAND and GRAVEL	
5	2	3	5	10	17	15		Similar	
	3	26	30	26	51	56		Rock Fragments	
								Weathered BEDROCK at 7.0' Below Grade	
10								End of Boring at 9.5' Below Grade	
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers



WELL No.
MW-45

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-45
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/10/98

FINISHED 11/10/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC

SUBSURFACE LOG

PJT. NO. 9850293

HOLE NO. MW-46

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

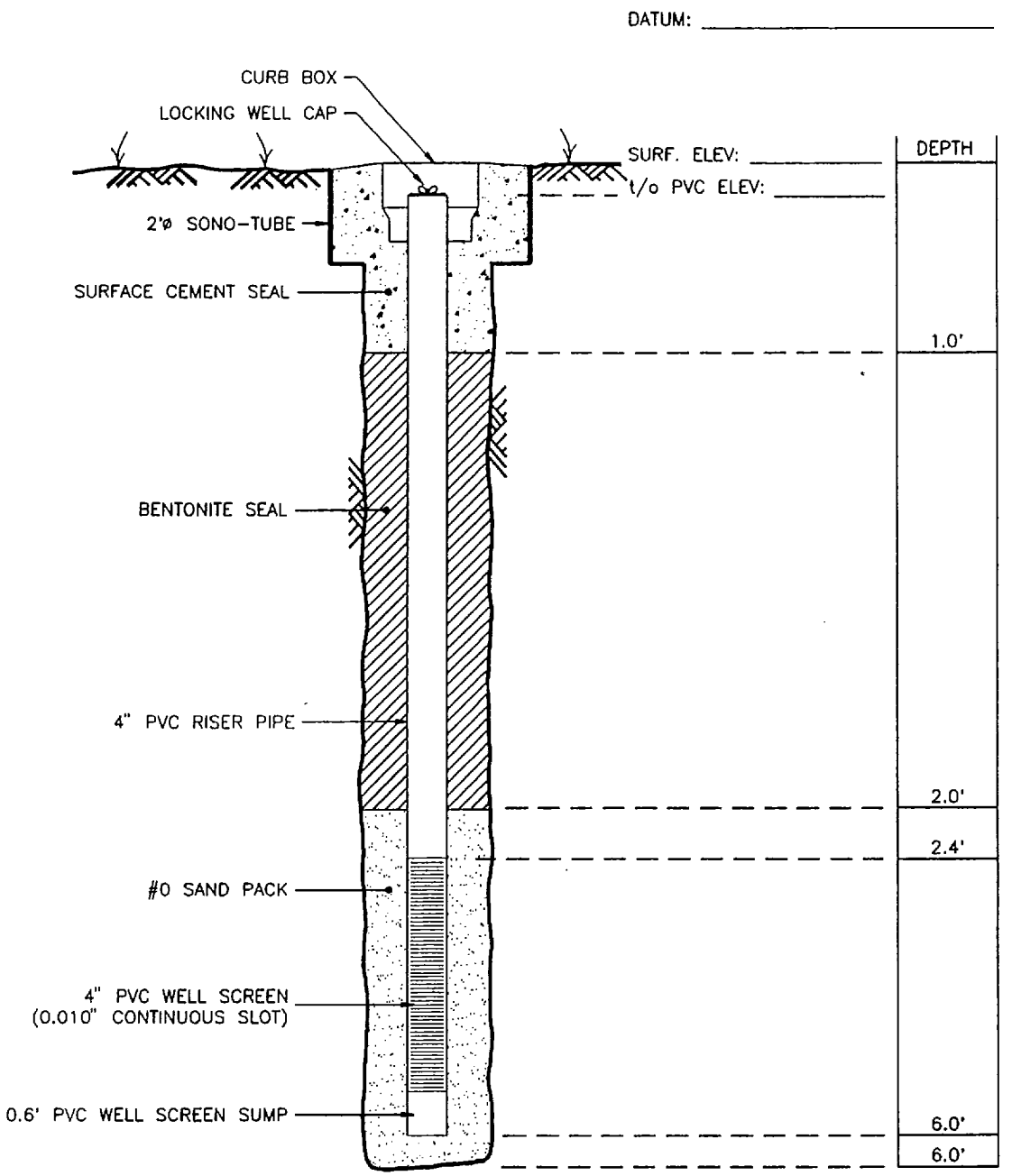
LOCATION Watervliet Arsenal
Watervliet, New York

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
								Augered to 6.5' with no split spoon sampling performed, and installed well.	Note #1: See attached well diagram.
5								End of Boring 6.5' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers



WELL No.
MW-46

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-46
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/9/98

FINISHED 11/9/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC

SUBSURFACE LOG

PJT. NO. 9850293

HOLE NO. MW-47

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

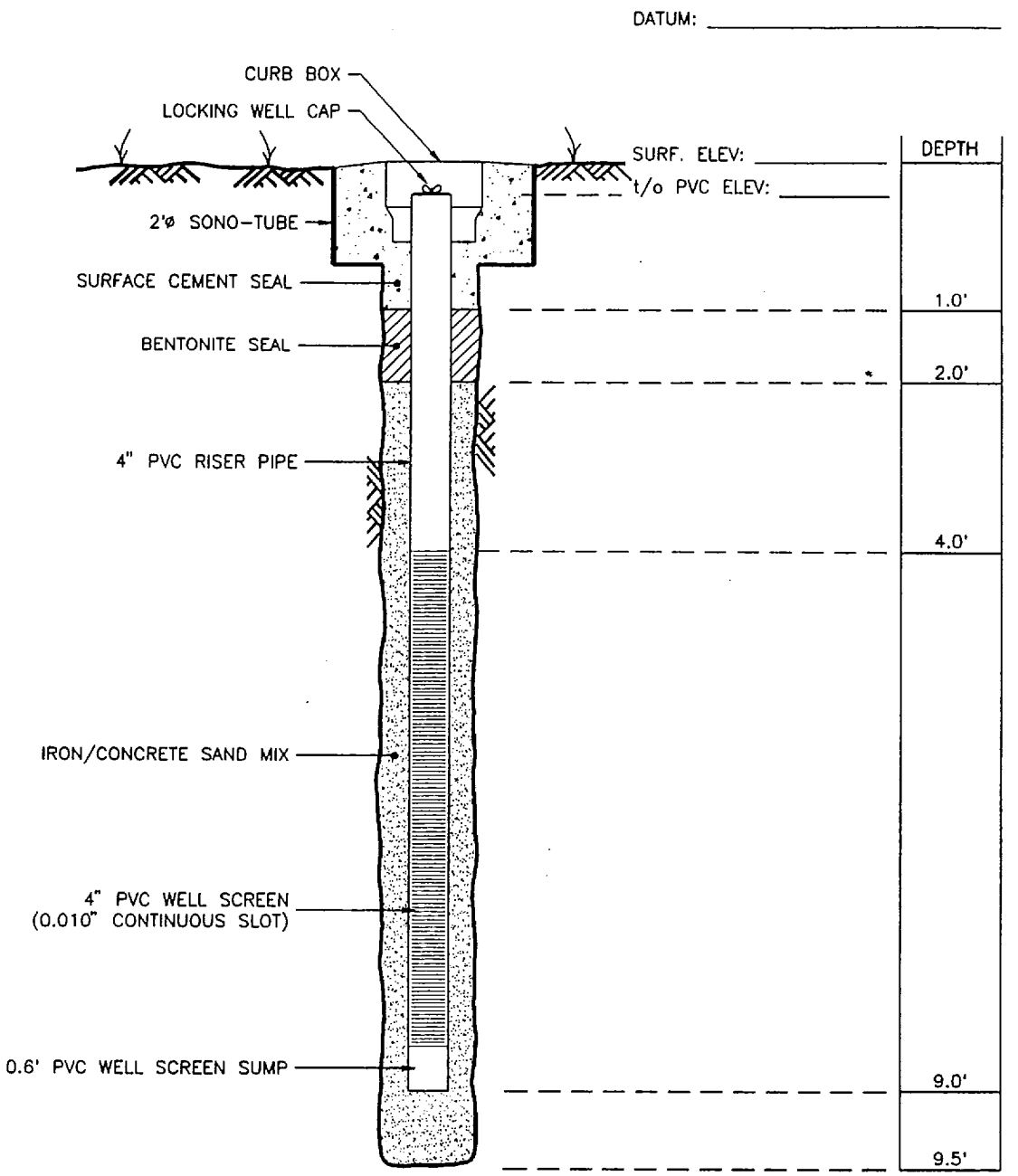
LOCATION Watervliet Arsenal
Watervliet, New York

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
								Advanced casing to 9.5' with no split spoon sampling performed and installed well.	Note #1: See attached well diagram.
5									
10								End of Boring at 9.5' Below Grade	
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 5" Casing



WELL No.
MW-47

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-47
PROJ. No.:	9850293
DRAWING No.:	

DATE .

STARTED 11/10/98

FINISHED 11/10/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC

SUBSURFACE LOG

PJT. NO. 9850293

HOLE NO. MW-48

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

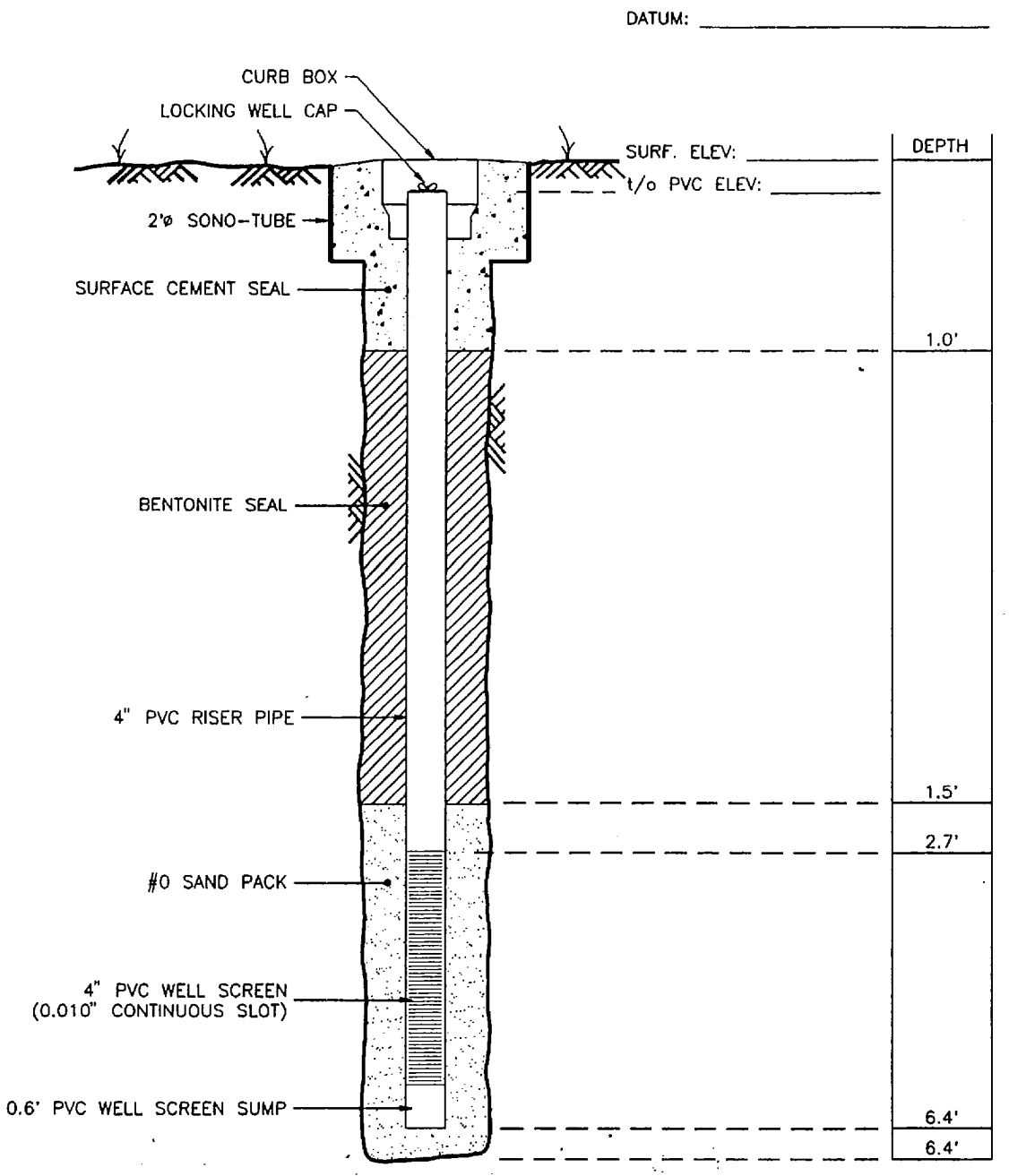
LOCATION Watervliet Arsenal
Watervliet, New York

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
								Augered to 6.5' with no split spoon sampling performed, and installed well.	Note #1: See attached well diagram.
5									
								End of Boring at 6.5' Below Grade	
10									
15									
0									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers



WELL No.
MW-48

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-48
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/5/98

'ISHED 11/5/98

,EET 1 OF 1

MAXIM TECHNOLOGIES INC **SUBSURFACE LOG**

PJT. NO. 9850293

HOLE NO. **MW-49**

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

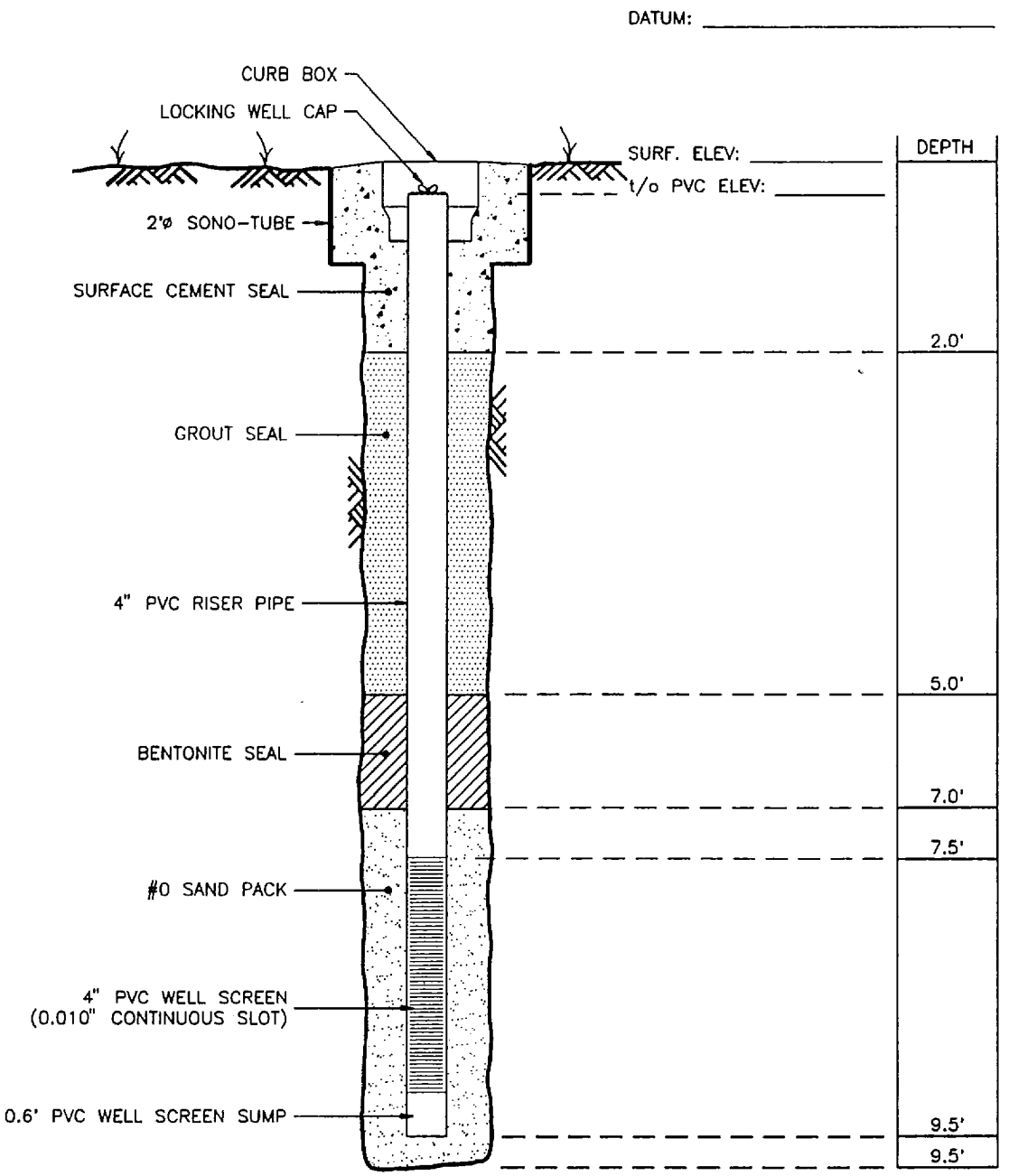
LOCATION Watervliet Arsenal
Watervliet, New York

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
									Note #1: See attached well diagram.
	1	2	3	6	67	9		Brown SILT and CLAY	
5	2	8	8	12	14	20		Rock Fragments	
	3	25	37	27	54	64		Rock Weathered BEDROCK at 6.5' Below Grade	
10								End of Boring at 9.4' Below Grade	
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers



WELL No.
MW-49

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-49
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/5/98

FINISHED 11/5/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC **SUBSURFACE LOG**

PJT. NO. 9850293

HOLE NO. MW-50

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

LOCATION Watervliet Arsenal
Watervliet, New York

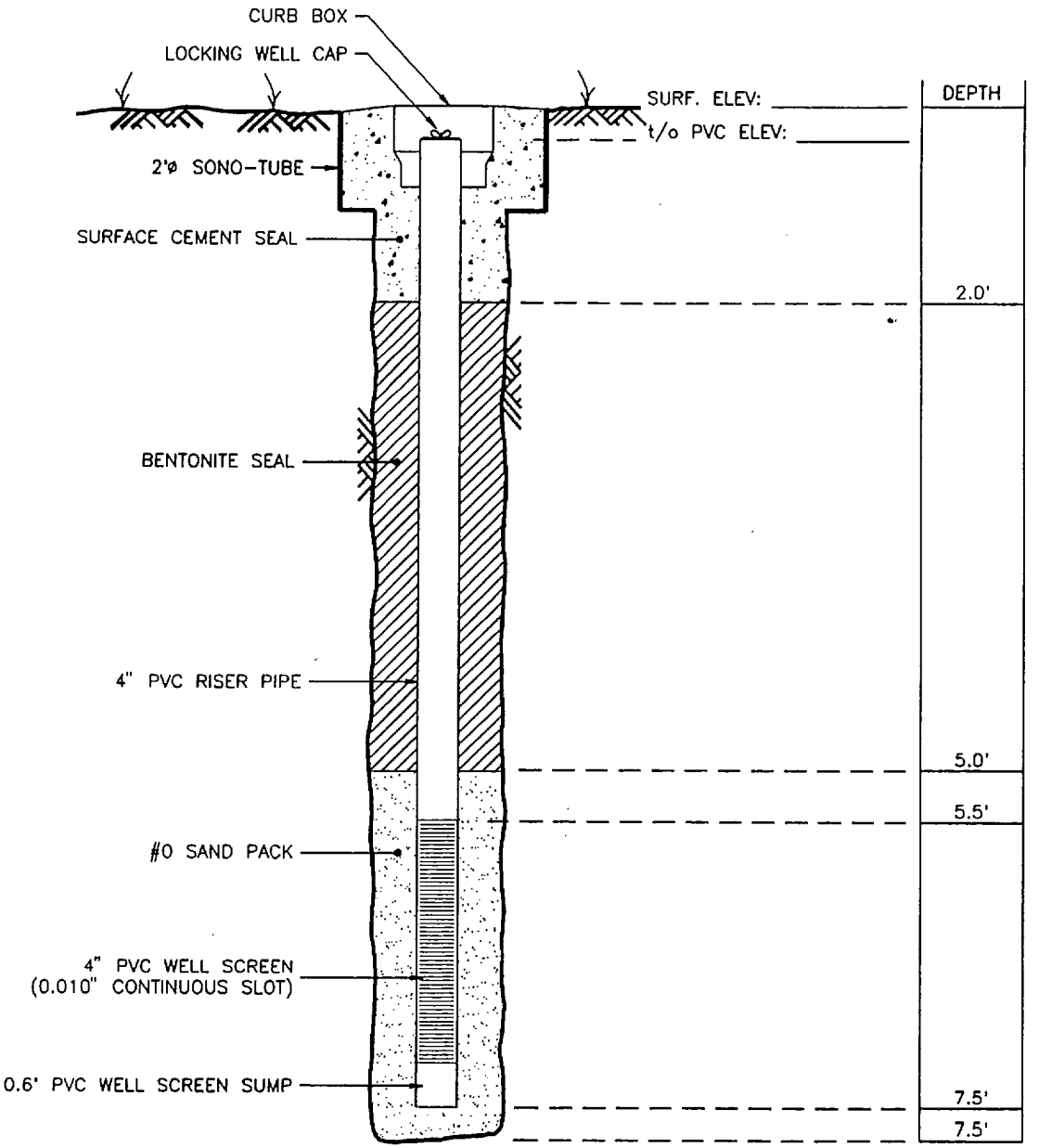
DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
									Note #1: See attached well diagram.
	1	5	5	8	9	13	1.0	Brown SILT and CLAY	
5	2	4	8	11	22	19		Similar with sand and gravel	
	3	38	40					Weathered BEDROCK at 5.3' Below Grade	
								End of Boring at 7.4' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers

DATUM: _____



WELL No.
MW-50

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-50
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/10/98

FINISHED 11/10/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC SUBSURFACE LOG

PJT. NO. 9850293

HOLE NO. MW-51

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

LOCATION Watervliet Arsenal
Watervliet, New York

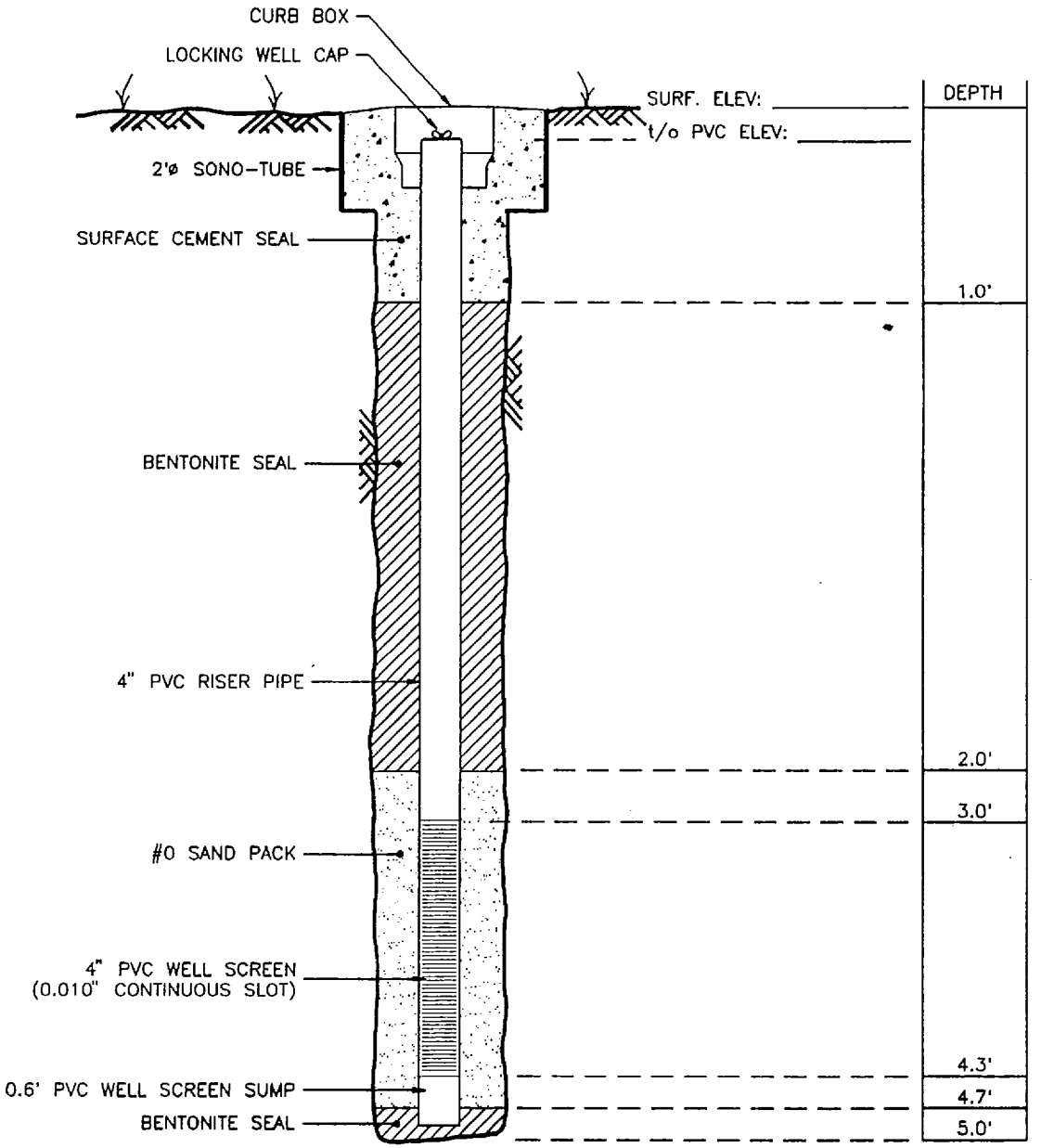
DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
5								Augered to 5.0' with no split spoon sampling performed, and installed well.	Note #1: See attached well diagram.
								End of Boring 5.0' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers

DATUM: _____



WELL No. MW-51

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-51
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/9/98

FINISHED 11/9/98

'EET 1 OF 1

MAXIM TECHNOLOGIES INC — **SUBSURFACE LOG**

PJT. NO. 9850293

HOLE NO. MW-52

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

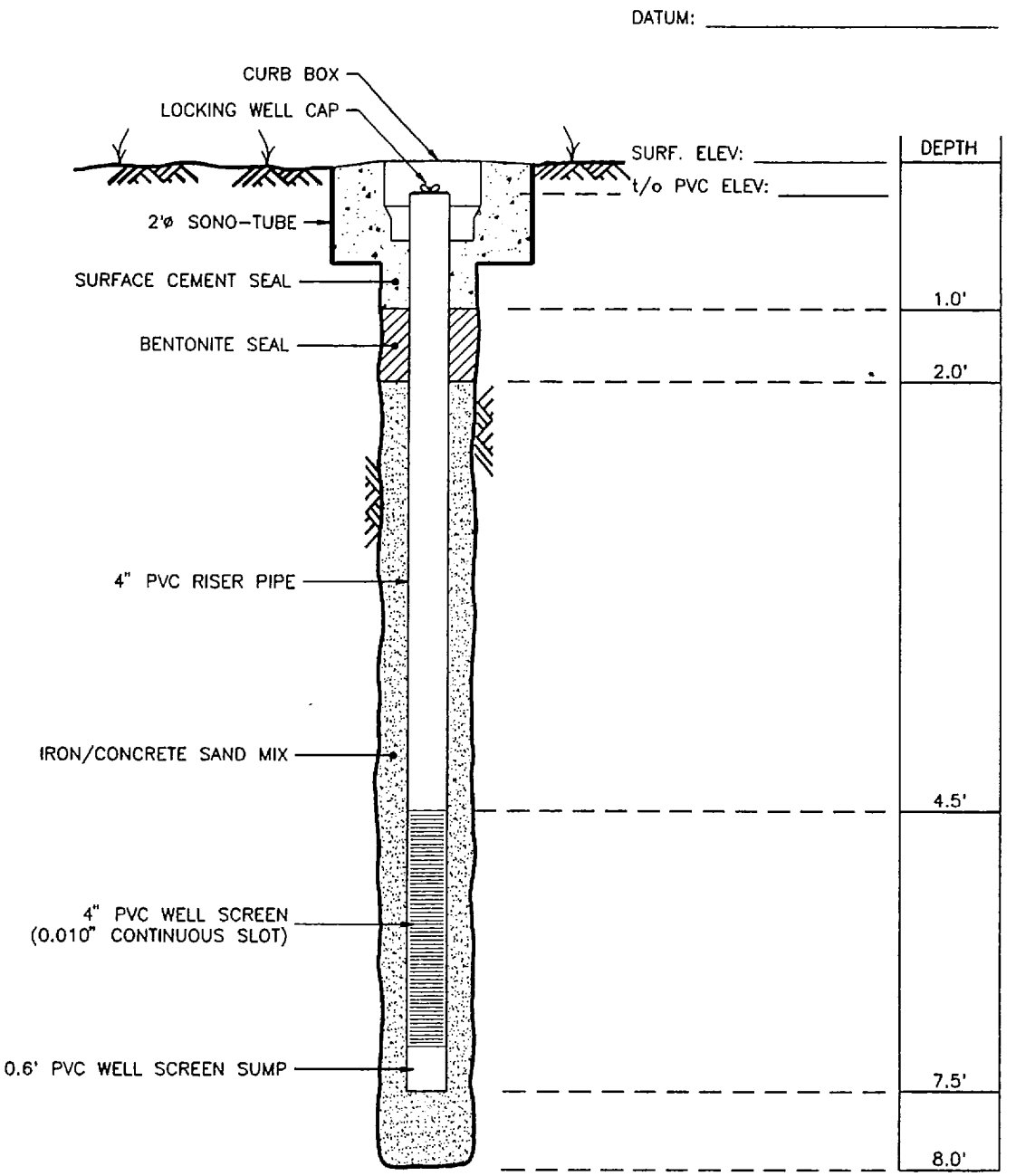
LOCATION Watervliet Arsenal
Watervliet, New York

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
								Advanced casing to 8.0' with no split spoon sampling performed, and installed well.	Note #1: See attached well diagram.
5									
								End of Boring at 8.0' Below Grade	
10									
15									
J									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 5" Casing



WELL No.
MW-52

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-52
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/10/98

FINISHED 11/10/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC **SUBSURFACE LOG**

PJT. NO. 9850293

HOLE NO. MW-53

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

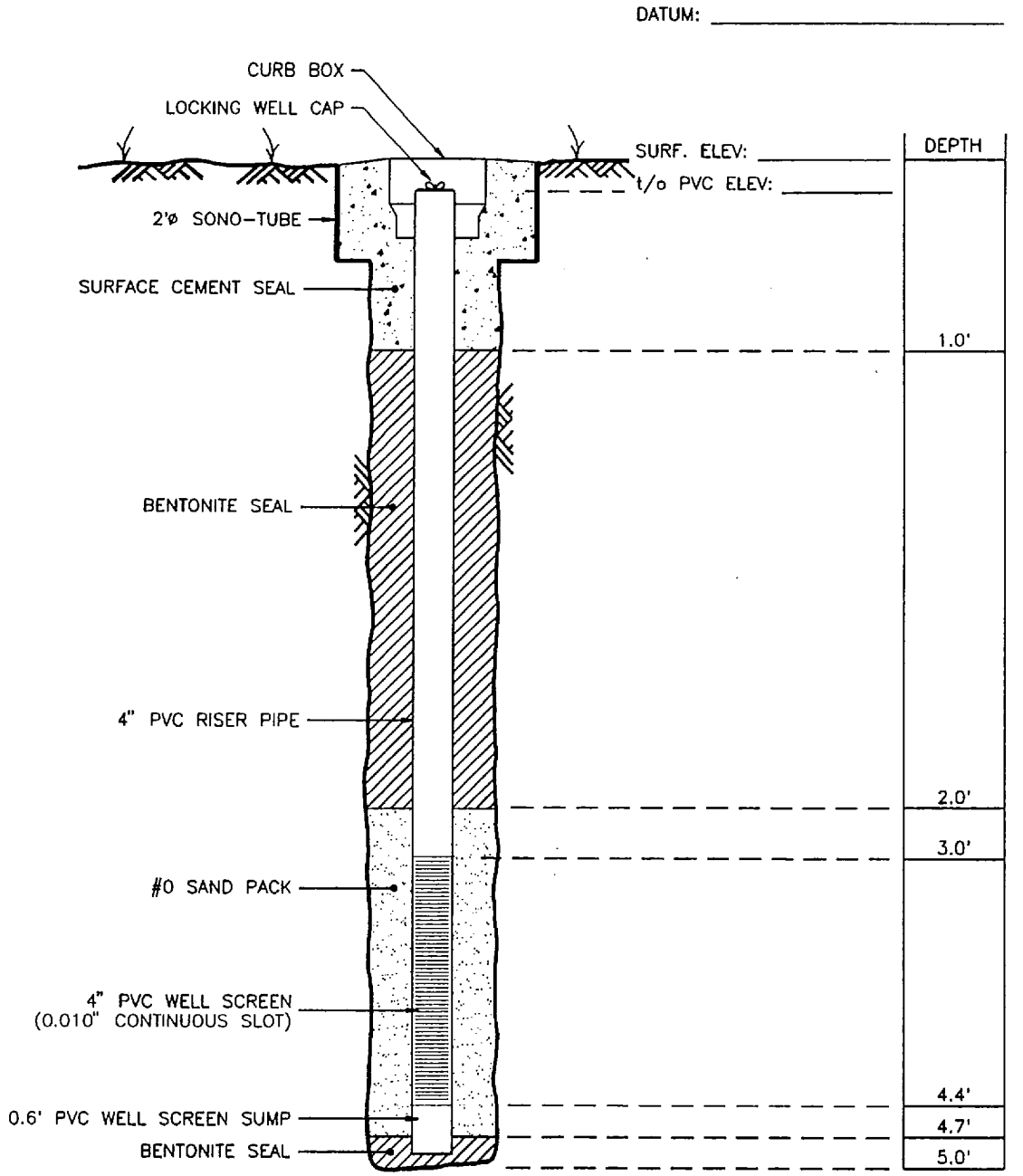
LOCATION Watervliet Arsenal
Watervliet, New York

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
								Augered to 5.0' with no split spoon sampling performed, and installed well.	Note #1: See attached well diagram.
5								End of Boring 5.0' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE: Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers



WELL No.
MW-53

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-53
PROJ. No.:	9850293
DRAWING No.	

DATE

STARTED 11/5/98

FINISHED 11/5/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC — **SUBSURFACE LOG**

PJT. NO. 9850293

HOLE NO. **MW-54**

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

LOCATION Watervliet Arsenal
Watervliet, New York

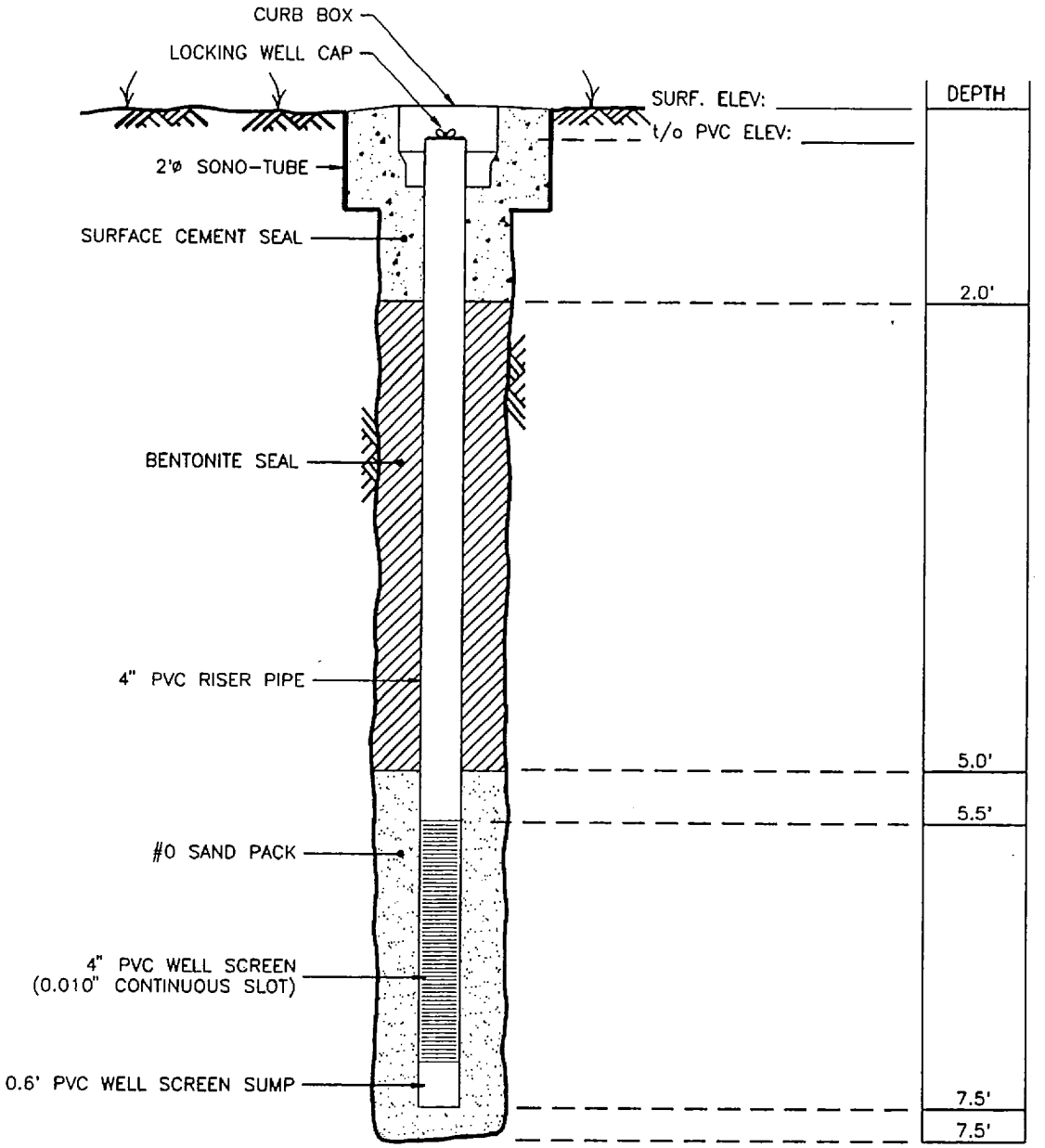
DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
									Note #1: See attached well diagram.
	1	2	3	5	8	8		Brown SILT and CLAY	
5	2	3	9	15	26	24		Similar	
								Weathered BEDROCK at 4.4' Below Grade	
	3	23	19	27				Rock Fragments	
								End of Boring at 7.5' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers

DATUM: _____



WELL No.
MW-54

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-54
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/10/98

FINISHED 11/10/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC

SUBSURFACE LOG

PJT. NO. 9850293

HOLE NO. MW-55

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

LOCATION Watervliet Arsenal
Watervliet, New York

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
0								Augered to 7.0' with no split spoon sampling performed, and installed well.	Note #1: See attached well diagram.
5									
								End of Boring 7.0' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW

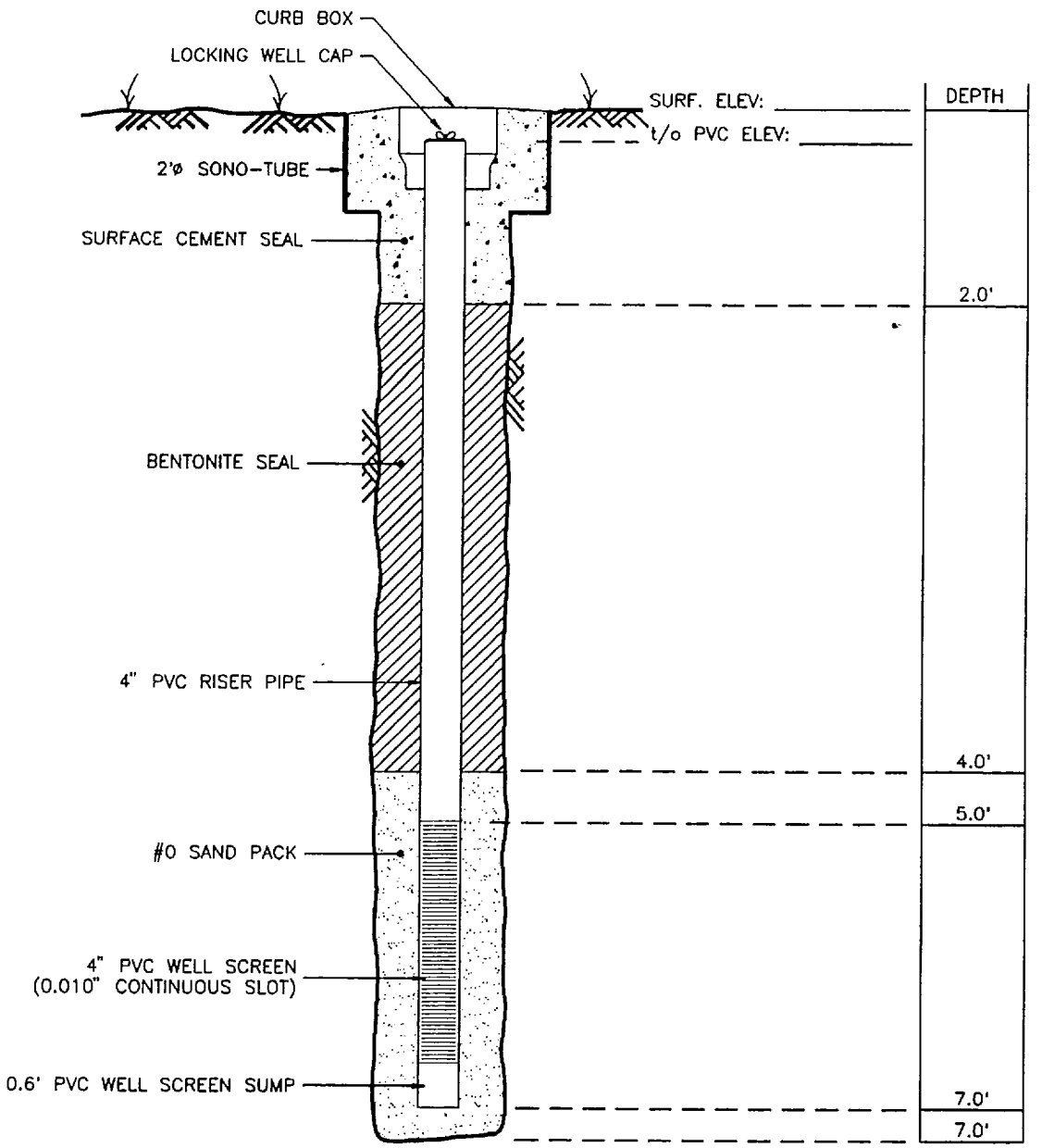
CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt

DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers

DATUM: _____



WELL No.
MW-55

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-55
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/10/98

FINISHED 11/10/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC — **SUBSURFACE LOG**

PJT. NO. 9850293

HOLE NO. MW-56

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

LOCATION Watervliet Arsenal
Watervliet, New York

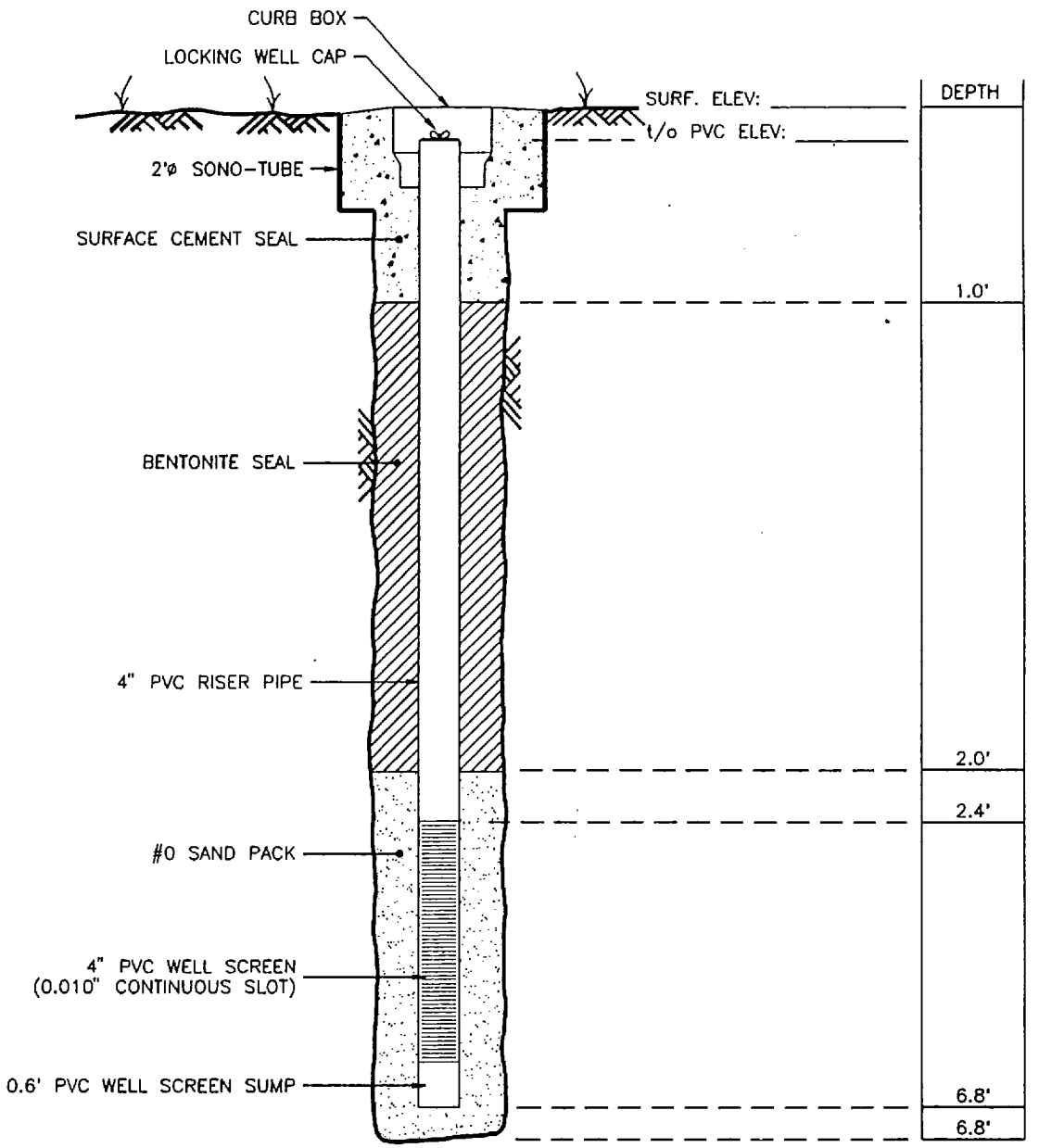
DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
	1	7	9	12	25	21			Note #1: See attached well diagram.
5	2	21	36	50	63	86		Weathered BEDROCK at 4.5' Below Grade	
								End of Boring 7.0' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers

DATUM: _____



WELL No. MW-56

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-56
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/9/98

FINISHED 11/9/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC SUBSURFACE LOG

PJT. NO. 9850293

HOLE NO. MW-57

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

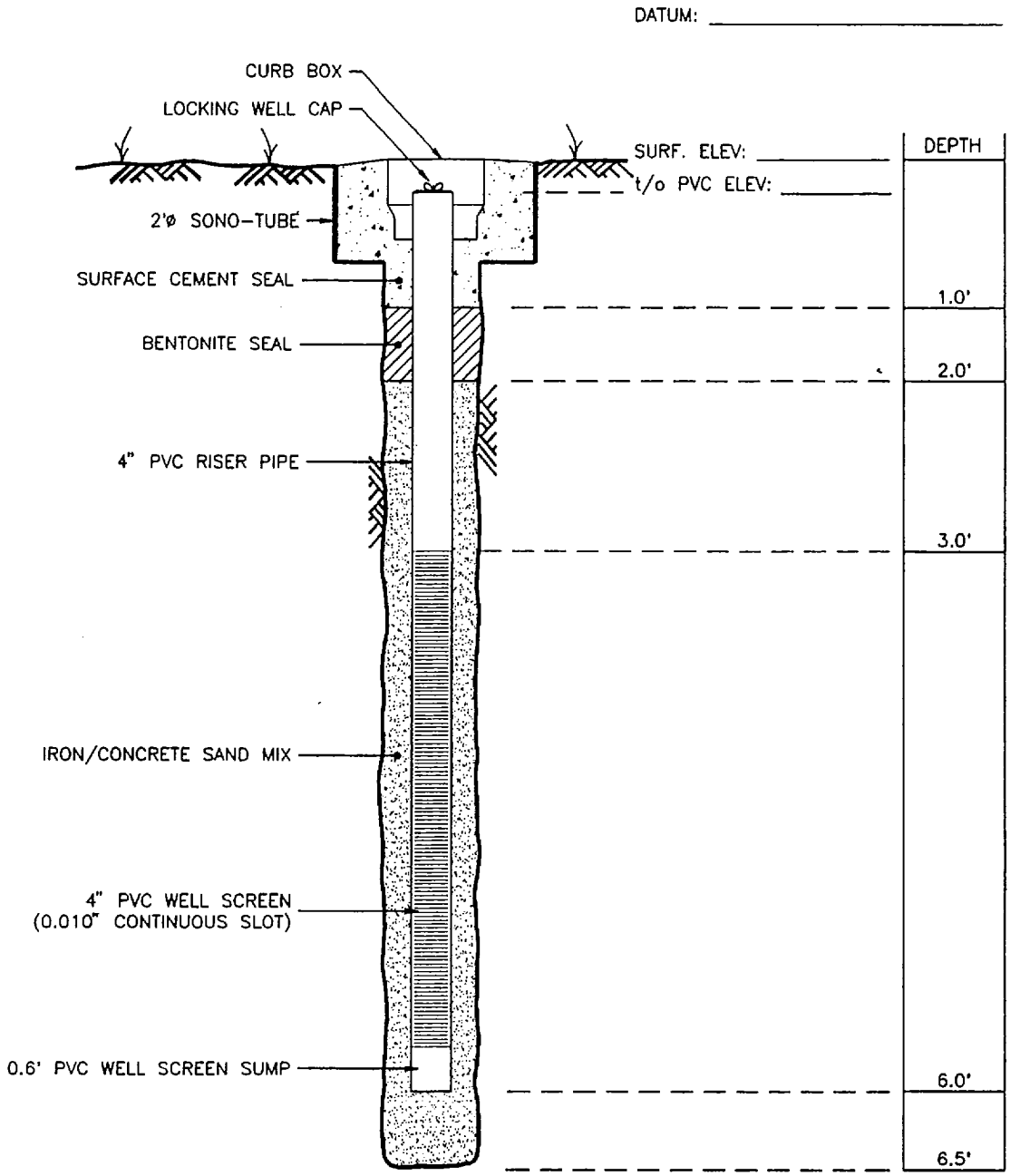
LOCATION Watervliet Arsenal
Watervliet, New York

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
								Drove 5" Casing to 6.5' with no split spoon sampling performed, and installed well.	Note #1: See attached well diagram.
5								End of Boring 6.5' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 5" Casing



WELL No.
MW-57

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-57
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/10/98

FINISHED 11/10/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC

SUBSURFACE LOG

PJT. NO. 9850293

HOLE NO. MW-59

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

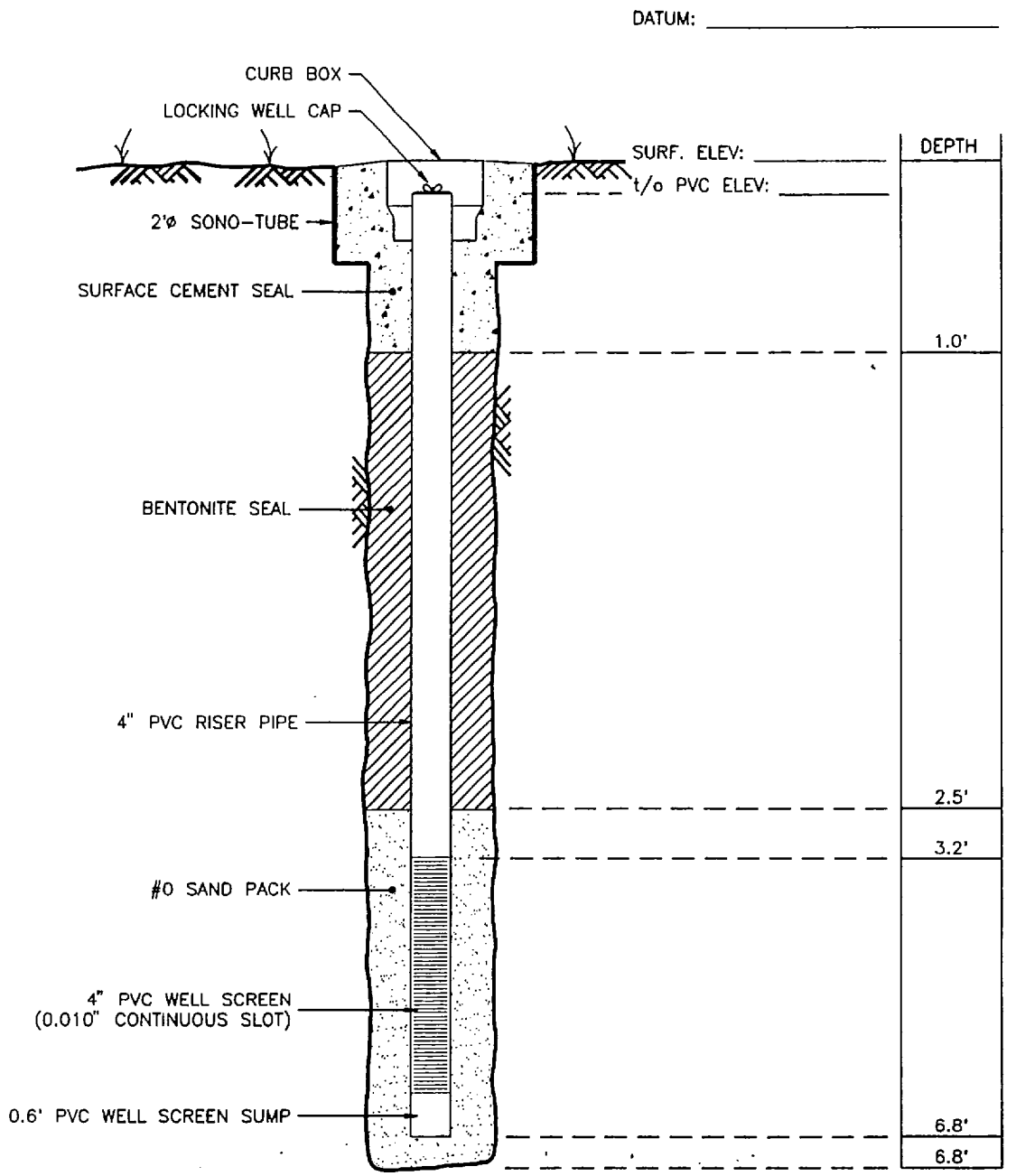
LOCATION Watervliet Arsenal
Watervliet, New York

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
									Note #1: See attached well diagram.
	1	13	32	32	40	64		Weathered BEDROCK at 2.2' Below Grade	
5	2	40	42	75					
								End of Boring 6.5' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers



WELL No.
MW-59

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-59
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/5/98

FINISHED 11/5/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC **SUBSURFACE LOG**

PJT. NO. 9850293

HOLE NO. **MW-60**

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

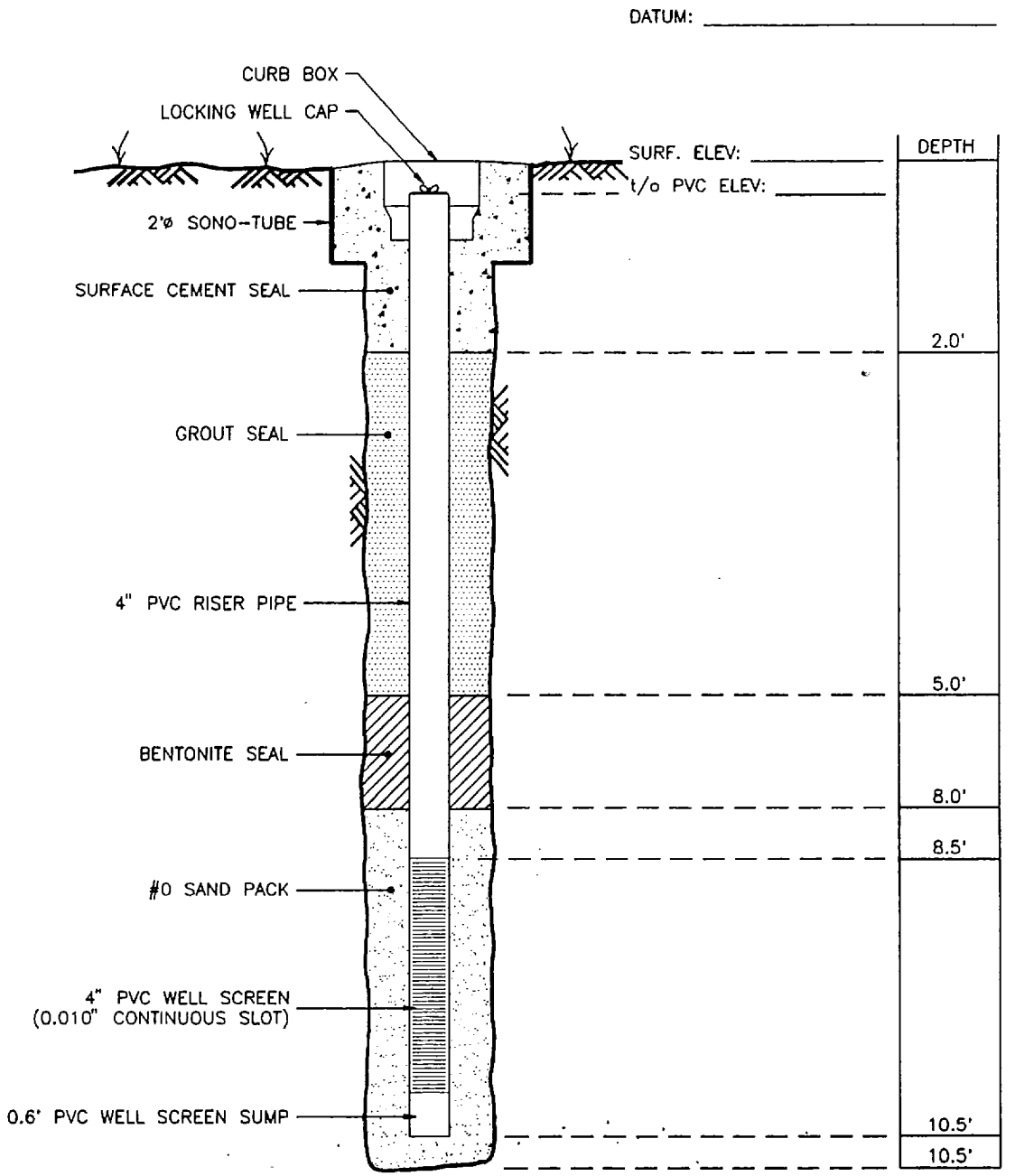
LOCATION Watervliet Arsenal
Watervliet, New York

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
									Note #1: See attached well diagram.
	1	8	9	9	8	18			
5	2	2	2	6	2	8			
	3	2	4	2	7	6			
	4	3	7	17	100/.5	24		Weathered BEDROCK at 8.0' Below Grade	
10								End of Boring at 10.5' Below Grade	
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers



WELL No.
MW-60

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-60
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/13/98

INISHED 11/13/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC **SUBSURFACE LOG**

PJT. NO. 9850293

HOLE NO. MW-61

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

LOCATION Watervliet Arsenal
Watervliet, New York

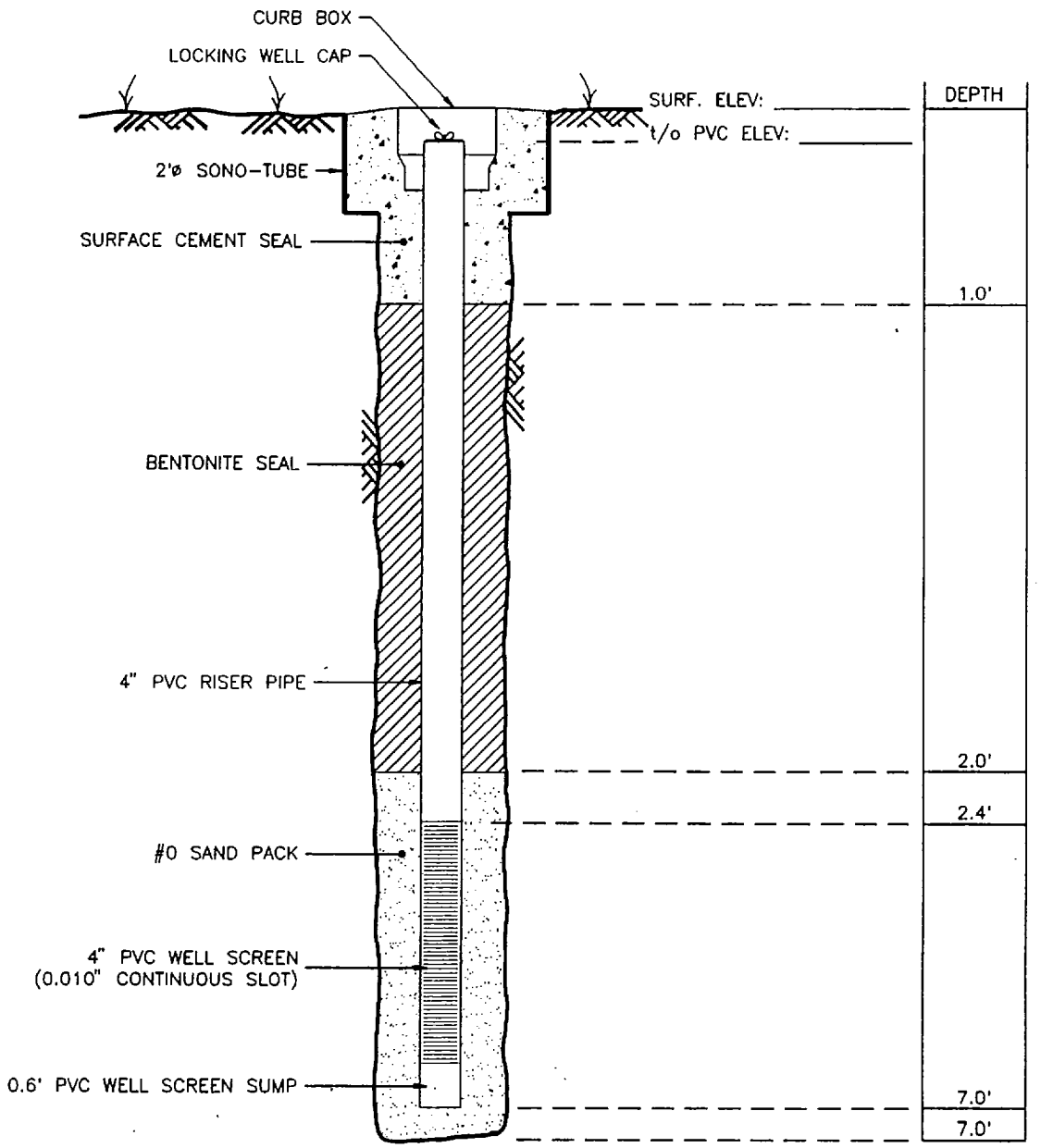
DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
								Augered to 7.0' with no split spoon sampling performed, and installed well.	Note #1: See attached well diagram.
5									
								End of Boring at 7.0' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers

DATUM: _____



WELL No.
MW-61

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-61
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/9/98

FINISHED 11/9/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC SUBSURFACE LOG

PJT. NO. 9850293

HOLE NO. MW-62

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

LOCATION Watervliet Arsenal
Watervliet, New York

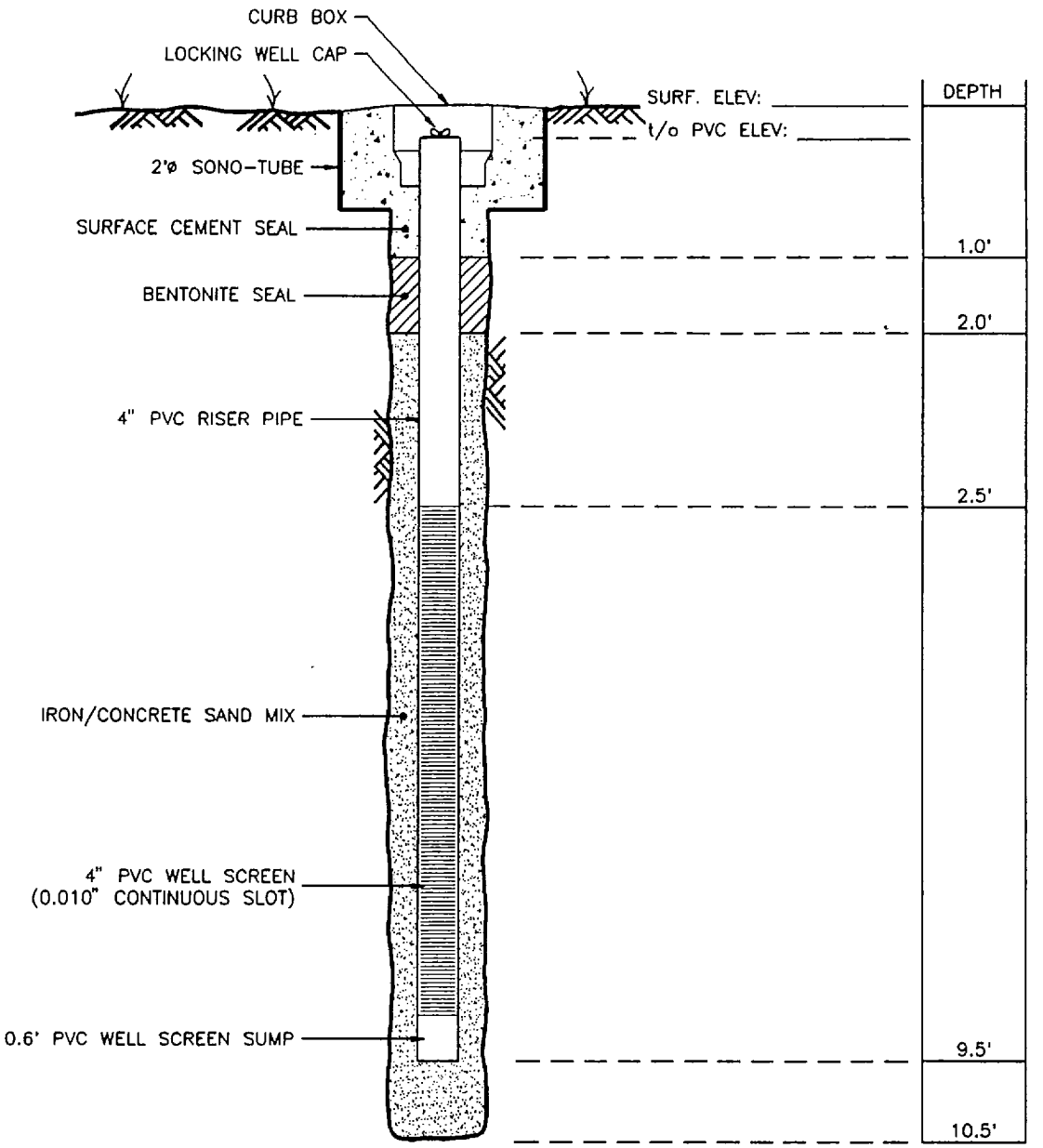
DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
								Drove 5" Casing to 10.5' with no split spoon sampling performed, and installed well.	Note #1: See attached well diagram.
5									
10								End of Boring at 10.5' Below Grade	
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 5" Casing

DATUM: _____



WELL No.
MW-62

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-62
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/13/98

FINISHED 11/13/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC

SUBSURFACE LOG

PJT. NO. 9850293

HOLE NO. MW-63

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

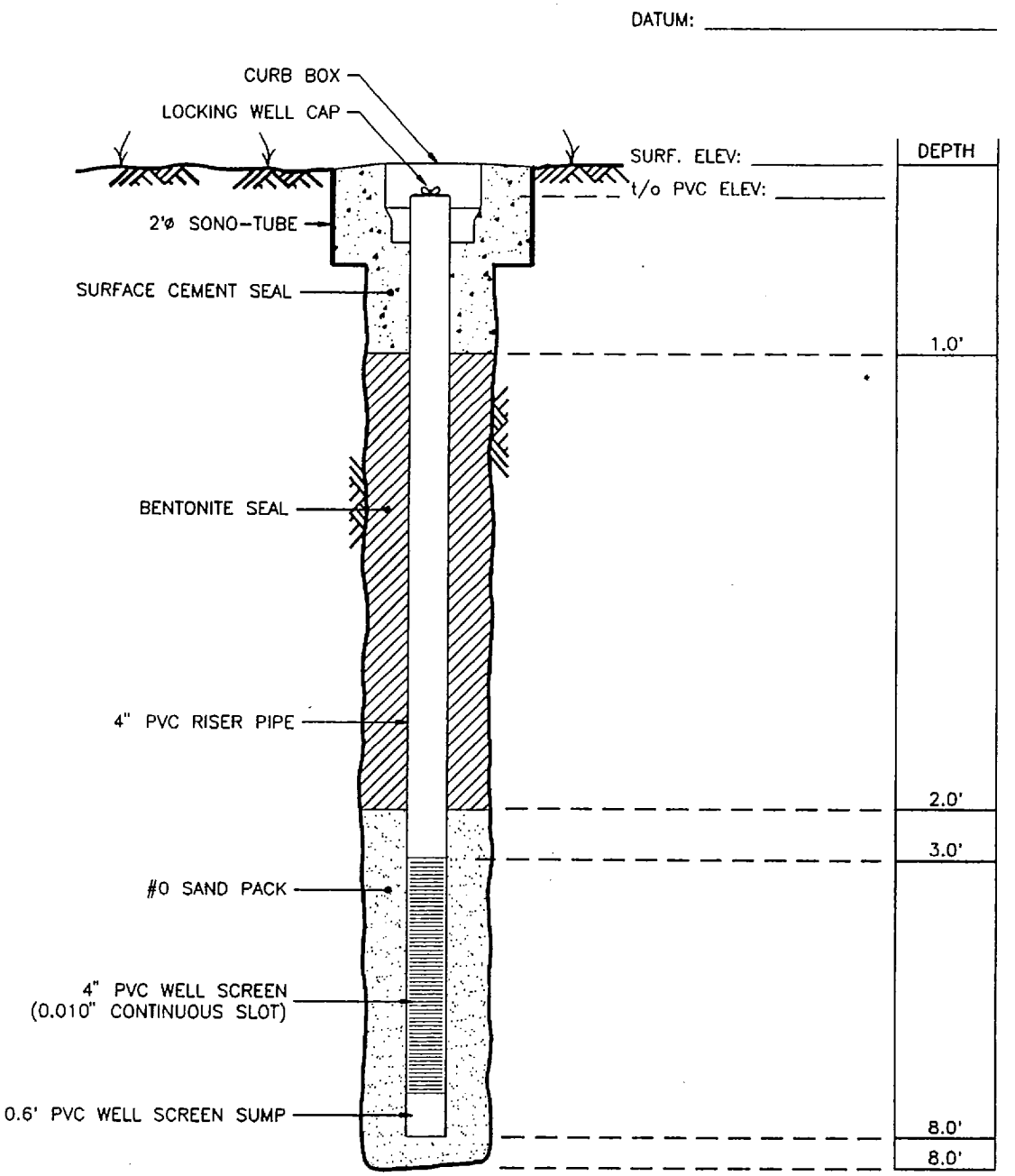
LOCATION Watervliet Arsenal
Watervliet, New York

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
								Augered to 8.0' with no split spoon sampling performed, and installed well.	Note #1: See attached well diagram.
5									
								End of Boring at 8.0' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers



WELL No.
MW-63

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-63
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/13/98

FINISHED 11/13/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC **SUBSURFACE LOG**

PJT. NO. 9850293

HOLE NO. MW-64

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

LOCATION Watervliet Arsenal
Watervliet, New York

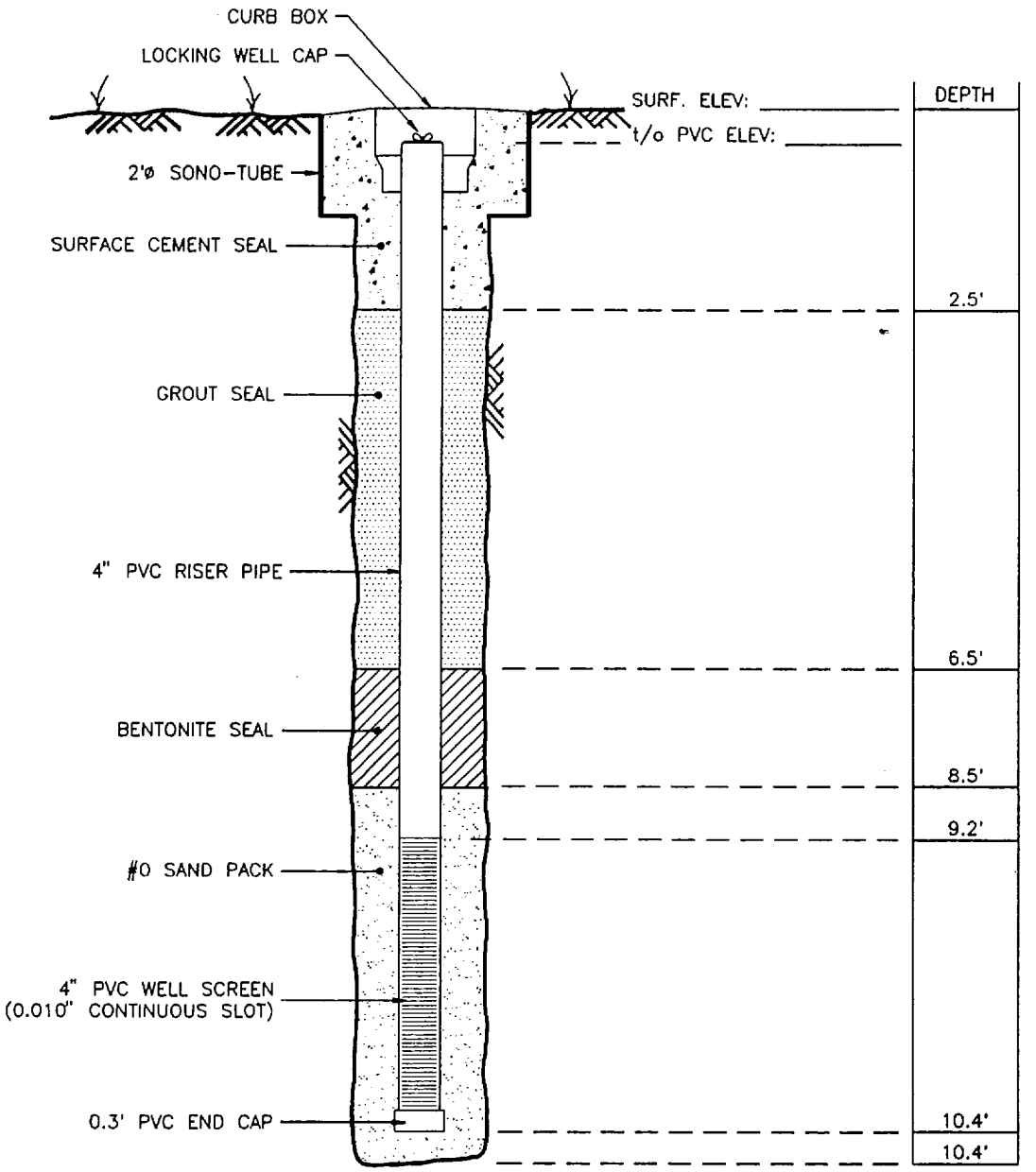
DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
									Note #1: See attached well diagram.
	1	2	7	9	10	16			
5	2	1	1	2	2	3			
	3	2	5	8	9	13			
	4	4	18	100/.4					
10								Weathered BEDROCK at 9.0' Below Grade	
								End of Boring at 10.5' Below Grade	
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers

DATUM: _____



WELL No.
MW-64

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-64
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/13/98

NISHED 11/13/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC

SUBSURFACE LOG

PJT. NO. 9850293

HOLE NO. MW-65

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

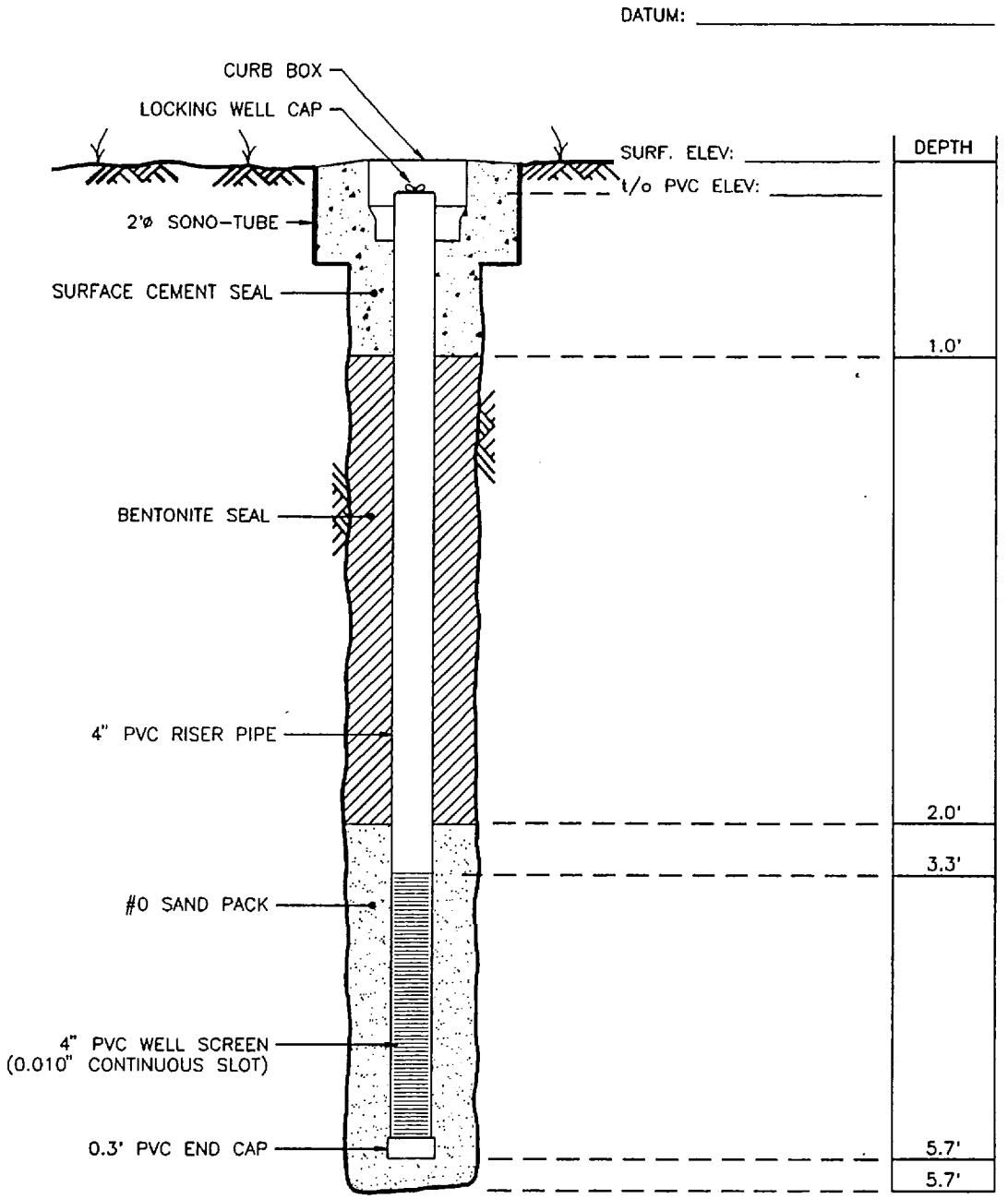
LOCATION Watervliet Arsenal
Watervliet, New York

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
								Augered to 5.0' with no split spoon sampling performed, and installed well.	Note #1: See attached well diagram.
5								End of Boring at 5.0' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers



WELL No.
MW-65

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-65
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/13/98

FINISHED 11/13/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC **SUBSURFACE LOG**

PJT. NO. 9850293

HOLE NO. MW-66

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

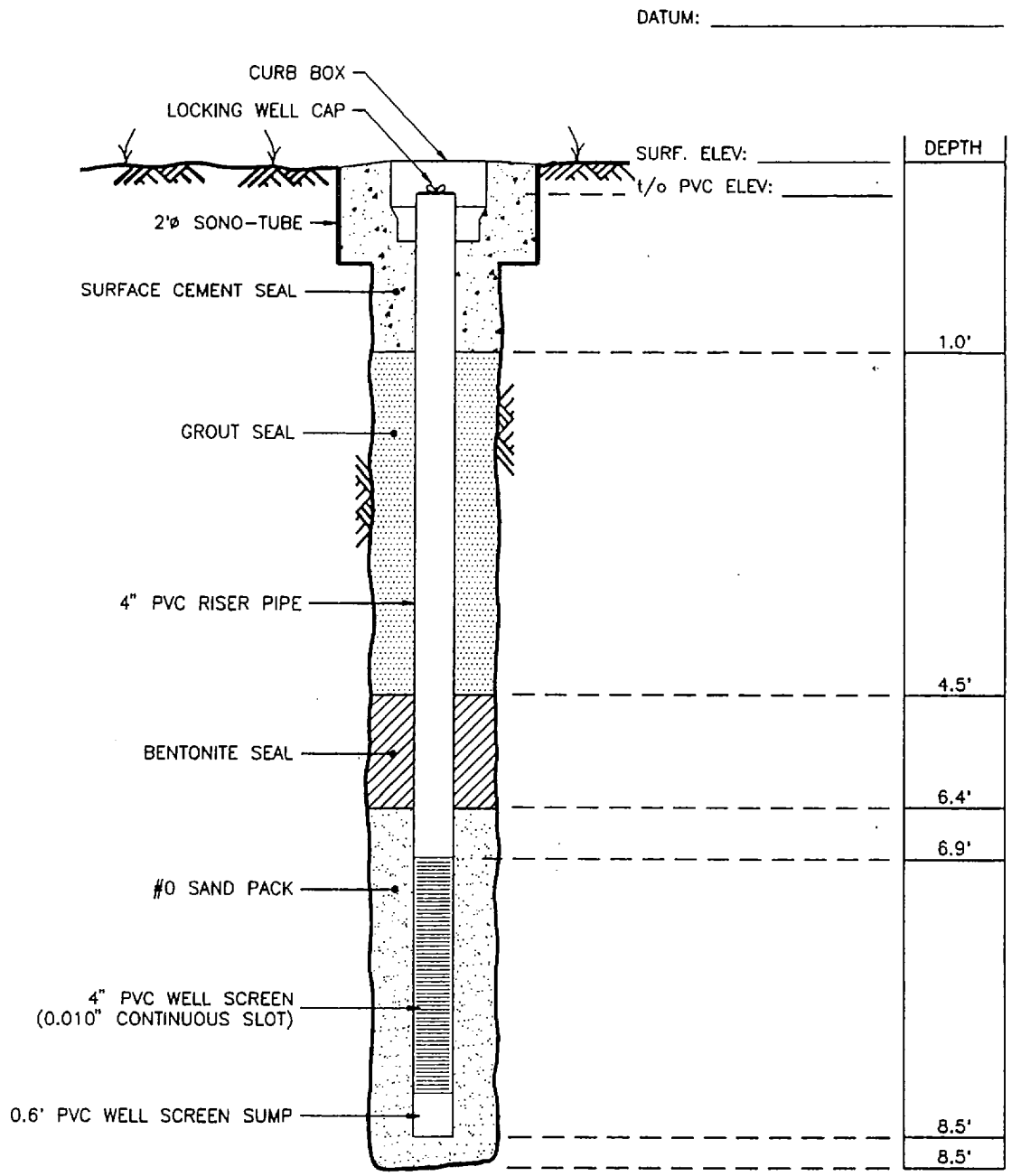
LOCATION Watervliet Arsenal
Watervliet, New York

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
	1	5	4	8	9	12			Note #1: See attached well diagram.
5	2	3	3	5	6	8			
	3	22	24	100/.3				Weathered BEDROCK at 6.0' Below Grade	
10								End of Boring at 8.5' Below Grade	
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers



WELL No.
MW-66

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-66
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/13/98

FINISHED 11/13/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC

SUBSURFACE LOG

PJT. NO. 9850293

HOLE NO. MW-67

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

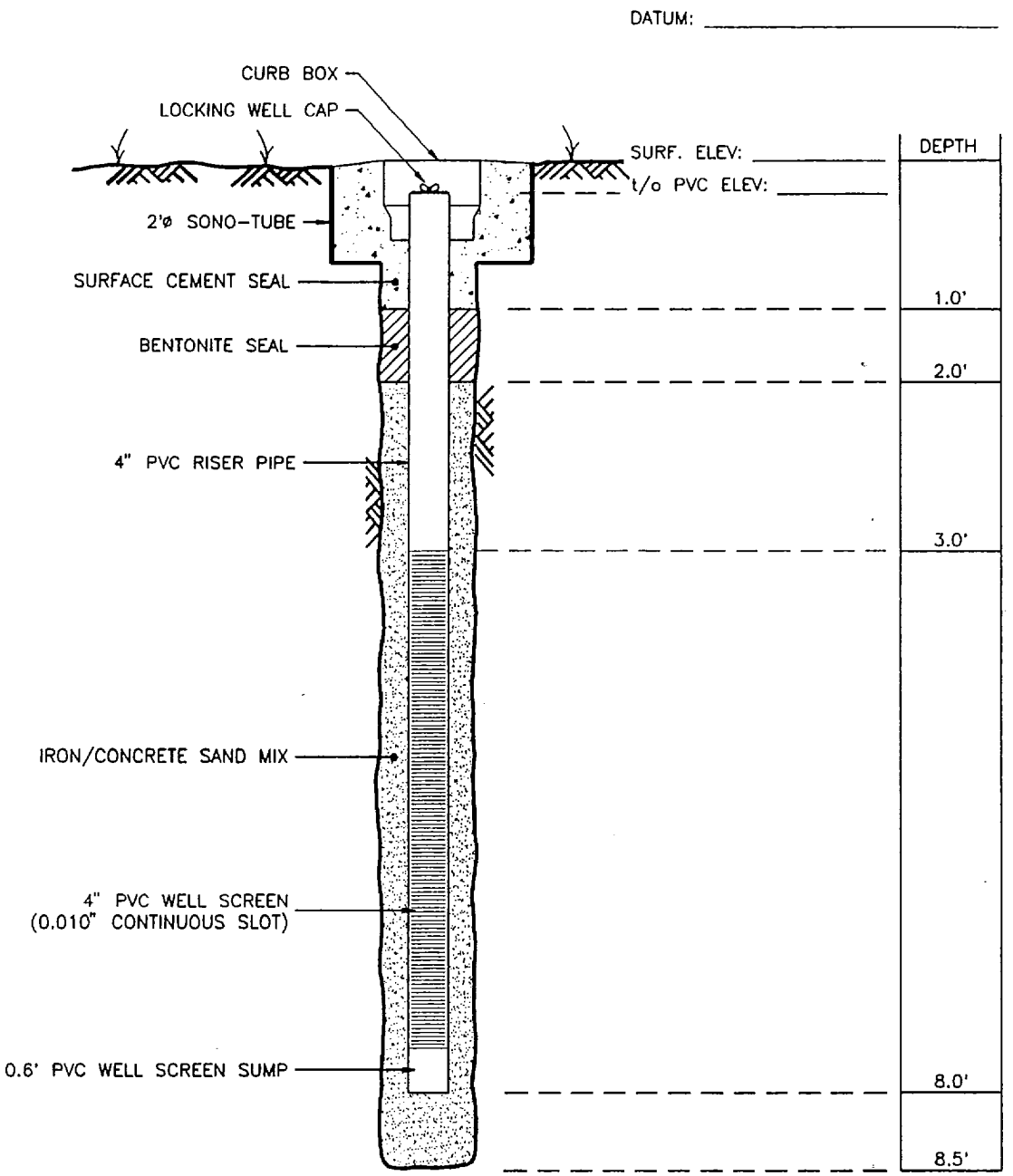
LOCATION Watervliet Arsenal
Watervliet, New York

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
								Drove 5" Casing to 8.5' with no split spoon sampling performed, and installed well.	Note #1: See attached well diagram.
5									
								End of Boring at 8.5' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 5" Casing



WELL No.
MW-67

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-67
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/12/98

FINISHED 11/12/98

EET 1 OF 1

MAXIM TECHNOLOGIES INC **SUBSURFACE LOG**

PJT. NO. 9850293

HOLE NO. MW-68

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

LOCATION Watervliet Arsenal
Watervliet, New York

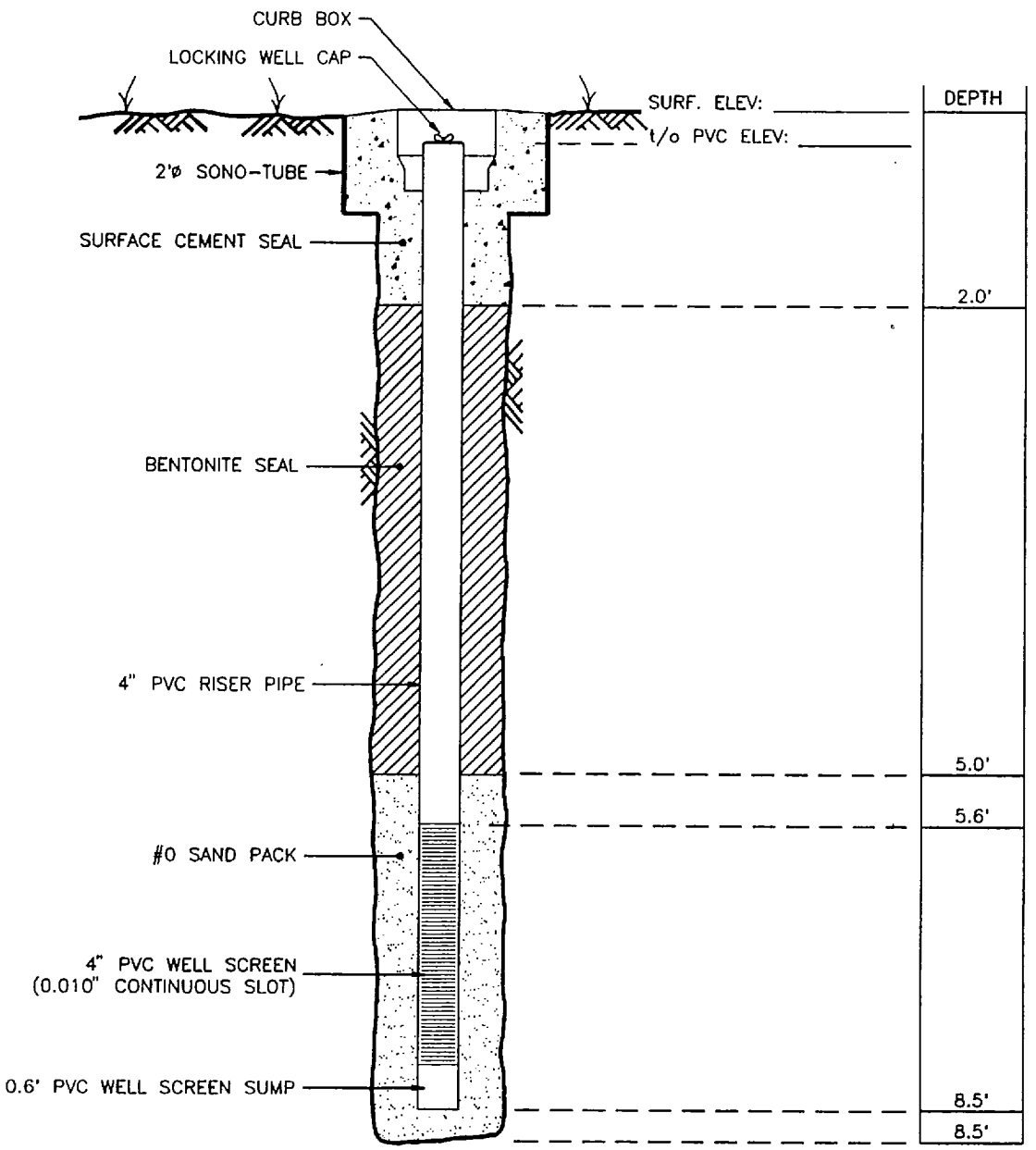
DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
	1	8	10	7	5	17			Note #1: See attached well diagram.
5	2	3	3	7	26	10			
	3	60	100/.4					Weathered BEDROCK at 5.0' Below Grade	
10								End of Boring at 8.5' Below Grade	
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers

DATUM: _____



WELL No.
MW-68

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-68
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/13/98

FINISHED 11/13/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC — **SUBSURFACE LOG**

PJT. NO. 9850293

HOLE NO. MW-69

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

LOCATION Watervliet Arsenal
Watervliet, New York

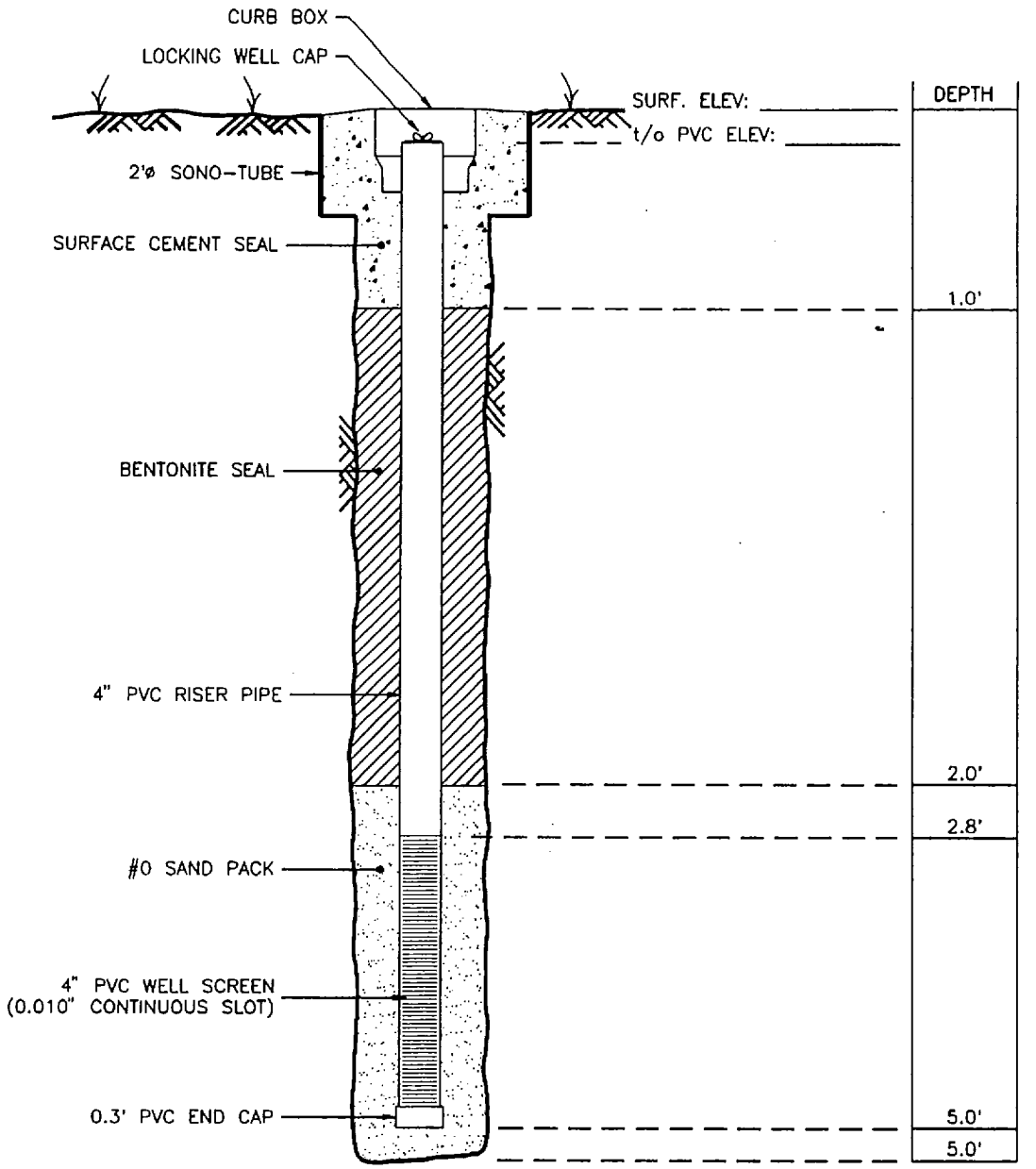
DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
5								Augered to 5.0' with no split spoon sampling performed, and installed well.	Note #1: See attached well diagram.
								End of Boring at 5.0' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers

DATUM: _____



WELL No.
MW-69

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-69
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/12/98

NISHED 11/12/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC **SUBSURFACE LOG**

PJT. NO. 9850293

HOLE NO. MW-70

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

LOCATION Watervliet Arsenal
Watervliet, New York

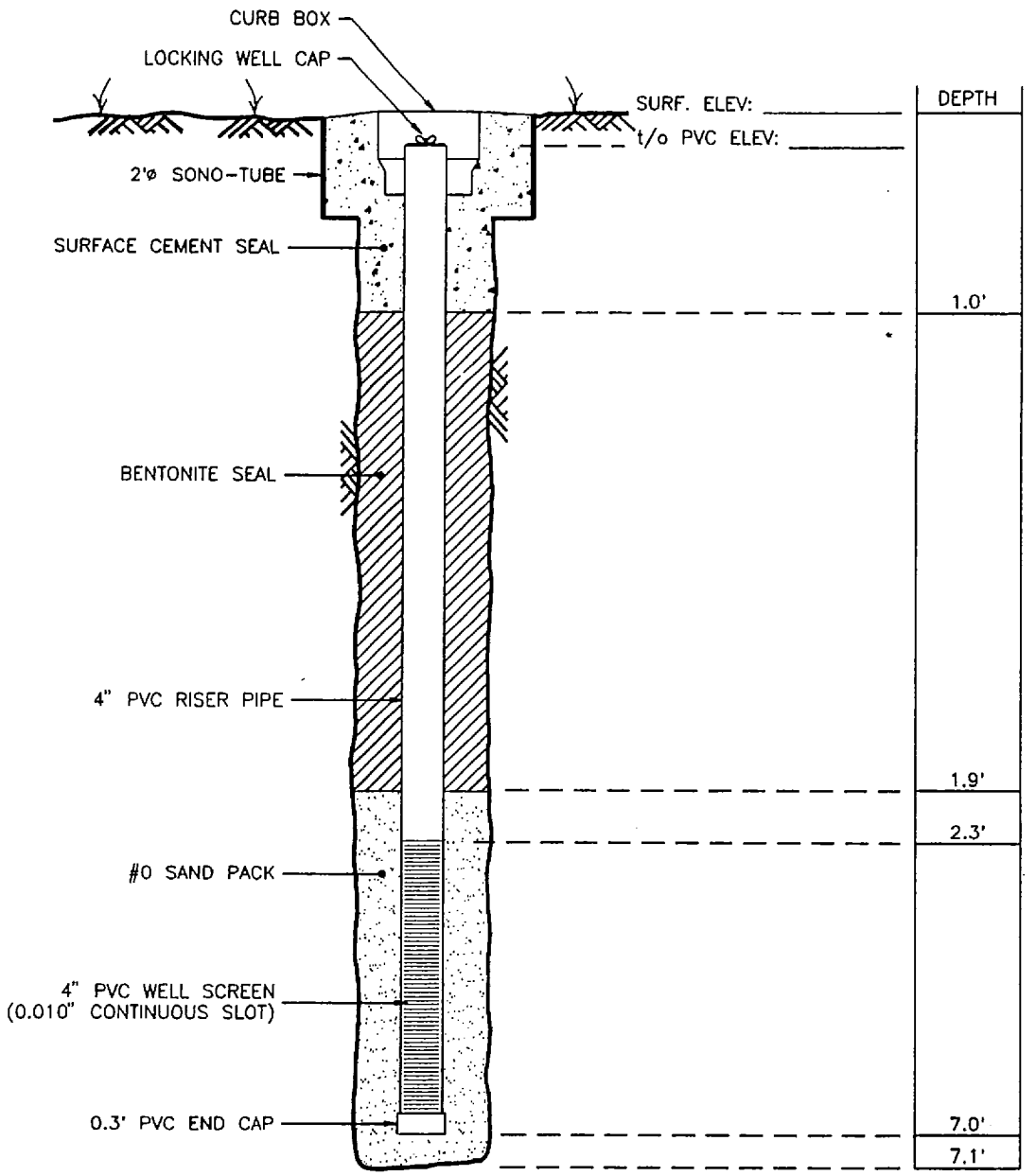
DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
								Augered to 7.5' with no split spoon sampling performed, and installed well.	Note #1: See attached well diagram.
5									
								End of Boring at 7.5' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers

DATUM: _____



WELL No.
MW-70

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-70
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/12/98

FINISHED 11/12/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC **SUBSURFACE LOG**

PJT. NO. 9850293

HOLE NO. MW-71

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

LOCATION Watervliet Arsenal
Watervliet, New York

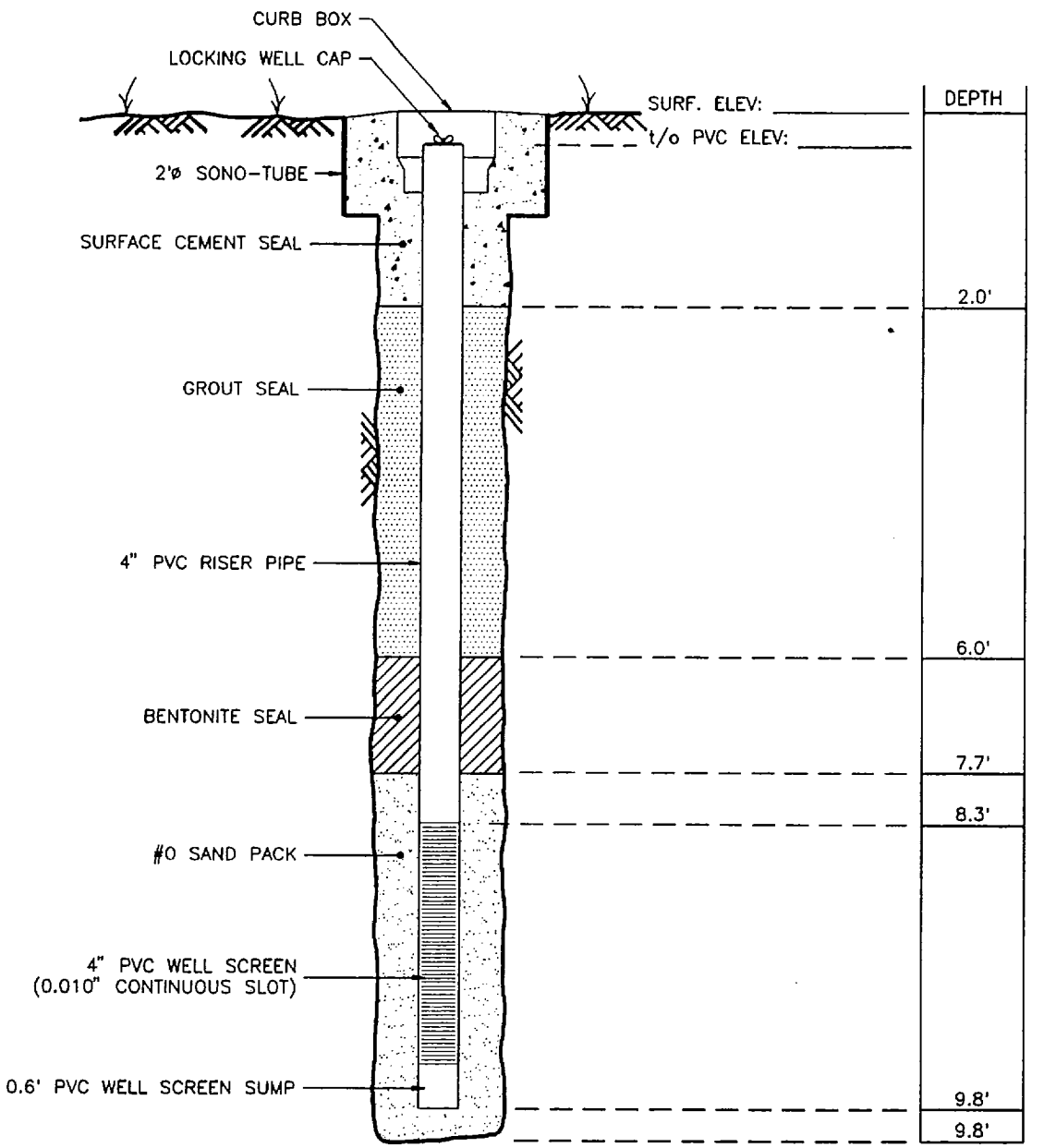
DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
	1	6	6	5	5	11			Note #1: See attached well diagram.
5	2	2	6	9	9	15			
	3	7	9	14	100/.3			Weathered BEDROCK at 7.5' Below Grade	
10								End of Boring at 9.5' Below Grade	
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers

DATUM: _____



WELL No.
MW-71

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-71
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/9/98

FINISHED 11/9/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC SUBSURFACE LOG

PJT. NO. 9850293

HOLE NO. MW-72

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

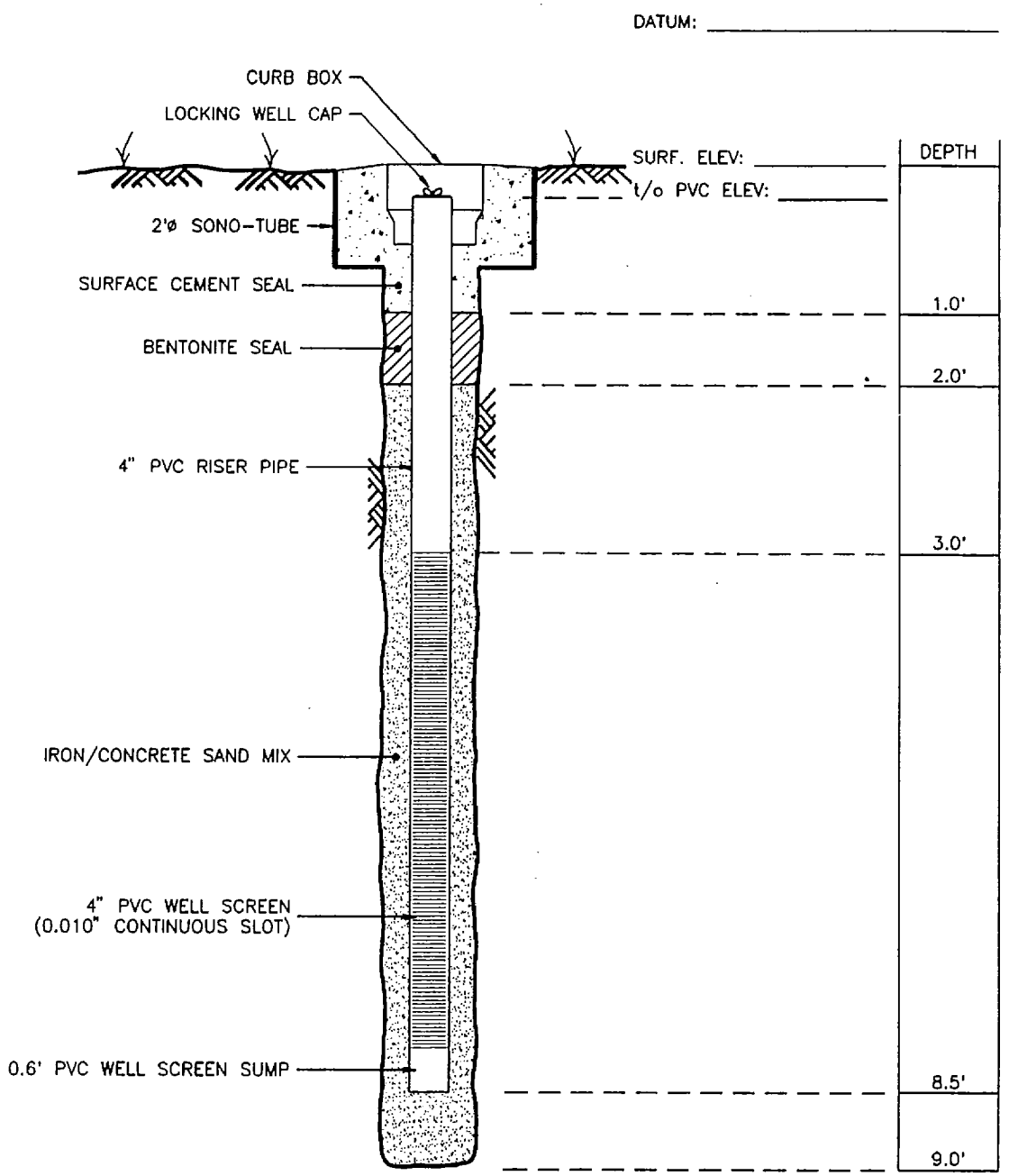
LOCATION Watervliet Arsenal
Watervliet, New York

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
								Advanced casing to 8.0' with no split spoon sampling performed, and installed well.	Note #1: See attached well diagram.
5									
								End of Boring at 8.0' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 5" Casing



WELL No.
MW-72

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-72
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/12/98

FINISHED 11/12/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC **SUBSURFACE LOG**

PJT. NO. 9850293

HOLE NO. MW-73

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

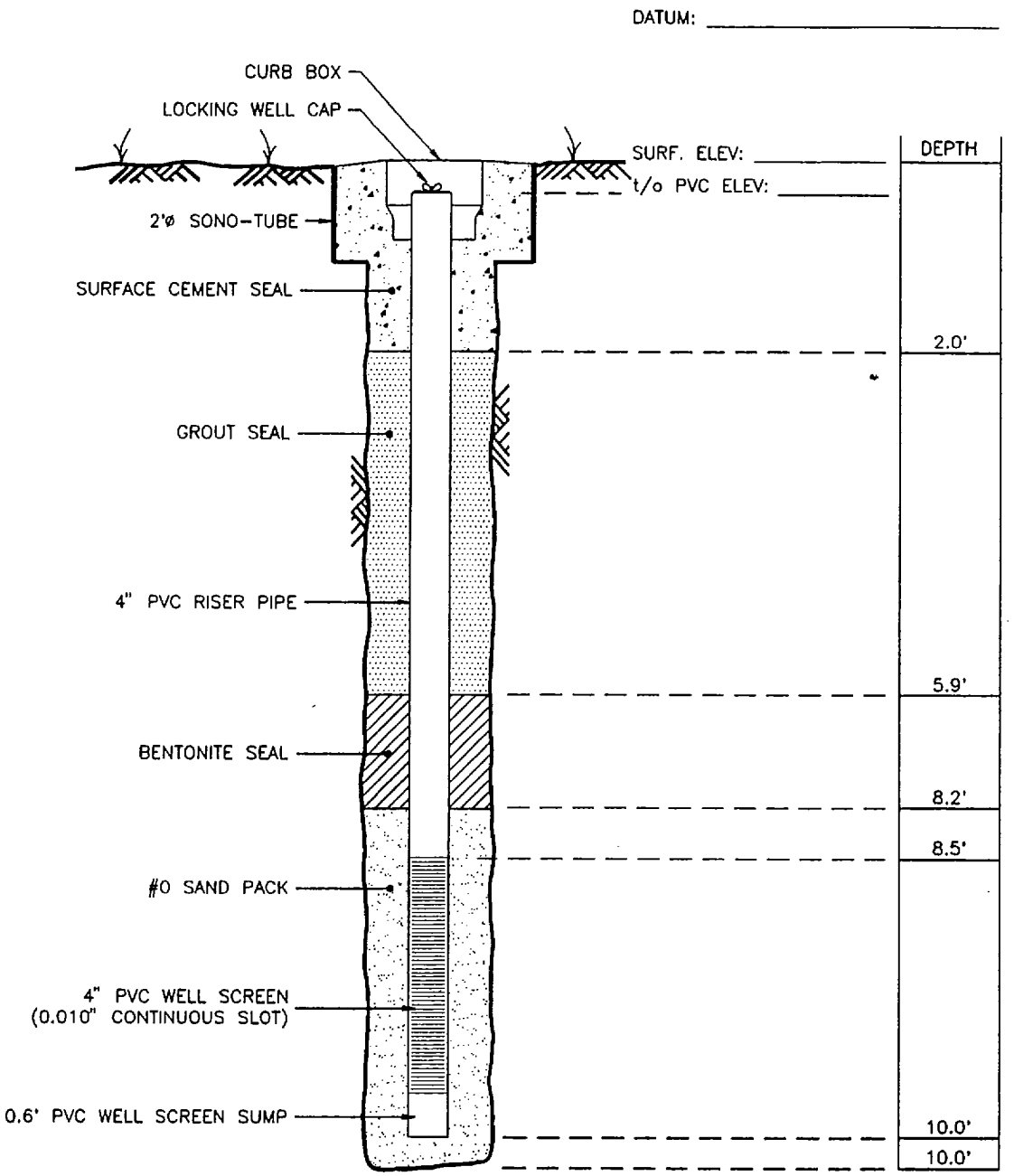
LOCATION Watervliet Arsenal
Watervliet, New York

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
									Note #1: See attached well diagram.
	1	12	15	9	11	24			
5	2	4	7	9	10	15			
	3	12	12	14	25	26			
	4	12	14	26	100/.2	40		Weathered BEDROCK at 8.0' Below Grade	
10								End of Boring at 10.0' Below Grade	
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers



WELL No.
MW-73

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-73
PROJ. No.:	9850293
DRAWING No.:	

DATE
STARTED 11/12/98
FINISHED 11/12/98
SHEET 1 OF 1

MAXIM TECHNOLOGIES INC SUBSURFACE LOG

PJT. NO. 9850293
HOLE NO. MW-74
SURF. ELEV
G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

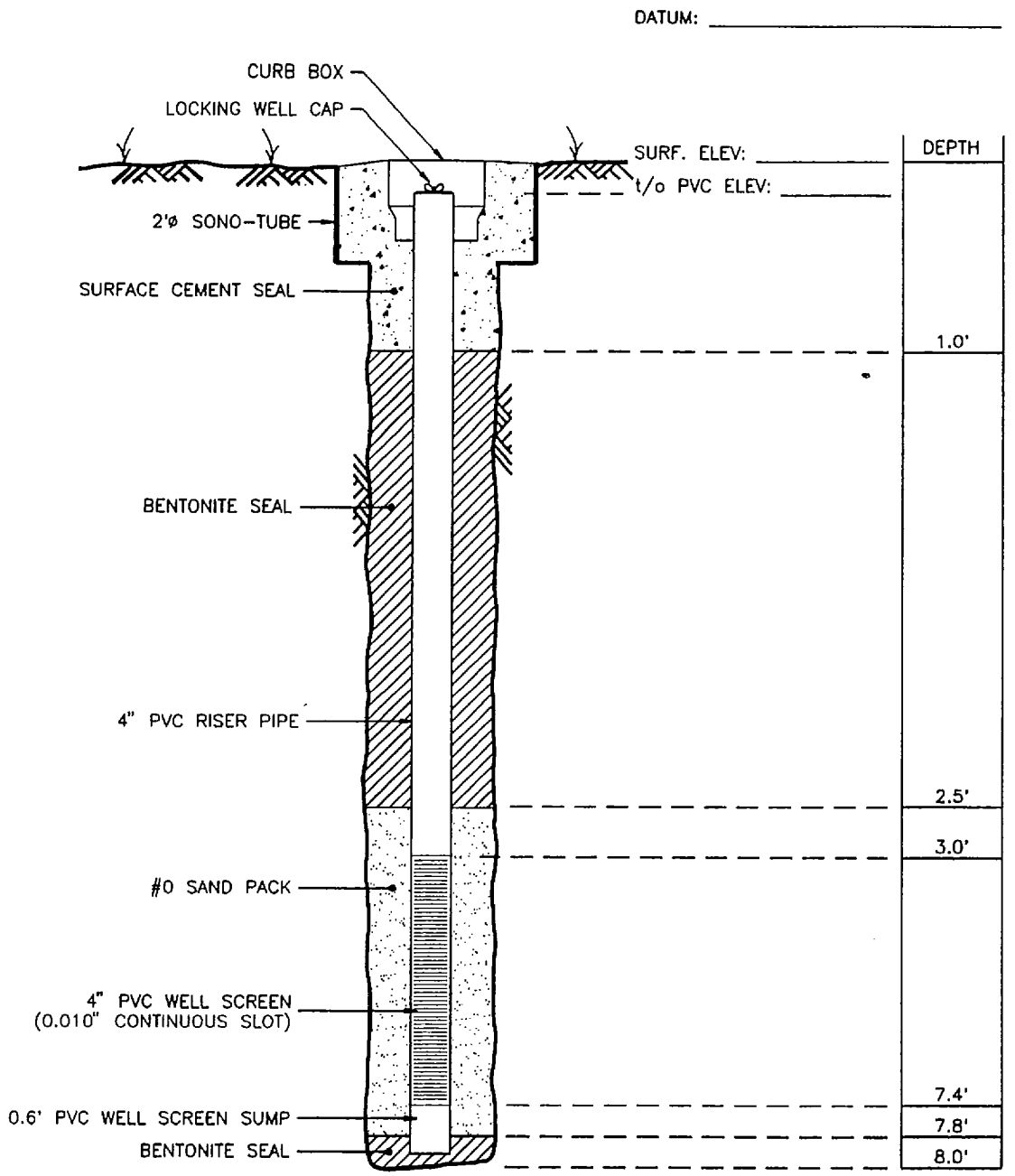
LOCATION Watervliet Arsenal
Watervliet, New York

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
								Augered to 8.0' with no split spoon sampling performed, and installed well.	Note #1: See attached well diagram.
5									
								End of Boring at 8.0' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers



WELL No.
MW-74

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-74
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/13/98

FINISHED 11/13/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC SUBSURFACE LOG

PJT. NO. 9850293

HOLE NO. MW-75

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

LOCATION Watervliet Arsenal
Watervliet, New York

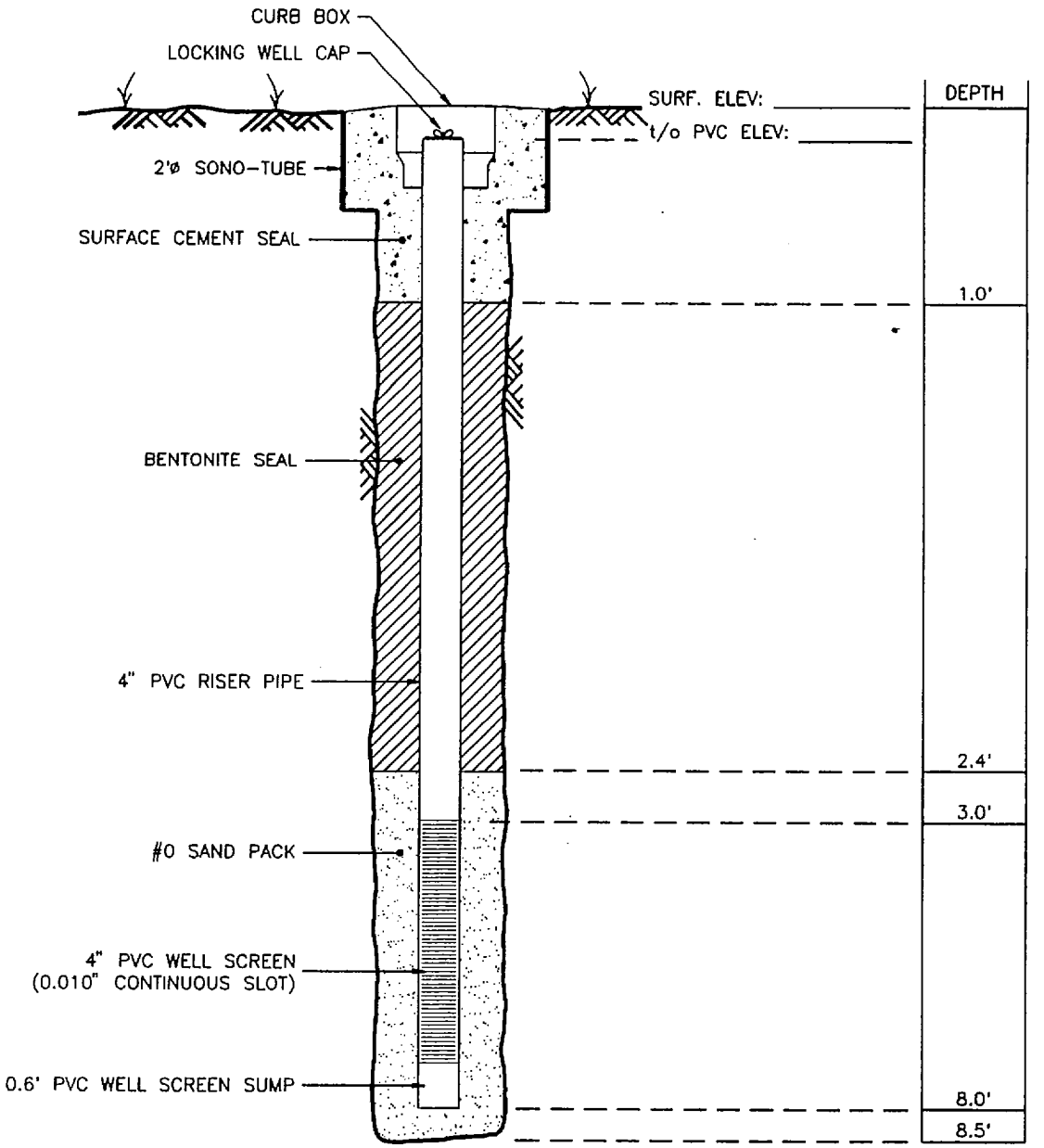
DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
	1	5	7	7	9	14			Note #1: See attached well diagram.
5	2	2	5	6	9	11			
	3	14	17	100/.4				Weathered BEDROCK at 6.0' Below Grade	
10								End of Boring at 8.5' Below Grade	
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers

DATUM: _____



WELL No.
MW-75

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-75
PROJ. No.:	9850293
DRAWING No.:	

DATE

STARTED 11/13/98

FINISHED 11/13/98

HEET 1 OF 1

MAXIM TECHNOLOGIES INC **SUBSURFACE LOG**

PJT. NO. 9850293

HOLE NO. MW-76

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

LOCATION Watervliet Arsenal
Watervliet, New York

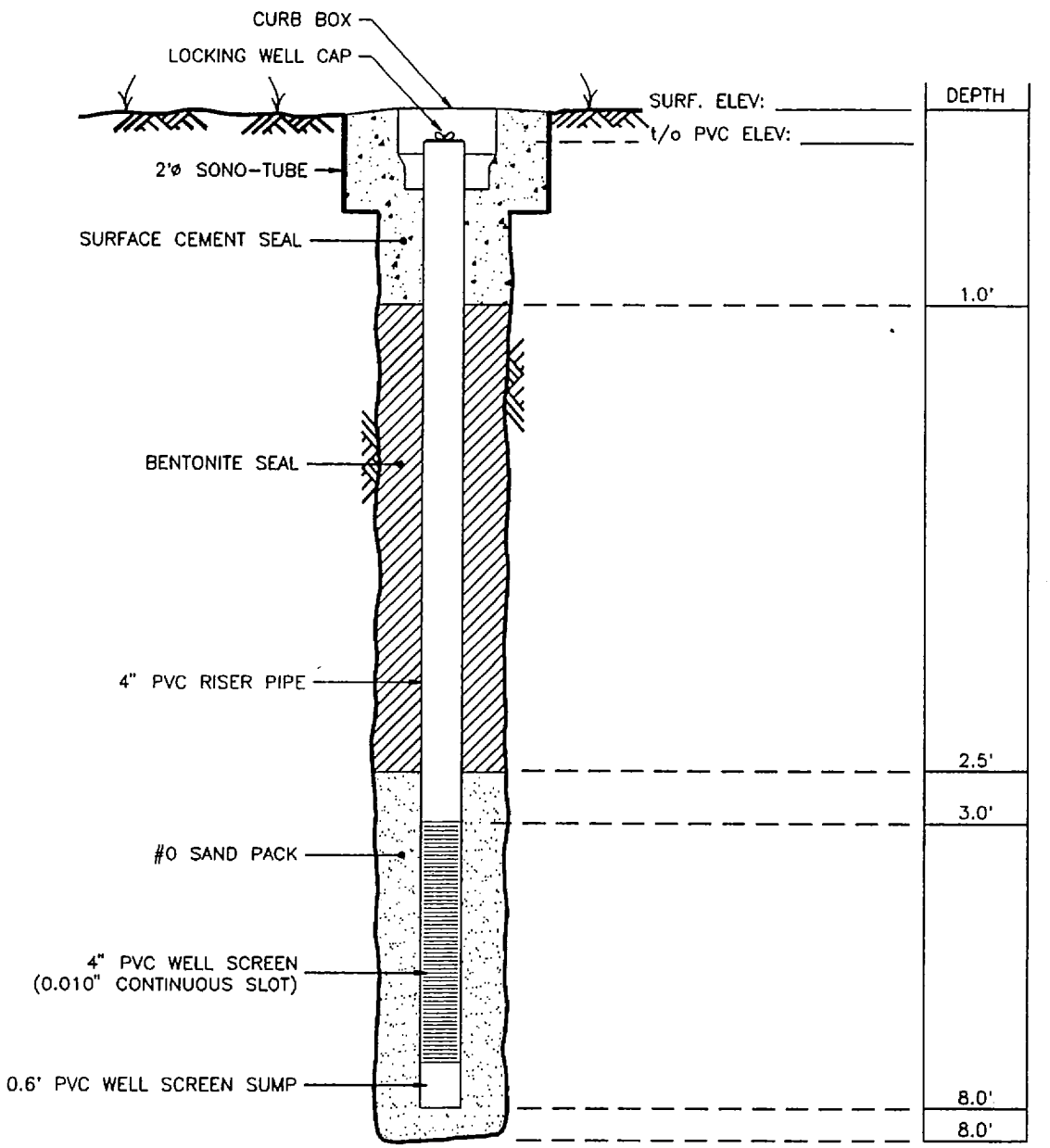
DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
	1								Note #1: See attached well diagram.
5	2	24	26	18	21			Weathered BEDROCK at 3.4' Below Grade	
	3							End of Boring at 8.0' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers

DATUM: _____



WELL No.
MW-76

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-76
PROJ. No.:	9850293
DRAWING No.	

DATE

STARTED 11/13/98

FINISHED 11/13/98

SHEET 1 OF 1

MAXIM TECHNOLOGIES INC **SUBSURFACE LOG**

PJT. NO. 9850293

HOLE NO. MW-77

SURF. ELEV

G.W. DEPTH See Notes

PROJECT Monitoring Well Installation
Reactive Trench Project

LOCATION Watervliet Arsenal
Watervliet, New York

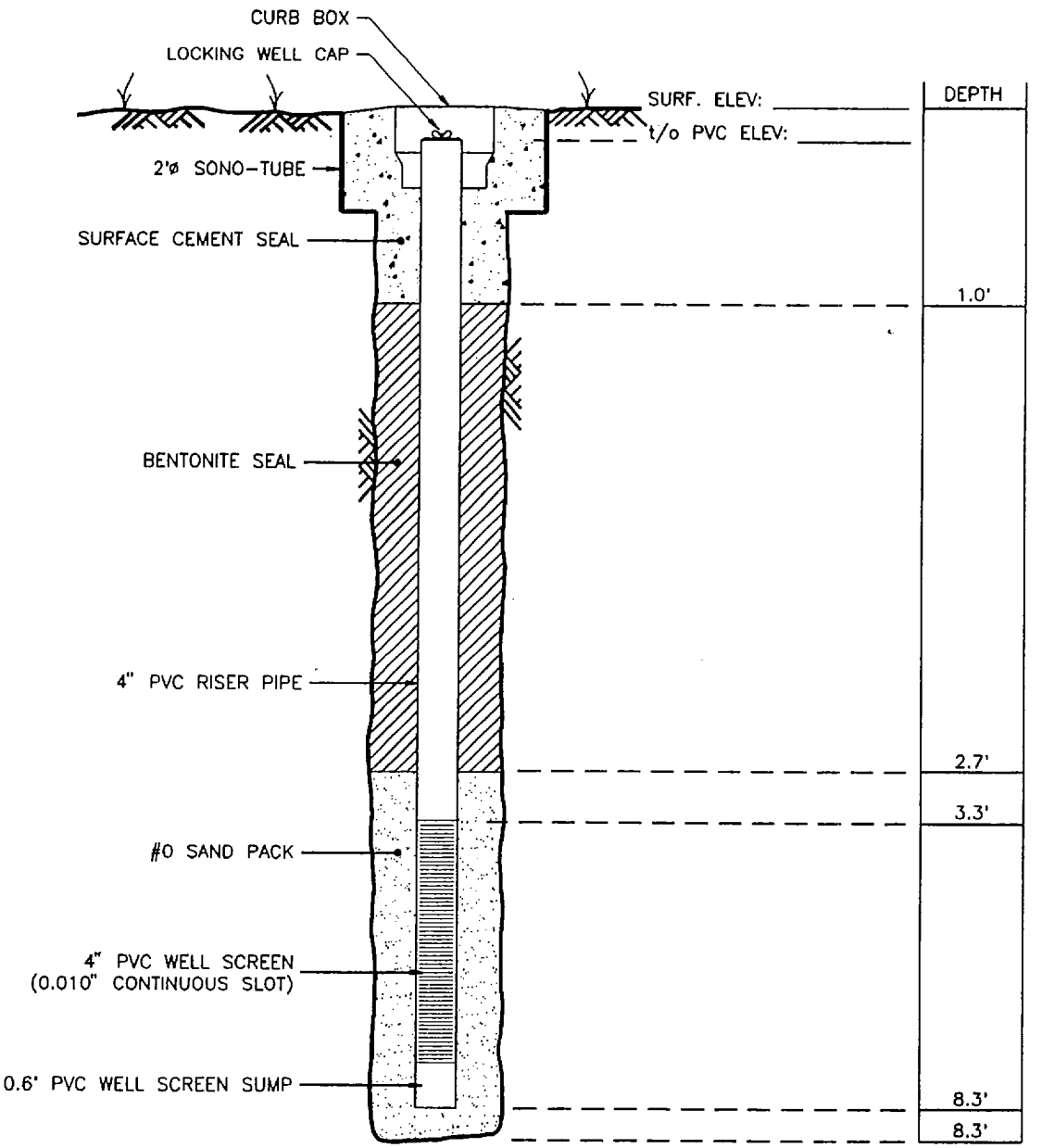
DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	REC (FT)	SOIL OR ROCK CLASSIFICATION	NOTES
									Note #1: See attached well diagram.
	1	5	5	5	5	10			
5	2								
	3	11	10	24	81	34			
								Weathered BEDROCK at 7.0' Below Grade	
								End of Boring at 8.0' Below Grade	
10									
15									
20									
25									
30									
35									
40									

N = NO. BLOWS TO DRIVE 2" SPOON 12" WITH A 140 LB. PIN WT. FALLING 30" PER BLOW CLASSIFICATION: Visual By Driller

DRILLER: John Leonhardt DRILL RIG TYPE : Failing F-10

METHOD OF INVESTIGATION 6¼" I.D. Hollow Stem Augers

DATUM: _____



WELL No.
MW-77

MAXIM TECHNOLOGIES INC
Empire Soils Investigations, Inc. Division

MONITORING WELL DETAILS

MONITORING WELL INSTALLATION
REACTIVE TRENCH PROJECT
WATERVLIET ARSENAL
WATERVLIET, NEW YORK

SCALE:	NOT TO SCALE
DATE:	12/98
DRAWN BY:	JSH
REV'D BY:	
DWG. FILE:	MW-77
PROJ. No.:	9850293
DRAWING No.:	

PERMEABLE REACTION WALL
PILOT TREATMENT SYSTEM

APPENDIX H

MONITORING WELL DEVELOPMENT LOGS

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/18/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Cloudy, 32°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 45

WELL HEADSPACE READING	0.0	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	5.38	FEET FROM TOP OF CASING	
WELL DEPTH	9.15	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	3.77	FEET	
WATER IN ONE WELL VOLUME	2.5	GALLONS	
DEVELOPMENT TIME (start/finish)	11/18/98 @ 0930 / 11/18/98 @ 1400		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
Temperature (degrees C)	13.1	11.1	13.8	13.2	13.9	13.9
specific conductivity (umhos/cm)	1880	1630	1820	1430	1550	1470
pH (SU)	—	—	—	—	—	—
turbidity (NTUs)	>1000	>1000	>1000	>1000	380	356
volume purged (gallons)	∅	2.5	5.0	7.5	10.0	12.5

NOTES:

Surged for 5 minutes prior to initial bailing

Recovery after development:

TIME	DTW
1355	6.62
1400	6.00
1420	5.50

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/18/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Cloudy, 32°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 46

WELL HEADSPACE READING	0.0 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	4.29	FEET FROM TOP OF CASING	
WELL DEPTH	5.59	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	1.30	FEET	
WATER IN ONE WELL VOLUME	0.9	GALLONS	
DEVELOPMENT TIME (start/finish)	11/18/98 @ 0915 / 11/23/98 @ 0830		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
Temperature (degrees C)	12.4	12.2	10.2	11.8		
specific conductivity (umhos/cm)	1145	1150	1450	1286		
pH (SU)	—	—	—	—		
turbidity (NTUs)	>1000	>1000	>1000	>1000		
volume purged (gallons)	∅	1.0 (dry)	1.8 (dry)	3.0 (dry)		

NOTES:

11/18/98 surged for 5 minutes prior to bailing initially

11/23/98 surged for 5 minutes prior to bailing dry. Discontinued development efforts after >5 hours total!

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/18/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Cloudy, 32°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW-47

WELL HEADSPACE READING	20.3 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	4.84	FEET FROM TOP OF CASING	
WELL DEPTH	8.17	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	3.33	FEET	
WATER IN ONE WELL VOLUME	2.2	GALLONS	
DEVELOPMENT TIME (start/finish)	11/18/98 @ 1000 / 11/18/98 @ 1015		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
.emperature (degrees C)	12.3	11.8	12.1			
specific conductivity (umhos/cm)	460	420	430			
pH (SU)	—	—	—			
turbidity (NTUs)	>1000	>1000	>1000			
volume purged (gallons)	∅	2.5	5.0			

NOTES:

No surging of in-trench wells performed. Evacuated 5 gallons total.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/18/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Cloudy, 32°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 48

WELL HEADSPACE READING	0.0 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	4.96	FEET FROM TOP OF CASING	
WELL DEPTH	6.28	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	1.32	FEET	
WATER IN ONE WELL VOLUME	0.9	GALLONS	
DEVELOPMENT TIME (start/finish)	11/18/98 @ 1135 / 11/19/98 @ 1015		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
Temperature (degrees C)	14.4	14.2	12.2			
specific conductivity (umhos/cm)	1540	627	850			
pH (SU)	—	—	—			
turbidity (NTUs)	>1000	>1000	>1000			
volume purged (gallons)	∅	1 (dry)	1.8 (dry)			

NOTES:

11/18/98 Surged for 5 minutes prior to bailing initially

11/19/98 Surged for 5 minutes prior to bailing dry. Discontinued development efforts after >5 hours total.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/18/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Cloudy, ~32°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 49

WELL HEADSPACE READING	0.0 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	5.09	FEET FROM TOP OF CASING	
WELL DEPTH	9.32	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	4.23	FEET	
WATER IN ONE WELL VOLUME	2.8	GALLONS	
DEVELOPMENT TIME (start/finish)	11/18/98 @ 1040 / 11/18/98 @ 1430		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
.emperature (degrees C)	15.4	10.9	14.1	11.2	13.8	12.9
specific conductivity (umhos/cm)	1405	1518	1550	1730	1450	1650
pH (SU)	—	—	—	—	—	—
turbidity (NTUs)	>1000	>1000	>1000	496	310	305
volume purged (gallons)	∅	3	5	7.5	10.	12.5

NOTES:

Surged for 5 minutes prior to bailing initially

Surged for 5 minutes between bailing 4th and 5th volumes

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/18/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	PM.- Sunny, ~45°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW-50

WELL HEADSPACE READING	1.8 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	4.78	FEET FROM TOP OF CASING	
WELL DEPTH	7.48	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	2.70	FEET	
WATER IN ONE WELL VOLUME	1.8	GALLONS	
DEVELOPMENT TIME (start/finish)	11/18/98 @1330 / 11/23/98		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
Temperature (degrees C)	12.1	12.3	10.5	11.6		
specific conductivity (umhos/cm)	1863	1817	1919	835		
pH (SU)	—	—	—	—		
turbidity (NTUs)	>1000	695	>1000	>1000		
volume purged (gallons)	Ø	1.8 (dry)	3.6 (dry)	5.6 (dry)		

NOTES:

11/18 Surged for 5 minutes prior to bailing initially.

11/23 Surged for 5 minutes prior to bailing dry. Discontinued development efforts after >5 hours total

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/18/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	PM- Sunny, ~45°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW-51

WELL HEADSPACE READING	0.0 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	4.73	FEET FROM TOP OF CASING	
WELL DEPTH	3.05	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	1.68	FEET	
WATER IN ONE WELL VOLUME	1.1	GALLONS	
DEVELOPMENT TIME (start/finish)	11/18/98 @ 1350 / 11/23/98		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
Temperature (degrees C)	10.7	10.1	10.8	10.6		
specific conductivity (umhos/cm)	676	742	741	740		
pH (SU)	—	—	—	—		
turbidity (NTUs)	>1000	>1000	>1000	>1000		
volume purged (gallons)	∅	1.1 (dry)	2.2 (dry)	3.5 (dry)		

NOTES:

11/18 - Surged for 5 minutes prior to bailing initially

11/23 - Surged for 5 minutes prior to bailing dry. Discontinued development efforts after > 5 hours total.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/18/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	PM - Sunny, ~45°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 52

WELL HEADSPACE READING	20.5 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	5.22	FEET FROM TOP OF CASING	
WELL DEPTH	7.32	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	2.10	FEET	
WATER IN ONE WELL VOLUME	1.4	GALLONS	
DEVELOPMENT TIME (start/finish)	11/18/98 @ 1400 / 11/18/98 @ 1430		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
Temperature (degrees C)	12.9	11.9				
specific conductivity (umhos/cm)	333	327				
pH (SU)	—	—				
turbidity (NTUs)	>1000	>1000				
volume purged (gallons)	∅	3				

NOTES:

No surging of in-trench wells. Removed 3 gallons total.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/18/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	PM - Sunny; ~45°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- S3

WELL HEADSPACE READING	0.0 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	Dry	FEET FROM TOP OF CASING	
WELL DEPTH		FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL		FEET	
WATER IN ONE WELL VOLUME		GALLONS	
DEVELOPMENT TIME (start/finish)			
WELL EVACUATION DEVICE:			

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
Temperature (degrees C)						
specific conductivity (umhos/cm)						
pH (SU)						
turbidity (NTUs)						
volume purged (gallons)						

NOTES:

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/18/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	P.M. - Sunny, ~45°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW-54

WELL HEADSPACE READING	0.0 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	4.92	FEET FROM TOP OF CASING	
WELL DEPTH	7.27	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	2.35	FEET	
WATER IN ONE WELL VOLUME	1.5	GALLONS	
DEVELOPMENT TIME (start/finish)	11/18/98 @ 1400 / 11/23/98		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
Temperature (degrees C)	11.8	12.3	12.6	11.2	12.1	
specific conductivity (umhos/cm)	555	1829	1830	1795	1778	
pH (SU)	—	—	—	—	—	
turbidity (NTUs)	735	636	161	659	832	
volume purged (gallons)	∅	1.5	3.0 (dry)	4.5 (dry)	7.5 (dry)	

NOTES:

11/18 Surged for 5 minutes prior to bailing initially

11/23 Surged for 5 minutes prior to bailing 4th volume. Discontinued development efforts after > 5 hours total.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/19/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Partly cloudy, ~ 32°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 55

WELL HEADSPACE READING	3.2 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	5.78	FEET FROM TOP OF CASING	
WELL DEPTH	4.68	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	1.1	FEET	
WATER IN ONE WELL VOLUME	0.7	GALLONS	
DEVELOPMENT TIME (start/finish)	11/19/98 / 11/23/98		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
Temperature (degrees C)	10.2	10.8	11.6	12.3		
specific conductivity (umhos/cm)	1860	1735	903	1009		
pH (SU)	—	—	—	—		
turbidity (NTUs)	759	798	>1000	>1000		
volume purged (gallons)	∅	0.7 (dry)	1.5 (dry)	2.2 (dry)		

NOTES:

11/19 - Surged for 5 minutes prior to bailing initially

11/23 - Surged for 5 minutes between bailing 2nd and 3rd volumes. Discontinued development efforts after > 5 hours total.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/18/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	P.M. - Sunny, ~45°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 56

WELL HEADSPACE READING	0.0 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	5.05	FEET FROM TOP OF CASING	
WELL DEPTH	6.47	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	1.42	FEET	
WATER IN ONE WELL VOLUME	0.9	GALLONS	
DEVELOPMENT TIME (start/finish)	11/18/98 @ 1600 / 11/23/98		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
temperature (degrees C)	10.8	10.7	10.2	12.9		
specific conductivity (umhos/cm)	1269	1278	735	1619		
pH (SU)	—	—	—	—		
turbidity (NTUs)	355	861	390	648		
volume purged (gallons)	∅	1 (dry)	1.8 (dry)	2.8 (dry)		

NOTES:

11/18 - Surged for 5 minutes prior to bailing initially.

11/23 - Surged for 5 minutes between bailing 2nd and 3rd volumes. Discontinued development efforts after > 5 hours total

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/18/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	PM - Sunny, ~45°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 57

WELL HEADSPACE READING	12.8 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	4.65	FEET FROM TOP OF CASING	
WELL DEPTH	5.78	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	1.13	FEET	
WATER IN ONE WELL VOLUME	0.7	GALLONS	
DEVELOPMENT TIME (start/finish)	11/18/98 @ 1600	/ 11/18/98 @ 1615	
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
temperature (degrees C)	12.2	11.7				
specific conductivity (umhos/cm)	497	435				
pH (SU)	—	—				
turbidity (NTUs)	>1000	>1000				
volume purged (gallons)	∅	2				

NOTES:

No surging of in-trench wells performed. Evacuated 2 gallons total.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/18/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	PM.- Sunny, ~45°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 59

WELL HEADSPACE READING	0.0	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	5.19	FEET FROM TOP OF CASING	
WELL DEPTH	6.53	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	1.34	FEET	
WATER IN ONE WELL VOLUME	0.9	GALLONS	
DEVELOPMENT TIME (start/finish)	11/18 PM / 11/23/98 A.M.		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST (11/18)	SECOND (11/18)	THIRD (11/19@0830)	FOURTH (11/19@1045)	FIFTH (11/23)	SIXTH
emperature (degrees C)	10.3	11.5	9.5	11.6	14.1	
specific conductivity (umhos/cm)	975	968	1052	979	1066	
pH (SU)	—	—	—	—	—	
turbidity (NTUs)	146	372	309	365	819	
volume purged (gallons)	0	1.0	2.0 (dry)	2.5 (dry)	4.0 (dry)	

NOTES:

11/18/98 Surged for 5 minutes prior to bailing initially

11/23/98 Surged for 5 minutes prior to bailing 4th volume. Discontinued development efforts after > 5 hours total

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/19/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Partly Cloudy, N 32°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 60

WELL HEADSPACE READING	49.6	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	4.76	FEET FROM TOP OF CASING	
WELL DEPTH	10.46	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	5.7	FEET	
WATER IN ONE WELL VOLUME	3.7	GALLONS	
DEVELOPMENT TIME (start/finish)	11/19/98 @ 1130 / 11/19/98 @ 1215		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
emperature (degrees C)	11.4	12.2	13.7	12.6	12.0	12.8
specific conductivity (umhos/cm)	1151	1215	1168	1080	1070	1070
pH (SU)	—	—	—	—	—	—
turbidity (NTUs)	>1000	>1000	315	456	524	661
volume purged (gallons)	∅	3.7	7.4	11.1	14.8	18.5

NOTES:

Surged for 5 minutes prior to bailing initially.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE
ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/19/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Partly Cloudy, ~32°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 61

WELL HEADSPACE READING	0.0	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	4.72	FEET FROM TOP OF CASING	
WELL DEPTH	6.69	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	1.97	FEET	
WATER IN ONE WELL VOLUME	1.3	GALLONS	
DEVELOPMENT TIME (start/finish)	11/19/98 @ 1200 / 11/19/98 @ 1330		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
temperature (degrees C)	13.2	12.9	12.3	12.4	13.2	12.2
specific conductivity (umhos/cm)	845	908	903	945	1020	924
pH (SU)	—	—	—	—	—	—
turbidity (NTUs)	>1000	>1000	>1000	>1000	>1000	>1000
volume purged (gallons)	∅	1.3	2.6	3.9	5.2	6.5

NOTES:
Surged for 5 minutes prior to bailing initially

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/19/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Partly Cloudy, ~ 32°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 62

WELL HEADSPACE READING	6.3 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	4.67	FEET FROM TOP OF CASING	
WELL DEPTH	9.48	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	4.81	FEET	
WATER IN ONE WELL VOLUME	3	GALLONS	
DEVELOPMENT TIME (start/finish)	11/19/98 A.M.		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
Temperature (degrees C)	12.3	12.1				
specific conductivity (umhos/cm)	397	367				
pH (SU)	—	—				
turbidity (NTUs)	>1000	>1000				
volume purged (gallons)	∅	4				

NOTES:

No surging of in-trench wells performed. Total of 5 gallons of water bailed from well.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/19/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Partly cloudy ; ~ 32°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 63

WELL HEADSPACE READING	1.3	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	4.56	FEET FROM TOP OF CASING	
WELL DEPTH	7.93	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	3.37	FEET	
WATER IN ONE WELL VOLUME	2.2	GALLONS	
DEVELOPMENT TIME (start/finish)	11/19/98 AM / 11/23/98 AM		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
Temperature (degrees C)	11.5	13.7	13.4			
specific conductivity (umhos/cm)	1149	1114	1115			
pH (SU)	—	—	—			
turbidity (NTUs)	>1000	>1000	>1000			
volume purged (gallons)	∅	2.2 (dry)	4.4 (dry)			

NOTES:

11/19/98 Surged for 5 minutes prior to bailing initially.

11/23/98 Surged for 5 minutes prior to bailing dry.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/19/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	partly cloudy, ~32°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 64

WELL HEADSPACE READING	16.2	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	5.52	FEET FROM TOP OF CASING	
WELL DEPTH	10.07	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	4.55	FEET	
WATER IN ONE WELL VOLUME	3	GALLONS	
DEVELOPMENT TIME (start/finish)	11/19/98 @ 1220 / 11/19/98 @ 1355		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
temperature (degrees C)	11.8	11.7	12.2	12.9	13.0	13.4
specific conductivity (umhos/cm)	771	795	770	755	735	727
pH (SU)	—	—	—	—	—	—
turbidity (NTUs)	612	330	639	185	672	742
volume purged (gallons)	Ø	3	6	9	12	15

NOTES:

Surged for 5 minutes prior to bailing initially.

Surged for 5 minutes between 4th and 5th volume removal.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/19/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Partly cloudy, ~32°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 65

WELL HEADSPACE READING	0.0	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	4.81	FEET FROM TOP OF CASING	
WELL DEPTH	5.63	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	0.82	FEET	
WATER IN ONE WELL VOLUME	0.5	GALLONS	
DEVELOPMENT TIME (start/finish)	11/19 @ 1430 / 11/23 @ 1400		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
.emperature (degrees C)	12.1	12.6	13.2			
specific conductivity (umhos/cm)	928	998	1139			
pH (SU)	—	—	—			
turbidity (NTUs)	>1000	>1000	>1000			
volume purged (gallons)	∅	0.5 (dry)	1.0 (dry)			

NOTES:

11/19/98 - Surged for 5 minutes prior to bailing initially

11/23/98 - Surged for 5 minutes prior to bailing dry. Very slow to recover. Discontinued development effort after > 5 hours total.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/19/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Partly cloudy, ~32°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW-66

WELL HEADSPACE READING	0.0 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	4.86	FEET FROM TOP OF CASING	
WELL DEPTH	8.63	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	3.77	FEET	
WATER IN ONE WELL VOLUME	2.5	GALLONS	
DEVELOPMENT TIME (start/finish)	11/19/98 @ 1420 / 11/24/98 AM		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST (11/19)	SECOND	THIRD (11/23)	FOURTH	FIFTH	SIXTH (11/24)
Temperature (degrees C)	13.3	14.0	14.3	14.5	13.6	12.8
specific conductivity (umhos/cm)	1268	1320	1299	1479	1487	1428
pH (SU)	—	—	—	—	—	—
turbidity (NTUs)	>1,000	>1,000	>1,000	>1,000	>1,000	>1,000
volume purged (gallons)	∅	2.5	5	7 (dry)	9.5 (dry)	12 (dry)

NOTES:

11/19/98 Surged for 5 minutes prior to bailing initially.

11/23/98 Surged for 5 minutes prior to bailing 2nd volume.

11/24/98 Surged for 5 minutes prior to bailing 4th vol.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/19/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Partly cloudy, ~32°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 67

WELL HEADSPACE READING	2.2 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	4.49	FEET FROM TOP OF CASING	
WELL DEPTH	7.28	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	2.79	FEET	
WATER IN ONE WELL VOLUME	1.8	GALLONS	
DEVELOPMENT TIME (start/finish)	11/19/98 P.M.		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
.emperature (degrees C)	12.1	12.4				
specific conductivity (umhos/cm)	497	485				
pH (SU)	—	—				
turbidity (NTUs)	>1000	>1000				
volume purged (gallons)	∅	3				

NOTES: Did not surge in-trench wells. Total of 3 gallons bailed.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/19/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Partly Cloudy

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW-68

WELL HEADSPACE READING	0.0	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	4.72	FEET FROM TOP OF CASING	
WELL DEPTH	8.23	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	3.51	FEET	
WATER IN ONE WELL VOLUME	2.3	GALLONS	
DEVELOPMENT TIME (start/finish)	11/19 @ 1400 / 11/24 @ 1300		
WELL EVACUATION DEVICE:	PVC Bailer		

11/19 → | 11/23 → | 11/24 →

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
.emperature (degrees C)	12.8	13.3	14.8	13.7	13.1	10.8
specific conductivity (umhos/cm)	1480	1390	1474	1209	1155	1298
pH (SU)	—	—	—	—	—	—
turbidity (NTUs)	>1000	>1000	>1000	>1000	>1000	>1000
volume purged (gallons)	∅	2.3	4.8	7.1 (dry)	9.4 (dry)	11.7 (dry)

NOTES:

11/19 Surged for 5 minutes prior to bailing initially

11/23 Surged for 5 minutes prior to bailing 2nd volume

11/24 Surged for 5 minutes prior to bailing 4th volume.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/19/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Partly Cloudy, ~32°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 69

WELL HEADSPACE READING	0.0 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	4.37	FEET FROM TOP OF CASING	
WELL DEPTH	4.93	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	0.56	FEET	
WATER IN ONE WELL VOLUME	0.4	GALLONS	
DEVELOPMENT TIME (start/finish)	11/19 @ 1410 / 11/23 @ 1400		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST (11/19)	SECOND (11/23)	THIRD (11/23)	FOURTH	FIFTH	SIXTH
temperature (degrees C)	13.9	12.2	12.1			
specific conductivity (umhos/cm)	706	702	761			
pH (SU)	—	—	—			
turbidity (NTUs)	>1000	>1000	>1000			
volume purged (gallons)	∅	0.4 (~dry)	0.8 (~dry)			

NOTES:

11/19 - Surged for 5 minutes prior to initial bailing

11/23 - Surged for 5 minutes prior to bailing dry - Well very slow to recharge. Development efforts discontinued after > 5 hours total

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/23/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Partly Cloudy, ~40°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 70

WELL HEADSPACE READING	0.0 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	3.87	FEET FROM TOP OF CASING	
WELL DEPTH	7.33	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	3.46	FEET	
WATER IN ONE WELL VOLUME	2.3	GALLONS	
DEVELOPMENT TIME (start/finish)	11/23 @ 1320 / 11/24 PM		
WELL EVACUATION DEVICE:	PVC Bailer		

11/24 →

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
Temperature (degrees C)	12.2	13.5	13.6	11.7	11.9	11.6
specific conductivity (umhos/cm)	1312	1202	1251	1282	1245	1219
pH (SU)	—	—	—	—	—	—
turbidity (NTUs)	>1000	833	564	925	455	473
volume purged (gallons)	∅	2.5 (dry)	4 (dry)	6.3 (dry)	8.6 (dry)	10.9 (dry)

NOTES:

11/23 - Surged for 5 minutes prior to bailing initially

11/24 - Surged for 5 minutes prior to bailing 4th volume

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/23/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Partly Cloudy, ~40°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 71

WELL HEADSPACE READING	0.0	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	4.06	FEET FROM TOP OF CASING	
WELL DEPTH	9.67	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	5.61	FEET	
WATER IN ONE WELL VOLUME	3.66	GALLONS	
DEVELOPMENT TIME (start/finish)	11/23 @ 1330 / 11/24 AM		
WELL EVACUATION DEVICE:	PVC Bailer		

→ 11/24

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
Temperature (degrees C)	12.4	13.5	14.1	14.7	11.7	12.0
specific conductivity (umhos/cm)	898	754	709	741	638	675
pH (SU)	—	—	—	—	—	—
turbidity (NTUs)	>1000	>1000	>1000	883	>1000	>1000
volume purged (gallons)						

NOTES:

11/23 Surged for 5 minutes prior to bailing initially

11/24 Surged for 5 minutes prior to bailing 4th volume

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/23/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Partly cloudy, ~40°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 72

WELL HEADSPACE READING	0.0	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	3.78	FEET FROM TOP OF CASING	
WELL DEPTH	8.04	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	4.26	FEET	
WATER IN ONE WELL VOLUME	2.8	GALLONS	
DEVELOPMENT TIME (start/finish)	11/23/98 PM		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
emperature (degrees C)	12.3	12.1				
specific conductivity (umhos/cm)	389	385				
pH (SU)	–	–				
turbidity (NTUs)	>1000	>1000				
volume purged (gallons)	∅	5				

NOTES:

Did not surge in trench wells. Total of 5 gallons removed.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/23/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Partly Cloudy, ~40°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 73

WELL HEADSPACE READING	0.0	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	3.87	FEET FROM TOP OF CASING	
WELL DEPTH	10.00	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	6.13	FEET	
WATER IN ONE WELL VOLUME	4.0	GALLONS	
DEVELOPMENT TIME (start/finish)	11/23 @ 1400 / 11/24 @ 1030		
WELL EVACUATION DEVICE:	PVC Bailer		

11/23 → | 11/24 →

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
temperature (degrees C)	13.7	14.0	13.9	14.6	11.5	12.0
specific conductivity (umhos/cm)	648	609	573	549	532	570
pH (SU)	—	—	—	—	—	—
turbidity (NTUs)	784	622	801	593	812	598
volume purged (gallons)	0	4	8	12	16	20

NOTES:

11/23 Surged for 5 minutes prior to bailing initially

11/24 Surged for 5 minutes prior to bailing 4th volume.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/23/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Partly Cloudy, ~40°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 74

WELL HEADSPACE READING	0.0 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	3.93	FEET FROM TOP OF CASING	
WELL DEPTH	8.07	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	4.14	FEET	
WATER IN ONE WELL VOLUME	2.7	GALLONS	
DEVELOPMENT TIME (start/finish)	11/23 @ 1330 / 11/24 A.M.		
WELL EVACUATION DEVICE:	PVC Bailer		

11/23@1330 1430 1530 11/24 →

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
temperature (degrees C)	13.8	13.5	14.1	13.7	11.7	12.0
specific conductivity (umhos/cm)	743	850	694	639	555	595
pH (SU)	—	—	—	—	—	—
turbidity (NTUs)	>1000	>1000	816	856	871	997
volume purged (gallons)	∅	2.8 (~dry)	5.5	8.2 (dry)	11.0	13.7 (dry)

NOTES:

11/23 Surged for 5 minutes prior to bailing initially

11/24 Surged for 5 minutes prior to bailing 4th volume

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/19/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Partly Cloudy, ~40°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 75

WELL HEADSPACE READING	0.0 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	6.61	FEET FROM TOP OF CASING	
WELL DEPTH	7.78	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	1.17	FEET	
WATER IN ONE WELL VOLUME	0.75	GALLONS	
DEVELOPMENT TIME (start/finish)	11/19/98@1030 / 11/23/98 1100		
WELL EVACUATION DEVICE:	PVC Bailer		
	11/19 @1040 - 1340 ← 11/23 →		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
temperature (degrees C)	11.2	13.2	13.6	15.5		
specific conductivity (umhos/cm)	628	635	662	1034		
pH (SU)	—	—	—	—		
turbidity (NTUs)	>1000	>1000	>1000	>1000		
volume purged (gallons)	Ø	0.75 (dry)	1.25 (dry)	2.0 (dry)		

NOTES:

11/19/98 Surged for 5 minutes prior to bailing initially.

11/23/98 Surged for 5 minutes prior to bailing dry.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/19/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Partly Cloudy, ~40°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 76

WELL HEADSPACE READING	0.0 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	6.18	FEET FROM TOP OF CASING	
WELL DEPTH	7.98	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	1.8	FEET	
WATER IN ONE WELL VOLUME	1.2	GALLONS	
DEVELOPMENT TIME (start/finish)	11/19 @0900 / 11/19 @ 1115		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
Temperature (degrees C)	8.2	11.7	12.1	13.3	13.2	12.2
specific conductivity (umhos/cm)	970	976	1141	1288	1174	1145
pH (SU)	—	—	—	—	—	—
turbidity (NTUs)	>1000	>1000	>1000	>1000	816	489
volume purged (gallons)	∅	1.2	2.5	3.7	5.0 (dry)	6.5 (dry)

NOTES:

Surged for 5 minutes prior to bailing initially

Surged for 5 minutes prior to bailing 5th volume

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

MALCOLM PIRNIE

ONE INTERNATIONAL BLVD., MAHWAH, NEW JERSEY 07495-0018

GROUNDWATER MONITORING WELL DEVELOPMENT LOGS

PROJECT NUMBER:	0285-734	DATE:	11/19/98
PROJECT NAME:	Reaction Wall Pilot Study	SAMPLERS:	Maxim Technologies
SITE LOCATION:	Watervliet Arsenal Siberia Area		
SITE CONTACT:	Maira Senick	WEATHER CONDITIONS:	Partly Cloudy, ~40°

WELL IDENTIFICATION NUMBER: 98MPI-SA-MW- 77

WELL HEADSPACE READING	0.0 ppm	PID MODEL/LAMP:	MiniRAE 10.2 eV
DEPTH TO WATER (Before Purging)	5.98	FEET FROM TOP OF CASING	
WELL DEPTH	8.39	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL	2.41	FEET	
WATER IN ONE WELL VOLUME	1.6	GALLONS	
DEVELOPMENT TIME (start/finish)	11/19 @ 0900 / 11/19 @ 1130		
WELL EVACUATION DEVICE:	PVC Bailer		

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH	SIXTH
Temperature (degrees C)	9.3	9.2	13.2	12.9	13.2	12.5
specific conductivity (umhos/cm)	1387	1277	1422	1357	1304	1305
pH (SU)	—	—	—	—	—	—
turbidity (NTUs)	>1000	>1000	>1000	>1000	785	>1000
volume purged (gallons)	∅	1.6	3.2 (dry)	4.8 (dry)	6.5 (dry)	8.1 (dry)

NOTES:

Surged for 5 minutes prior to bailing initially.

Surged for 5 minutes prior to bailing 5th volume

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
(4.0)	0.6528
6.0	1.4687

PERMEABLE REACTION WALL
PILOT TREATMENT SYSTEM

APPENDIX I

AS BUILT RECORD SURVEY

SUBMITTAL DATA SHEET

PROJECT NAME: Watervliet Arsenal Reactive Trench DATE: 12-10-98
PROJECT NO.: 0285709
CONTRACTOR: Kilby Brothers, Inc.
SUBMITTAL NO: 7

☒ Project Data	☐ Mat. Safety Data Sheet	☐ Performance Data
☐ Schedule	☐ Photos	☐ Test Report
☐ Shop Drawings	☐ Sample	☐ Certification
☐ Other	☐ Substitution	☐ Warranty

DESCRIPTION OF SUBMITTAL: Record Drawing

PRODUCT NAME:

MFG:

SUBCONTRACTOR: Vollmer Associates

SPEC SECTION: 01050 PARAGRAPH: 1.3 & 1.4
02014 3.5

DRAWING NO.

By submitting this information, I represent that I have determined and verified materials, field measurements and conditions and have checked the information contained here in with requirements of the work and the contract documents.

Reviewed by: Thomas McClain
(Signature Required)

Contractor's Review and Approval	Engineer's Review and Approval
Subcontractor/Vendor Name: Vollmer Drawn By/Assembled By: TWM Approved By: TWM Date: 12-10-98	☒ APPROVED ☒ APPROVED AS CORRECTED ☐ REVISE AND RESUBMIT ☐ NOT APPROVED Checking is only for the conformance with the design concept of the Project and compliance with the information given in the Contract Documents. Contractor is responsible for dimensions to be confirmed and correlated at the job site; for information that pertains solely to the fabrication process or to techniques of construction, and for coordination of the work of all trades. MALCOLM PIRNIE, INC. Date 12/10/98 By

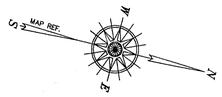
TRENCH "A" (B)		
MONITOR WELL	TOP OF CASING	TOP OF PVC
45	40.22	39.87
46	40.15	39.90
47	40.03	39.31
48	39.91	39.58
49	40.07	39.68
50	40.06	39.80
51	40.13	39.89
52	39.90	39.32
53	39.90	39.68
54	39.83	39.40
55	39.71	39.45
56	39.87	39.61
57	39.56	39.07
–	–	–
59	39.36	39.06

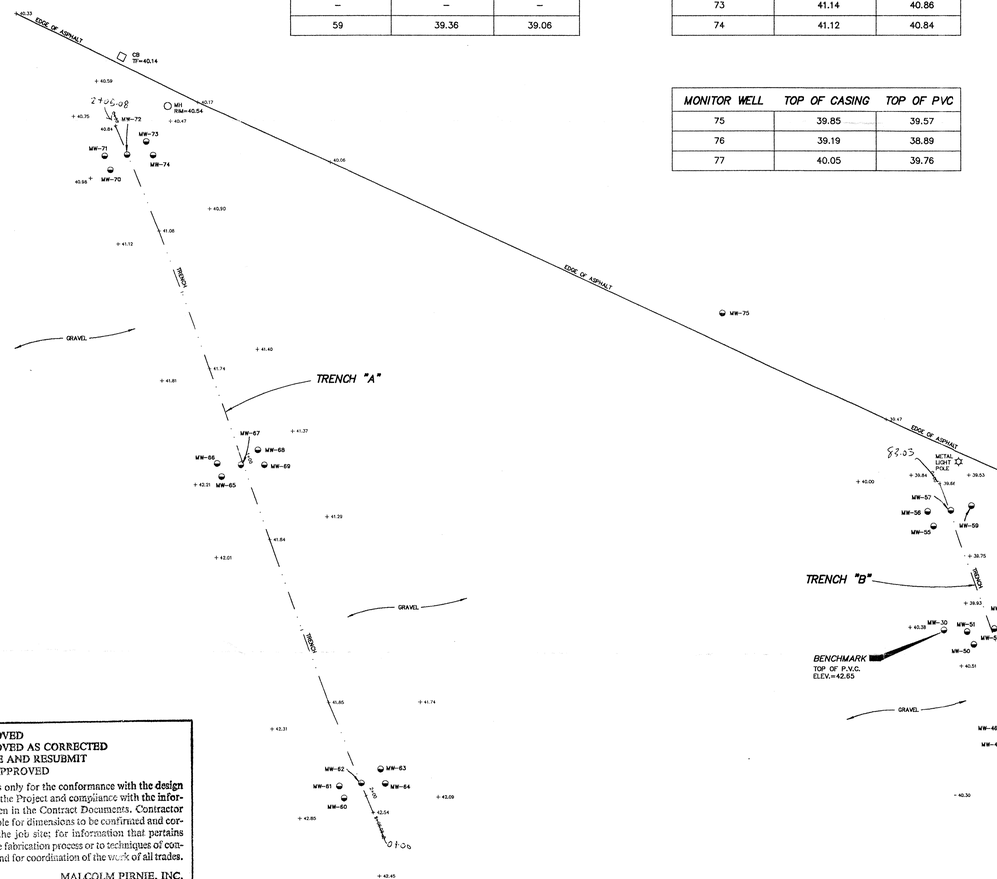
TRENCH "B" (A)		
MONITOR WELL	TOP OF CASING	TOP OF PVC
60	42.65	42.31
61	42.58	42.27
62	42.49	42.16
63	42.36	42.04
64	42.47	42.08
65	42.28	41.93
66	42.26	41.99
67	42.06	41.56
68	41.96	41.71
69	42.03	41.71
70	41.25	40.79
71	41.15	40.91
72	41.24	40.86
73	41.14	40.86
74	41.12	40.84

MONITOR WELL	TOP OF CASING	TOP OF PVC
75	39.85	39.57
76	39.19	38.89
77	40.05	39.76

98 MPI-5A-MW-(49)

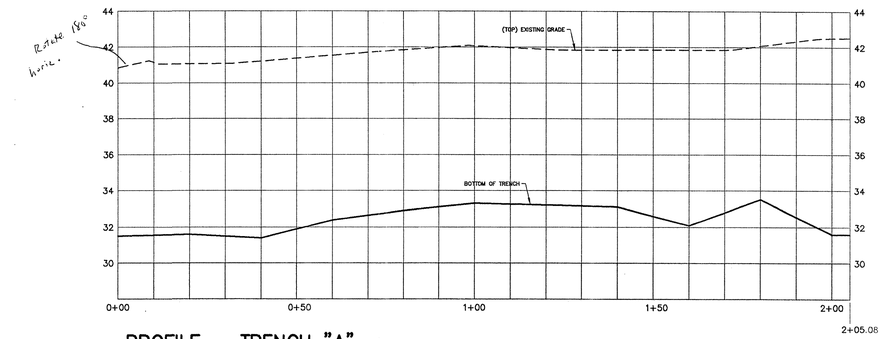
MAP REF.





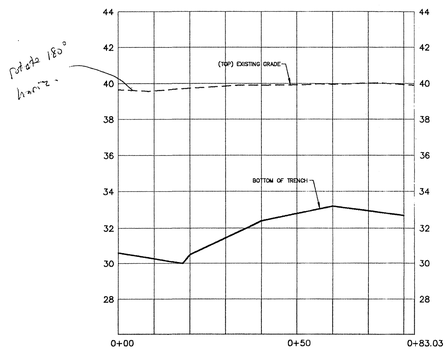
PLAN

SCALE: 1" = 20'



PROFILE – TRENCH "A"

SCALE: HORIZ. 1" = 20'
VERT. 1" = 4'



PROFILE – TRENCH "B"

SCALE: HORIZ. 1" = 20'
VERT. 1" = 4'

NOTES:

1. UNDERGROUND UTILITIES SHOWN HEREON BASED ON UTILITY EVIDENCE VISIBLE AT GROUND SURFACE AND RECORD DRAWINGS AND ARE SUBJECT TO FIELD VERIFICATION BY EXCAVATION. UTILITIES SHOWN DO NOT PURPORT TO CONSTITUTE OR REPRESENT ALL UTILITIES LOCATED UPON OR ADJACENT TO THE SURVEYED PREMISES.
2. THE OFFSETS OR DIMENSIONS SHOWN HEREON, FROM THE PROPERTY LINES TO THE STRUCTURES, ARE FOR A SPECIFIC PURPOSE AND USE; THEREFORE, THEY ARE NOT INTENDED TO MONUMENT THE PROPERTY LINES OR TO GUIDE THE ERECTION OF FENCES, ADDITIONAL STRUCTURES, OR ANY OTHER IMPROVEMENT.
3. EASEMENTS AND/OR SUBSURFACE STRUCTURES RECORDED OR UNRECORDED ARE NOT GUARANTEED UNLESS PHYSICALLY EVIDENT ON THE PREMISES AT THE TIME OF THE SURVEY.
4. SUBJECT TO ALL RIGHTS, EASEMENTS, COVENANTS AND RESTRICTIONS OF RECORD.

MAP REFERENCE:

MAP ENTITLED "WATERVLIET ARSENAL, PERMEABLE REACTION WALL, PILOT SYSTEM CONSTRUCTION, SITE PLAN" DATED AUGUST 1988 AND LAST REVISED 9/14/98 BY MALCOLM PIRNIE.

☐ APPROVED
☒ APPROVED AS CORRECTED
☐ REVISE AND RESUBMIT
☐ NOT APPROVED

Checking is only for the conformance with the design concept of the Project and compliance with the information given in the Contract Documents. Contractor is responsible for dimensions to be confirmed and correlated at the job site; for information that pertains solely to the fabrication process or to techniques of construction; and for coordination of the work of all trades.

MALCOLM PIRNIE, INC.

Date 12/14/98 By

EX_98483.DWG 12-7-98 4:16:10 pm EST

DATE	RECORD OF WORK	APPR.

DRAWN BY: | FIELD SURVEY: J.A. SMITHSON, M.A. DeLOR | CHK BY: M.I. GROFF

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REGISTERED LAND SURVEYOR MICHAEL I. GROFF No. 49454 STATE OF NEW YORK

MICHAEL I. GROFF

RECORD SURVEY
FOR
WATERVLIET ARSENAL
PERMEABLE REACTION WALL
PILOT SYSTEM CONSTRUCTION
CITY OF WATERVLIET • COUNTY OF ALBANY • STATE OF NEW YORK

DATE: NOVEMBER 25, 1998 | SCALE: AS NOTED

1 of 1

MAP NO.