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Municipal Brownfields - B
Superfund - HW
Spills - SP
ERP - E
VCP - V
BCP - C

PALMER STREET LANDFILL
POST CLOSURE PLAN
(EPA ID# NY002126910)

MOENCH COMPANY
GOWANDA, NEW YORK 14070

JULY 1993(originally)
Revised March 1994
Revised March 2001
Revised December 2006

Jeffrey Smith
Site Manager

PALMER STREET LANDFILL; POST CLOSURE PLAN 12/06
MOENCH COMPANY; A division of Brown Shoe Co.

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1.0 FACILITY DESCRIPTION

The following information is submitted in accordance with the requirements for a general description of the facility as contained in 40 CFR 270.14(b)(l) and 6 NYCRR 373-1.5(a)(2)(l) and related Subparts. All information presented herein is submitted for use in evaluating the " Post-Closure Plan" for the Palmer Street Landfill.

1.1 GENERAL DESCRIPTION

The Moench Tanning Company, a division of Brown Group, Inc. has been closed and all waste generating operations have ended. Most buildings have been demolished and equipment sold. The site is located near the southeast corner of the Village of Gowanda, Cattaraugus County, New York. As of 1993, it is simply known as Moench Co.

The site address is:

Moench Co.
465 Palmer St.
Gowanda, New York 14070

The contact and party responsible for previous hazardous waste management activities at Moench Co. is:

Jeffrey Smith

Site Manager (716) 532-2201

1.1.1 Products Produced

Moench Tanning Company was a leather tanning facility that was in operation for approximately 120 years. A brief discussion of leather tanning processes and a summary of Moench Tanning's company history has been presented in the Closure Plan for the Palmer Street Landfill (Reference 7).

1.1.2 Site Description

The Palmer Street Landfill was operated by Moench Tanning from 1900 through July 1983. (See Figure 1-1 for Location Map). The site occupies approximately 25 acres in size and is bound on the west and south by a steeply-sloped wooded area, on the on the northwest by a swamp area. Cattaraugus Creek is to the East. The former tannery site is North.

1.2 WASTE GENERATION

A variety of wastes generated at Moench Site, was disposed of at the landfill site. The landfill was not used for disposal of wastes generated from outside sources. Brief descriptions of the types of wastes known to have disposed of at the landfill site are presented in the Palmer Street Landfill Closure Plan (revised August 1989). The waste types include sole leather extract, rendering waste, spray booth clean-up waste, wastewater treatment plant sludge, and construction debris.

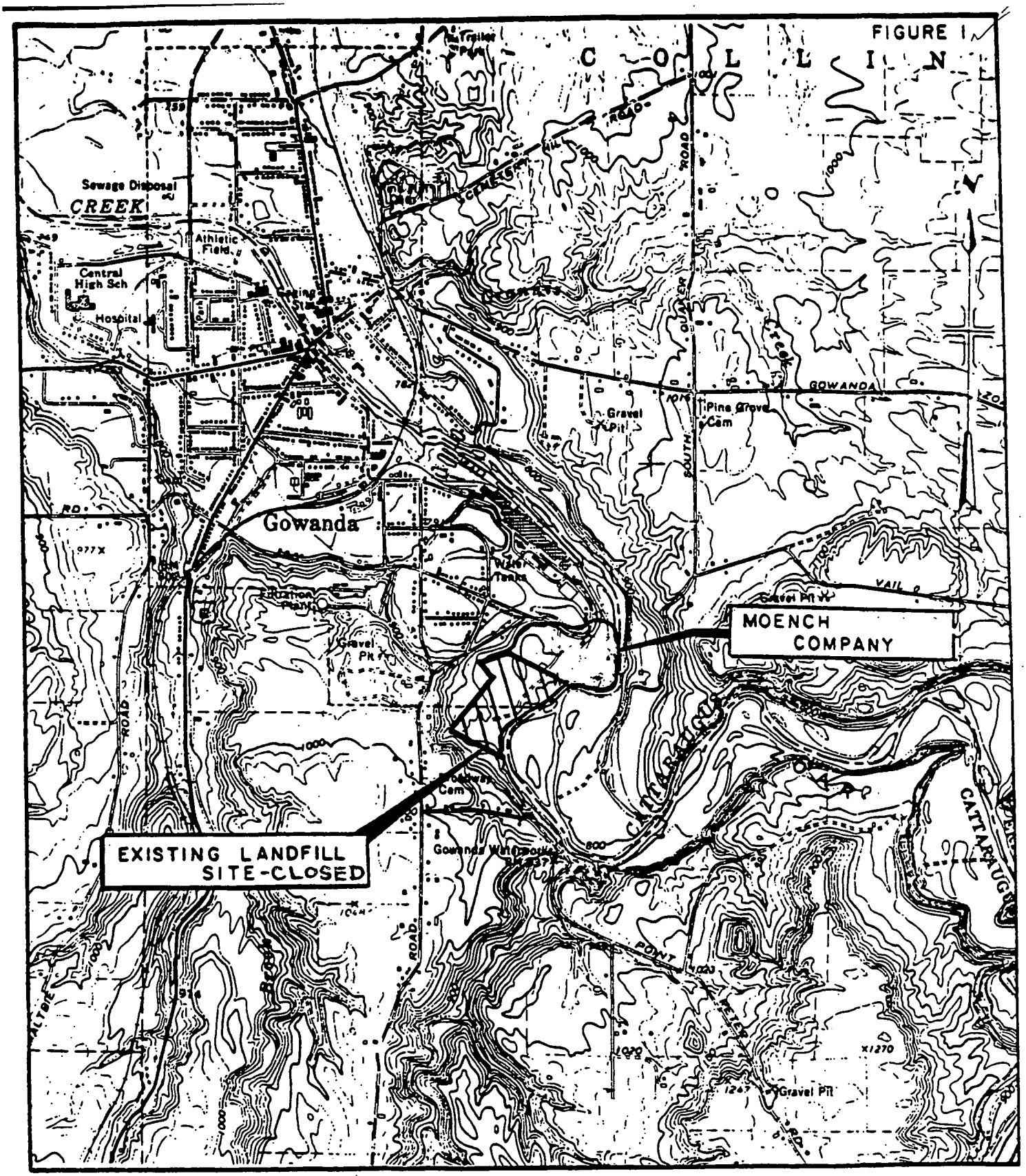
Spray Booth Clean-up waste is the only potentially hazardous material landfilled at the Palmer Street site since the effective date of the Resource Conservation and Recovery Act (RCRA). The Brown Group maintains that these wastes were not hazardous when disposed of at the landfill. Following the end of landfill disposal operations these wastes were classified as a nonhazardous industrial waste and disposed of at a permitted disposal facility.

1.3 LANDFILL OPERATION

There is virtually no documented information on the operation of Palmer Street Landfill because records/logs were not maintained. All available information regarding operational practices and the location of wastes is based on interviews with plant personnel actually involved in the landfill operation. This information is summarized in the Palmer Street Landfill Closure Plan (Reference 7).

1.4 TOPOGRAPHIC MAP

Plate I is a topographic map with existing contours, site property lines and drainage. Figure 1-1 is a location map showing topography in the vicinity of the landfill site. Plate I also shows site property lines, site drainage control and the 100-year floodplain.



NOTE:
TOPOGRAPHY TAKEN FROM 1963 GOWANDA, N.Y.
U.S.G.S. QUADRANGLE 7.5 MIN. SERIES
SCALE: 1" = 2000'

FIG. 1-1

QUADRANGLE LOCATION

SITE LOCATION MAP
PALMER STREET LANDFILL
GOWANDA, N.Y. 6-94

MOENCH CO.

2.0 POST-CLOSURE CARE AND MONITORING

This information is submitted to comply with 40 CFR 270.14(b)(13) and 6 NYCRR 373-1.5(a)(2)(xiii) and related Subparts.

2.1 POST-CLOSURE PERIOD

Post-closure activities for the Palmer Street Landfill will extend over a 30-year period, starting with acceptance of the Closure. NYSDEC acceptance of closure occurred August 1992.

2.2. INSPECTION AND MAINTENANCE

2.2.1 Site Inspections

The Moench Company/Brown Shoe Company will be responsible for site inspection and maintenance. The site will be inspected on a semiannual basis throughout the entire post-closure period. The landfill site will be inspected for:

- Integrity of structures.
- Visible debris, litter and waste.
- Loss of vegetative cover or growth of undesirable species.
- Integrity of drainage ditches including:
  - Sediment buildup.
  - Pooling or ponding.
  - Slope integrity, and
  - Overall adequacy of surface runoff collection system.
- Integrity of gas venting astern.
- Integrity of access roads, gates and fences.
- Integrity of groundwater monitoring system.
- Integrity of landfill cap including:
  - Erosion or settling of cap material
  - Leachate breakthroughs.

- Maintenance of existing benchmarks.

All records on frequency of inspection, maintenance, detection monitoring and maintenance of bench marks will be submitted to the NYSDEC Region 9 Office, Attention: Regional Solid and Hazardous Waste Engineer, on an annual basis.

2.2.2 Cover Maintenance

Cover maintenance will be performed as necessary over the entire post-closure care period. Any signs of erosion, settling, cracking or other site maintenance problems detected during routine site inspections will be corrected as soon as possible. All eroded areas will be brought back to original grade according to the procedures described for constructing the final cover. Settling which results in ponding of water will be regraded and revegetated as necessary to eliminate the ponding. All bare spots in the final cover will be reseeded and fertilized as necessary. Seed and fertilizer will be of the same type and quality as specified in Table 2-1. "First-mowing will be done with light equipment so as not to impart excessive wheel-injury to seedlings. Successive mowing will be undertaken with a frequency to minimize the accumulation of clippings that would smother grass. Six months after seeding, the cover will be fertilized with 400 lb/acre of 10-10-10 fertilizer. Any undesirable species (i.e., large tree growth) will be removed if their presence is suspected to have the potential to deteriorate the integrity of the final cover.

The need for cover repairs due to subsidence and/or settling will be determined based on an evaluation of whether the functions of the final cover in the affected area has been impaired. Those areas where the function has been impaired or will be impaired will be repaired to ensure that the integrity of the final cover is maintained. These repair actions may include, but will not be limited to:

- Strip and stockpile topsoil from the affected area.
- Regrade the affected area in accordance with the grading plan.
- Using clay or a bentonite-soil admixture, fill cracks and re-establish the recompacted low permeability soil layer to a depth of twenty-four inches at a maximum permeability of 1 x 10(-7) cm/s.

TABLE 2-1 PALMER STREET LANDFILL	
Seed Mixture(1)	
Perennial Ryegrass	10 lbs/acre
Kentucky Bluegrass	20 lbs/acre
Strong Creeping Red Fescue	20 lbs/acre
Chewing Fescue	20 lbs/acre
Hard Fescue	20 lbs/acre
White Clover	10 lbs/acre
(1) Areas requiring vegetation will be seeded with 100 lbs/acre of seed conforming to this mix.	

- Replace topsoil and re-vegetate affected area in accordance with Table 2-1.

2.2.3 *Maintenance of Site Structures*

Maintenance of structures for surface water control and groundwater monitoring will be performed by Moench Company as necessary during the post-closure period.

All eroded areas in the drainage ditches will be repaired and regraded. Reseeding will be carried out using the recommended seed mixture given in Table 2-1. Sediment buildup in the ditches will be removed if it restricts flow in the ditches. Any other areas in the ditches where the cross-section or slope has been altered to the extent that flow does not occur as desired will be reworked and regraded as necessary.

Gas vents will be repaired or rebuilt to restore them to the original design configuration. Monitoring wells, which sustain damage or cannot provide representable groundwater samples will be examined to determine whether the problem can be corrected. In particular, attention will be given to:

- Signs of encrustation and corrosion.(pipes are PVC)
- An exceptional increase in solids content (due to the breakdown of the screening arrangement).
- An appreciable decrease in groundwater elevation.

Remedial actions will be determined by the expected impact of the loss of data on the overall monitoring program.

The access road to the landfill site will be maintained in good condition so that routine inspections and required maintenance activities can be carried out. Gates will be kept in good repair to prevent unauthorized access onto the landfill site.

2.2.4 Contingency Plans

The objective of the contingency plan is to address events, which occur outside the scope of the routine maintenance program. The contingency plan will be implemented following the discovery of a condition at the landfill, which is not covered by the routine maintenance plan.

Natural occurrences such as storms, drought and subsidence should be considered as "expected occurrences" and are addressed in the maintenance program and are not

addressed in this contingency plan. Certain problems, which cannot be reasonably expected to occur, such as earthquakes or war, are also not addressed in this contingency plan.

The following problems may not be reasonably expected to occur, yet may be discovered during a routine post-closure inspection and monitoring program:

- Leachate significantly impacting groundwater or surface water quality.
- Failure of the final cover integrity which may be a result of, or indicated by:
    - Waste protruding through the final cover.
    - Soil erosion or other drainage problems.
    - Uncontrolled burrowing by pests.
- Vegetative cover missing despite repeated efforts at re-vegetation.

The following guidelines are offered to determine when the contingency plan should be implemented and to determine possible corrective actions when responding to a contingency. All corrective actions, where appropriate, will be executed in a timely fashion after noticing the appropriate regulatory agencies.

2.2.4.1 Leachate Breakout Repair Procedure

Leachate breakouts through the landfill cover system will be discovered during regularly scheduled site inspections. Should such a breakout occur, the damage will be repaired as quickly as possible. Repairs will be made with materials and methods as specified in previous sections of the closure plan. Areas where leachate breakouts have occurred will receive additional cover material, which shall be compacted and overlaid with topsoil for vegetative growth.

If the Moench Company or the NYSDEC believes a substantial threat of water pollution exists as a result of leachate draining from the site, the Moench Company will prepare a work plan to determine appropriate response efforts including:

- Whether leachate should be contained and treated on-site.
- Whether leachate should be collected and transported to an off-site treatment facility.
- Actions to control, minimize or eliminate the conditions which are contributing to leachate production.

2.2.4.2 Fire

A fire at the landfill will be immediately reported to the local fire department. Appropriate response measures, including personnel safety, will be the responsibility of the fire department. Underground fires will be controlled as necessary. Aboveground fires will be quenched according to approved fire department protocol. Damage to the surface drainage system or final cover will be repaired where these systems have been compromised.

2.2.4.3 Vandalism

Vandalism will be reported to the local enforcement authorities. If vandals have gained entry to the landfill, appropriate measures will be taken to eliminate or restrict future access. Vandalism to monitoring wells will be repaired as appropriate. Damage caused by off-road vehicles will be repaired, where the damage is determined to have compromised the integrity of the final cover or the functions of the gas vents or surface drainage system.

2.2.4.4 Air Contamination

Methane gas venting to the atmosphere should not present a risk to human health due to the rural nature of the landfill and the relative lack of human population adjacent to the landfill. It is conceivable although highly unlikely that a build-up of gas within the landfill may occur.

Should it be suspected that methane gas generation may be presenting an explosion or other hazard, the Moench Company will notify the NYSDEC and New York State Department of Health (NYSDOH). If it is determined that such a hazard is present, a work plan will be developed to determine if the venting system is functioning properly and to determine the appropriate response actions. Possible response actions include replacing portions of the venting system, adding new vents, or installing an active gas withdrawal system. Any proposed remedial actions would be approved through the NYSDEC prior to implementation.

2.2.4.5 Unauthorized Dumping or Disposal

Unauthorized dumping or waste disposal by other parties will be reported to the NYSDEC, and local enforcement officials. In the event that such disposal occurs, efforts

will be taken to eliminate further dumping and to restrict subsequent entry to the site. The Moench Company will assist the NYSDEC and/or USEPA in the prosecution of persons found in the act of illegal dumping and in seeking reimbursement from the responsible party for all costs incurred in the removal and disposal of the waste.

2.2.4.6 Quality Assurance/Quality Control

To assure the performance of site inspection and maintenance, a reporting procedure has been established. A site inspection checklist and maintenance schedule is provided in Appendix 1. The site inspection checklist was developed in accordance with the parameters identified in Section 2.2. The maintenance schedule will be completed after regularly scheduled site inspections and will be submitted to the NYSDEC on an annual basis.

Moench Company will hire personnel (fully qualified to perform the work) or a licensed consulting engineering firm to perform site inspections and supervise maintenance operations. The site inspection checklist and maintenance schedule will be signed by authorized personnel. Maintenance and repair work shall conform to the requirements set forth in Section 2.0 of this report.

2.3 NEED FOR CORRECTIVE ACTION

Ground and surface water quality data collected to date indicates that the Palmer Street Landfill is not having a significant impact on the ground and surface water quality in the vicinity of the site (Reference 5). No corrective actions beyond those already implemented are considered necessary at this time.(Also References # 10 & #11) + 12.

2.4 DETECTION MONITORING PROGRAM-Historical Progression.

2.4.1 GENERAL

The principal purpose of any landfill monitoring system is to provide a mechanism for initiating corrective actions if the impairment of groundwater or surface water is apparent. Remediation is triggered by comparison of water quality at pre-established points of monitoring/compliance with appropriate and applicable standards. The monitoring system should be site specific; in other words, the system design should be capable of

detecting landfill derived contaminants along the principal pathways of contaminant movement. Hydrogeologic conditions at the Palmer Street Landfill have been described in a series of site investigation reports that were completed between 1983 and 2006 (see References I through 12).

It has been determined that much of the leachate produced at the landfill is currently moving with the shallow groundwater either towards the east with discharge to Cattaraugus Creek or northwards across the landfill boundary. A lesser volume of leachate is moving to depth through the lower overburden (overburden aquitard) to the regional groundwater flow system. The historical water quality data had been obtained from the existing monitoring well system, which includes a total of seven shallow wells (viz. MW-1, MW-2, MW-3, MW-4, MW-5, MW-6 and MW-7S), three wells completed in the lower overburden (viz. MW-7, MW-3D and MW-8), and three bedrock wells (viz. MW-7D, MW-3DR, and MW-8D). A new bedrock well, MW-4D, was installed in September 1993. This distribution of wells is considered adequate for monitoring existing shallow leachate and groundwater flow.

Completion of the landfill cover system(1990), has influence the existing pattern of groundwater flow with flow reversal anticipated along the northern landfill boundary (inflow as opposed to outflow). This is likely due to reduced infiltration. This has reached a steady state after several years of significant groundwater levels increases('92-'94), in several deep wells. Termination of Tannery activities, the water withdrawn from the Aquifer, along with the Village of Gowanda's cessation of use of the Aquifer, have resulted in increase water levels in the deep wells.

Future monitoring at the Palmer Street Landfill must be cognizant of possible changes to the groundwater flow pattern. The following have been factored into the "Detection Monitoring" program.

- With reversal of shallow groundwater movement along the northern boundary, well MW-7S will be physically upgradient of the landfill. Any improvement in water quality monitored at this location, however, will be gradual because it will likely take some time for the contaminant plume, if any, in this area to disperse.
- Monitoring wells MW-4SR, MW-5, MW3 and MW-6, although hydraulically downgradient from the landfill, are screened within waste fill. Because of their physical position within the waste, water samples from these wells are

representative of leachate quality rather than true downgradient groundwater quality. It is conceivable that now that the landfill is covered, the observed water quality in these wells will deteriorate further as infiltration through the landfill is reduced. Although these wells will not be suitable for monitoring groundwater quality improvement, they can be used to monitor contaminant loadings to Cattaraugus Creek. Contaminant loadings will decrease proportional to the decline in water levels as measured in these wells.

- The bedrock wells were continue to be used to monitor water quality changes attributable to the landfill in the regional groundwater flow system. Lower overburden wells can provide a measure of early detection of water quality changes in the lower overburden prior to detection in the regional aquifer. It should, however, be recognized that because groundwater flow and any contaminant movement through the confining aquitard is slow, it may take several years for an existing contaminant plume, if any, to disperse. Therefore, it is possible monitoring could indicate some impairment of water quality even after the landfill cover system is in place and loadings are reduced.

- Based on the hydrogeologic information available on the aquitard which separates the shallow overburden and deep regional groundwater flow systems, it is reasonable to assume that leachate contaminants have penetrated some undefined distance into the aquitard. The extent of contaminant penetration would be a function of the hydraulic gradient, porosity, and hydraulic conductivity of the aquitard material.

Initially a two-phased detection monitoring program was planned, based on the premise that it would be premature to attempt to evaluate the impacts of the cover system construction until such time as steady-state flow conditions and chemical equilibrium are re-established. Since a steady-state condition has been obtained, a four phase plan now exists.

2.4.2 Phase 1: Continued Routine Monitoring(3/89 – 7/93)

Phase I of the detection monitoring program involved continued routine monitoring of selected existing monitoring wells in accordance with requirements of 40 CFR Part 265.93 and 6NYCRR Part 373-3.6. Monitoring wells MW-I, MW-3, MW-4, MW-5, MW-6, MW-7S, MW-3DR, MW-7D and MW-8D plus two bank seeps were monitored for the contaminants-of-interest (viz. arsenic, barium, chromium, lead and volatile organics) on a quarterly basis. All remaining monitoring wells were monitored annually for the contaminants-of-interest. All monitoring wells were monitored quarterly for pH, conductivity, turbidity as well as elevation data. Quarterly and annual reports summarizing the routine monitoring data were submitted to the NYSDEC.

Phase I routine monitoring was initiated in March 1989 and continued on a quarterly basis through July 1993.

2.4.3 Phase 1: Supplemental Site Assessment

A supplemental site assessment was conducted in response to NYSDEC comments on previous investigation reports prepared for the Palmer Street Landfill. A complete description of the investigative methodology and results of the supplemental site assessment is provided in the report entitled "Post-Closure Investigation Report - Palmer Street Landfill" (Ref#6, July 1991) prepared by Malcolm Pimie, Inc. This section presents a summary of the assessment objectives, and findings.

2.4.3.1 Objectives

The objectives of the program were developed in response to NYSDEC comments to previous investigation reports, which have been prepared for the Palmer Street Landfill. These objectives were as follows:

- Install a bedrock monitoring well fully downgradient of the waste/fill and replace a damaged existing well.(MW-4D).
- Assess the potential for hydraulic connections between on-site wells, off-site wells, and Cattaraugus Creek.
- Assess the need for long-term groundwater monitoring in bedrock in the northeast corner of the site.
- Assess the integrity/of existing deep overburden and bedrock monitoring wells (MW-3D and MW-8D).
- Recommend a detection monitoring strategy for the lower overburden which underlies the site.
- Recommend detection monitoring parameters.

2.4.3.2 **Summary and Conclusions** The results and conclusions of the supplemental site assessment are presented below:

- Overburden geologic formations in the southwestern corner of the site toward MW-1D consist of a thickening wedge of low permeability glaciolacustrine sediments and till.

- The potential for hydraulic connections between on-site wells, Cattaraugus Creek and the deep production wells in Gowanda was assessed as follows:
  - MW-1D, and to a lesser degree, MW-8D and MW-3DR, were shown to be influenced by pumping of the Moench Tanning production wells. The Village of Gowanda wells, if used on a regular basis, would also influence the on-site bedrock wells.
  - Bedrock water levels exhibited a long-term rise, which is attributed to the reduced use (pumping) of the Village of Gowanda water supply wells.
  - MW-3D and MW-3DR show no response to transient fluctuations in the stage levels in Cattaraugus Creek. Therefore, there is no direct hydraulic connection between the Creek and these wells. Tritium sampling results also suggest that no direct connection is present.
  - MW-6D shows a weak response to transient fluctuations in Cattaraugus Creek stage levels. The response is probably lessened by the low hydraulic conductivity of the upper bedrock at MW-6D.
- Long-term detection monitoring should be conducted in the northeast corner of the site at MW-6D based on the following.
  - A groundwater high has been identified in the upper bedrock zone between MW-7D and P-6D. Groundwater flows away from the high to the northeast toward Cattaraugus Creek.
  - The upper bedrock zone at MW-6D discharges to Cattaraugus Creek. This conclusion is based on the relative elevations of the Creek bed and groundwater in MW-6; and the tritium content in groundwater at MW-6D, which is much lower in comparison to the Creek.
  - Deep overburden wells MW-3D and MW-8 exhibit elevated pH and specific conductivity, which may be attributable to grout contamination. Redevelopment has not mitigated the elevated pH. However, neither well is applicable to detection monitoring, since the monitored intervals are probably of limited extent. Tritium levels in each well are equal to or less than tritium levels in the upper bedrock zone, indicating that the monitoring intervals are not recharged at a rate equal to or less than the upper bedrock.
  - Upper bedrock wells MW-7D, MW-8D, and P-6D all exhibit turbid samples, which are a result of weathered shale layers in the monitored intervals. Groundwater samples collected from the upper bedrock zone for the analysis

Palmer St. I/fill: Bedrock GW elevation

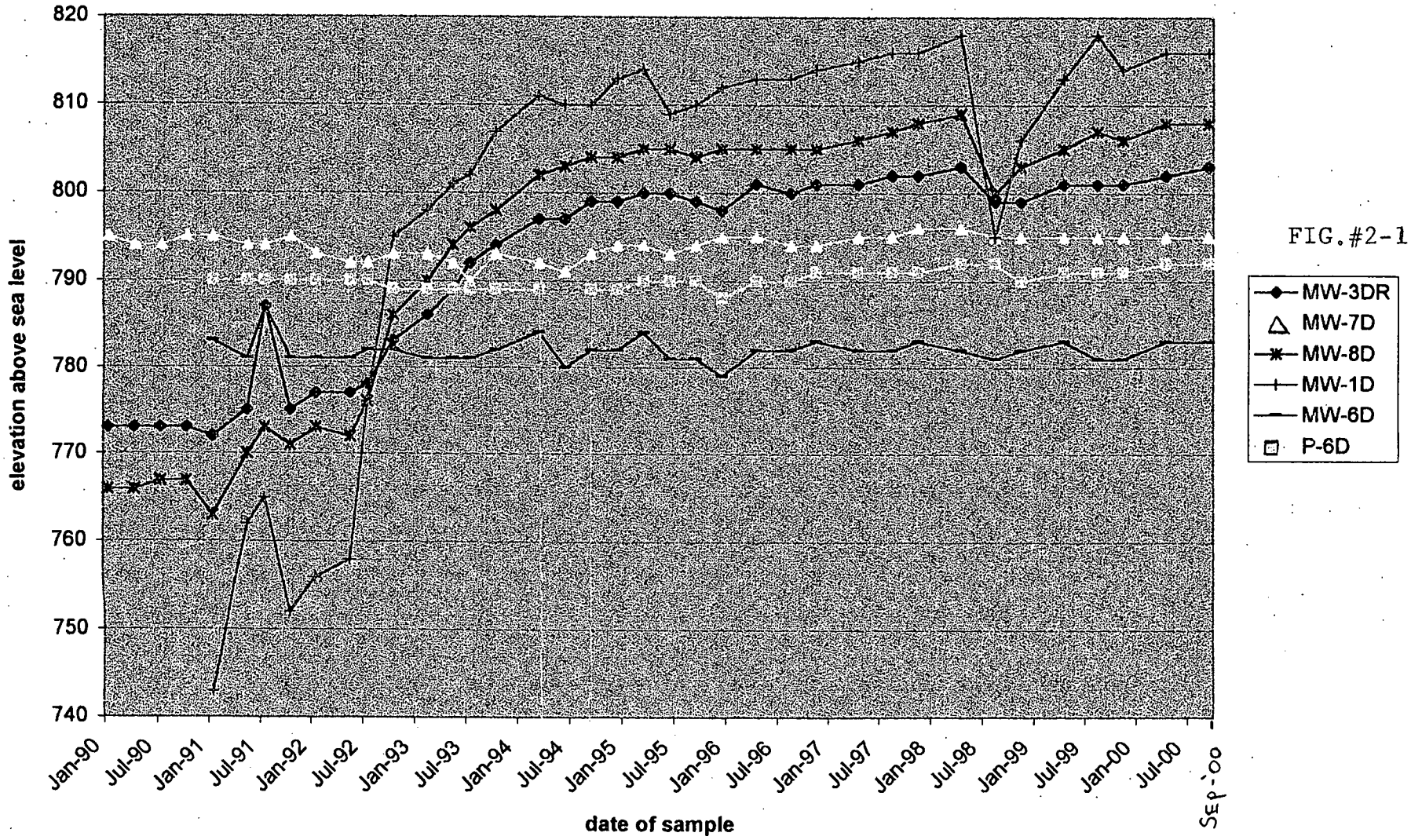


FIG.#2-1

plmrgw3-chart4

Palmer St. L/fill: Deep overburden GW elevation

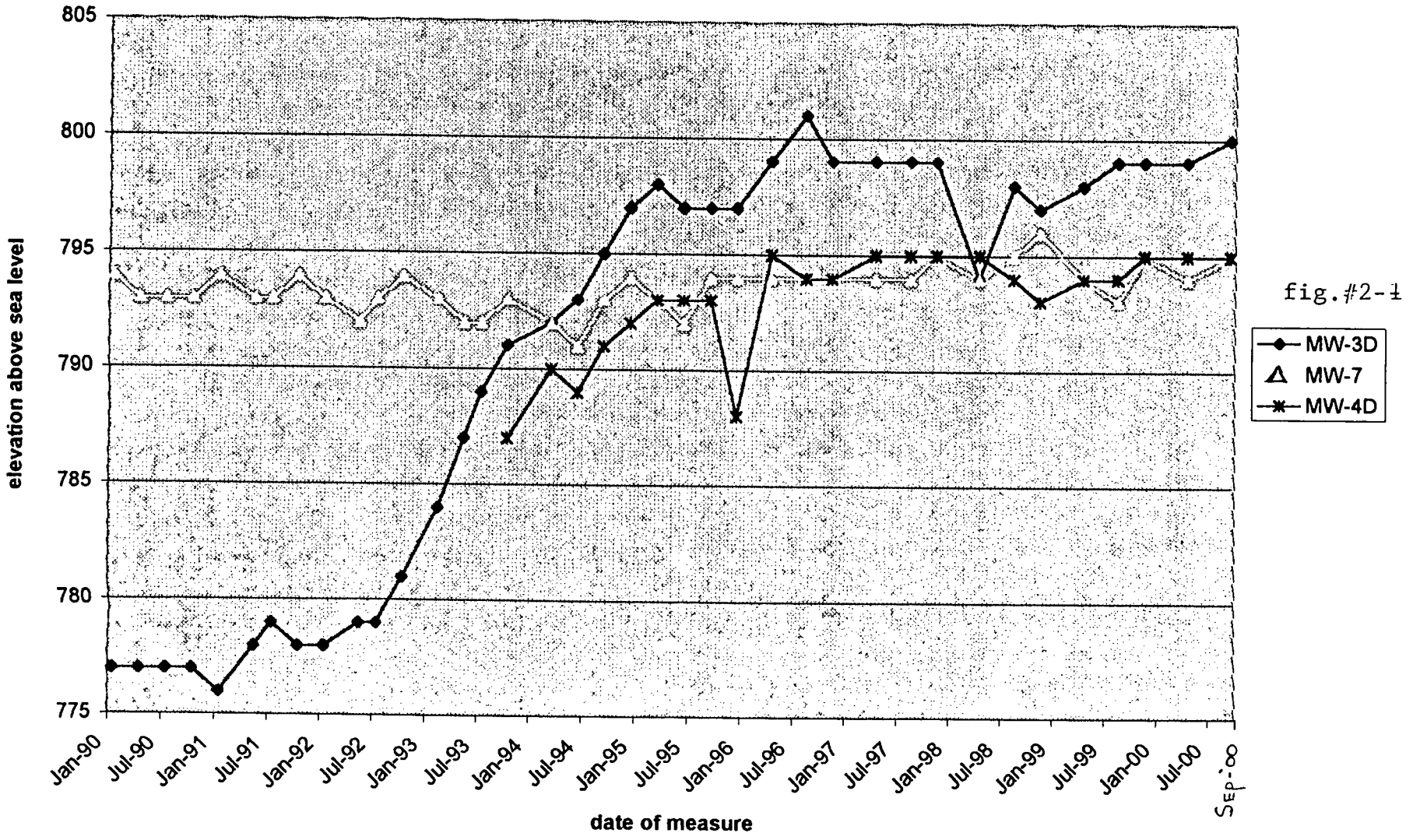


fig.#2-1

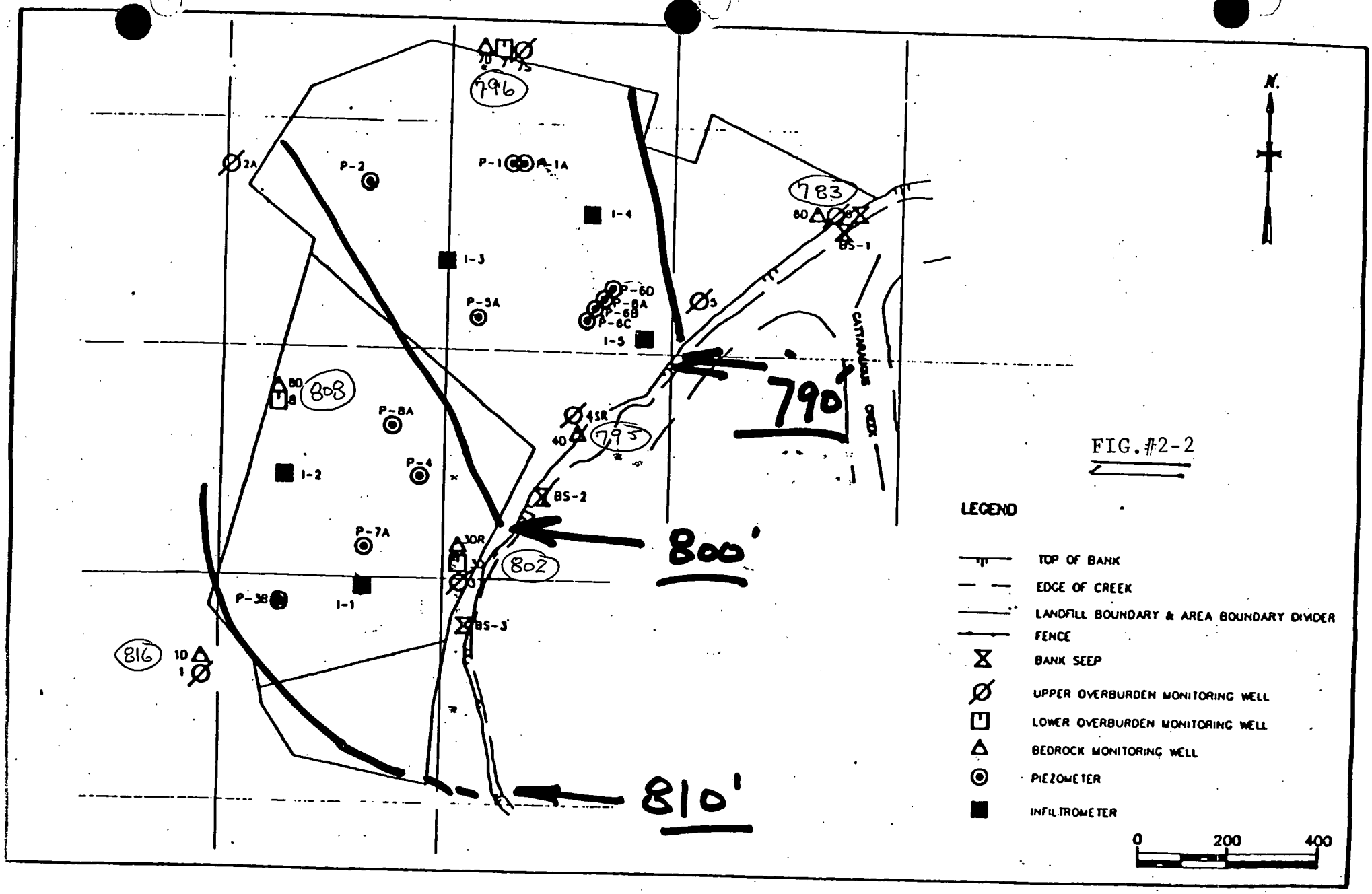


FIG. #2-2

PALMER STREET LANDFILL
BEDROCK ISOPOTENTIAL MAP
9-14-00 MONITORING EVENT
MOENCH TANNING COMPANY JULY 1992

FIGURE

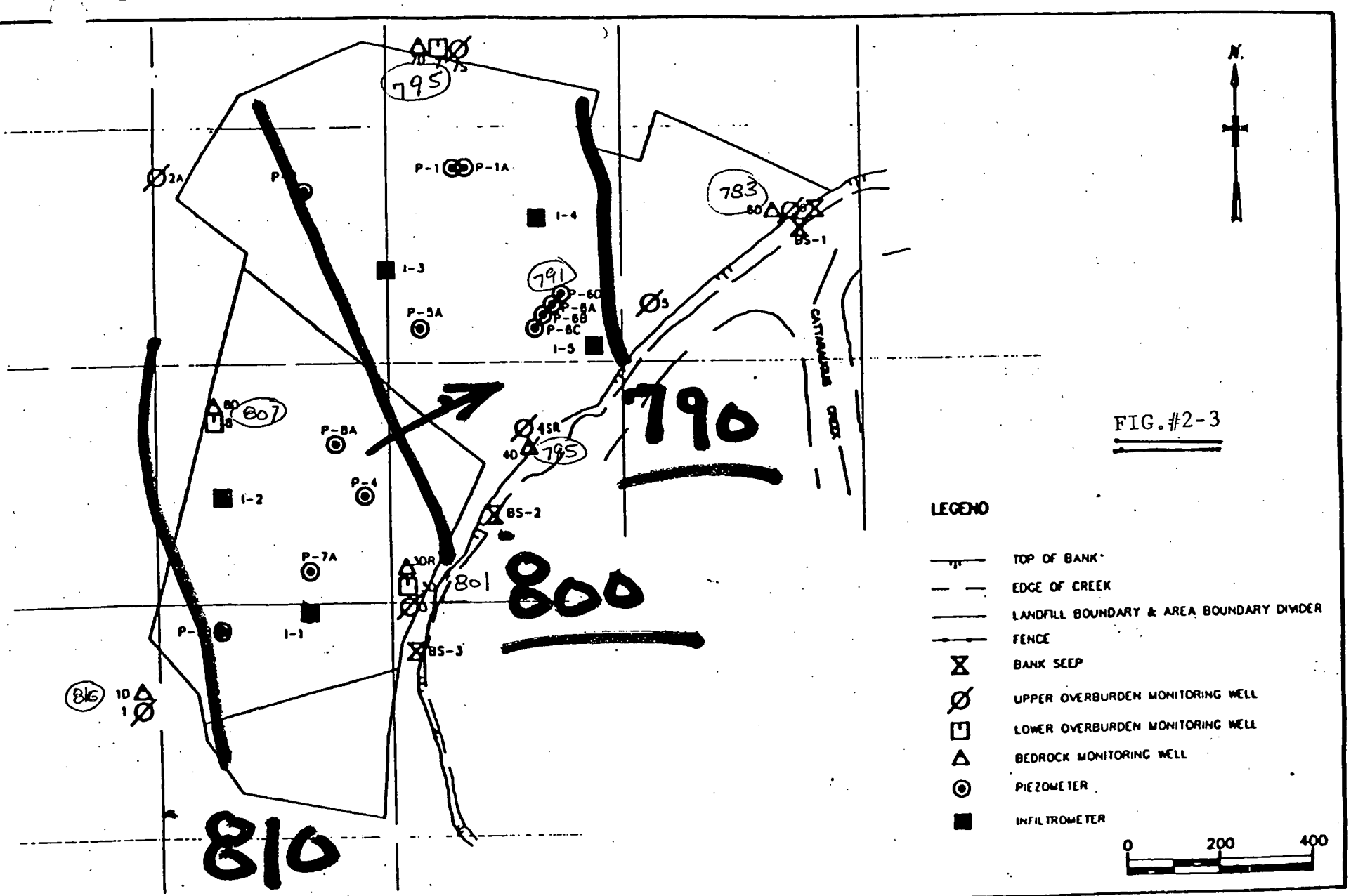


FIG. #2-3

PALMER STREET LANDFILL
BEDROCK ISOPOTENTIAL MAP
4-13-00 MONITORING EVENT

MOENCH TANNING COMPANY JULY 1992

FIGURE

of metals should be filtered to eliminate the interference of metal bearing sediment on the samples.

The long-term rise in bedrock water levels observed during the supplemental site assessment was accelerated during 1992 due to the cessation of pumping at the Moench Tanning Company production wells. Figure 2-1 is a hydrograph showing the changing bedrock water levels over time. The effect of the changing water levels on bedrock groundwater flow is illustrated on two bedrock groundwater isopotential maps presented as Figures 2-2 and 2-3.

Bedrock groundwater now flows from a groundwater potentiometric high situated within the buried bedrock valley (underlying Gowanda) toward Cattaraugus Creek. Under present conditions leachate that migrates downward through the aquitard underlying the site would ultimately discharge to Cattaraugus Creek.

As shown on Figure 2-1, groundwater levels were still rising during May 1993, but finally leveled off in 1995 and 1996. The general configuration of the isopotential lines (e.g., with flow toward the Creek) appears to be well established.

All bedrock wells located between the landfill and Cattaraugus Creek are and are likely to remain, in the absence of pumping, downgradient of the waste/fill. Bedrock wells located west and north of the site are upgradient wells.

The results of the supplemental site assessment and the reversal of bedrock groundwater flow were utilized in the development of the detection monitoring program

described below.

2.4.4 Phase II: Post-Closure Detection Monitoring(8/1993 – 6/2006)

This section outlines the monitoring locations, monitoring frequency, and monitoring parameters to be utilized in the post-closure Detection Monitoring program for the Palmer Street Landfill, which was initiated in November 1993. Detailed monitoring requirements, such as sampling and analytical procedures, are presented in a Post-Closure Sampling and Analysis Plan presented as Appendix 2.

The long-term post-closure Detection Monitoring program at the Palmer Street Landfill consists of three (3) principle elements, which are as follows:

- Detection monitoring of the regional bedrock groundwater flow system at upgradient and downgradient locations in accordance with 6NYCRR Part 360 or 40 CFR Part 264.98 and 6NYCRR Part 373-2.6(i);
- Early warning detection monitoring of the regional bedrock aquifer at a central location within the boundaries of the landfill to provide an early warning of contaminant release to the regional aquifer;
- Performance Monitoring(Phase III) of the shallow overburden groundwater/leachate flow system for periodic evaluation of landfill cover system impact performance and to determine when steady state flow conditions and chemical equilibrium have been established.

2.4.4.1 Monitoring Locations *Detection Monitoring Locations*

Detection monitoring was performed in the upper bedrock zone of the regional bedrock aquifer. The detection monitoring well network was be comprised of five/six monitoring wells as follows:

- Upgradient Wells: MW-7D and MW-1D (MW-8D, 1/yr.)
- Downgradient Wells: MW-3DR, MW-6D, and MW-4D.

Early Warning Detection Monitoring Location

Monitoring of the upper bedrock at P-6D and the lower overburden at P-6B will provide an early warning of contaminant release to the upper bedrock. The rationale for the selection of these wells is as follows:

- P-6D is upgradient of all downgradient monitoring wells;
- Based on vertical hydraulic gradients, leachate has the potential to move downward through the lower overburden and be detected at P-6D;
- Monitoring of the upper bedrock at an interior location provided an adequate warning or lead time to develop and implement a corrective action program. This conclusion is based on estimates of contaminant migration rates based on calculations using Darcy's Law and on the interpretation of tritium concentrations in bedrock wells.
- The groundwater quality data indicate that P-6D does not currently exhibit elevated levels of contaminants.
- Two Bank seeps were also samples: BS-1, located close to MW-6, and BS-3; located between area 2 and 3.

- Monitoring of the lower overburden (at P6-B) was performed as an additional monitoring point to detect contaminant releases to the upper bedrock.

2.4.4.2 Frequency of Sample: Starting in 1993 these Detection Monitoring Program were conducted four times per year, on an approximate seasonal basis. In 1996, it was proposed that the "winter" sample be eliminated, for safety purposes. This was approved by NYSDEC9, and sampling occurred three times per year, until 2001. From 2002 until currently(11/06), the samples occurred twice(2) per year. This was also approved by NYSDEC9. The large volume of historical data, and the consistency, allowed this to be changed. We now sample in a "wet" period, the spring, and a "dry" period, the summer.

2.5 Performance Monitoring Locations(Cover System Evaluation- Phase III)

The landfill cover system at the Palmer Street Landfill is comprised of 24-inches of a barrier layer and a 12-inches topsoil layer. A previous investigation (Reference 5) concluded that the cover system will provide equivalent performance to a "RCRA Cap". A performance evaluation of the landfill cover system was conducted (10/94, 9/98 & 8/03), to determine the actual impact of the cover system on the site water balance and contaminant loadings to Cattaraugus Creek.(ref# 10/11).

The upper overburden zone was recharged primarily by precipitation/infiltration and secondarily by upgradient groundwater flow. Both sources of recharge generated leachate at the Palmer Street Landfill. Construction of the landfill cover system will reduce the generation of leachate due to infiltration of precipitation.

It was conceivable that the leachate quality in the downgradient overburden monitoring wells would deteriorate further as infiltration through the cover system is reduced, although water levels will fall and loading will decrease. Therefore, the performance of the landfill cover system was evaluated by assessing the reduction in mass loading to Cattaraugus Creek from the upper overburden.

A mathematical model was developed during a previous investigation (Reference 5) that calculated a mass balance for the site. The same model or modifications thereof will be used during the post-closure period. The model uses observed concentration data and a calculated water balance to predict the mass load to Cattaraugus Creek. The calculated impact to Cattaraugus Creek is determined under average flow and low flow conditions.

The cover system performance evaluation will be based on water quality data from the following on-site monitoring locations:

2.5.1 Groundwater

Upgradient: MW-1, MW-2A
Groundwater/Leachate: P1, P2, P-6C, P-3B, P-7A, P-8
Downgradient- MW-3, MW4Sr, MW-5, MW-6, MW-7S

Waste/Fill Pore Water

Area 1 - LYS-P2, LYS-MW4, LYS-MW6T A

Area 2 - LYS-P7B, LYS-P8

Performance Monitoring

Construction of the landfill cover system has influenced the existing pattern of overburden groundwater/leachate flow. It also may result in measurable changes in overburden groundwater/leachate quality. Based on the results of the three "Cover System Evaluations" it is believed that steady state flow conditions and chemical equilibrium has been established. The cover system performance evaluation was conducted in Fall of 1994, Fall of 1998 and summer of 2003, after completion of construction of the final cover system. In July of 2006, as a result of meetings with NYSDEC9 and our environmental consultant(Geomatrix), an agreement was reached to eliminate the future "Cover System Evaluations-Performance Monitoring). This was done in exchange for a revised Detection Monitoring System. This is described in References #13 & #14.

2.5.2 Monitoring Parameters-Current.

The recommended monitoring parameters are listed in Table 2-2. These parameters are the same as the interim monitoring parameters being analyzed during the closure period, except that barium and total metals have been deleted from the monitoring program.

Detection monitoring samples that will be analyzed for metals, will be filtered to eliminate the interference from metal bearing sediments on the analytical results. To mitigate the potential effects of the filtering process on the samples, filtration will be performed with an in-line filter and under pressure, or vacuum pump and Erwinmeyer flask.

Total barium occurs in the waste/fill at concentrations of up to 2060 mg/kg. Soluble barium occurs in the leachate at concentrations that range from 1 to 4 times the 6 NYCRR Part 703 groundwater quality standard of 1.0 mg/l. However, the natural background concentrations of barium in the regional bedrock aquifer have been shown to equal and/or exceed barium concentrations in the leachate.

Moore and Staubitz (1984) have documented barium concentrations in 21 wells on the Cattaraugus Indian Reservation (north of Gowanda) which exceed the groundwater quality standard. Water supply wells for Moench Tanning and the Village of Gowanda have exhibited barium concentrations of 2.4 and 1.7 mg/l, respectively.

On-site wells MW-1D and MW-3DR have exhibited total barium concentrations of 5.5 and 1.7 mg/l, respectively. Neither MW-3DR nor MW-1D exhibit elevated concentrations of other constituents on the interim monitoring parameter list and neither well appears to be influenced by landfill derived leachate. Furthermore, barium in the more shallow bedrock wells, MW-6D and P-6D, which are well situated to intercept leachate contaminated groundwater, do not exhibit elevated barium.

In this context, it is difficult to distinguish between naturally occurring barium and landfill derived barium in the regional bedrock aquifer. Therefore, barium has been deleted from the monitoring program.

TABLE 2-2

MOENCH COMPANY; PALMER STREET LANDFILL

ROUTINE GROUNDWATER QUALITY MONITORING PARAMETERS

Soluble Arsenic
Soluble Chromium
Soluble Lead
Volatile Organics
pH

Conductivity

Turbidity(visual)

Groundwater Elevation

Temperature

All samples collected for analysis of soluble metals will be pressure-filtered in the field immediately upon sample collection.

NOTES;

1. All field parameters (i.e., pH, specific conductance, temperature and turbidity) will be measured in the field. No analysis of these parameters will be required by the laboratory.
2. Volatile organic compounds will be those compounds determined by SW-846, Method 8260.

2.6 CURRENT DETECTION MONITORING PROGRAM(7/06); Phase IV

In July of 2006, meetings were held with the New York State Department of Environmental, Region 9, for the purpose of reconfiguring the Routine Detection Monitoring Program. Our Environmental Consultants(Geomatrix) were also present. This was done, after evaluating the results of the three "Performance Monitoring " results and the prior 12 years of "Detection Monitoring". It was decided and agreed that a steady state of groundwater flow had been reached in the landfill, and that the primary groundwater flow was toward Cattaraugus Creek. As such, downgradient Overburden/Waste wells and bedrock well would be used in future Detection Monitoring programs.(Ref# 13 & 14).

The details of this plan are addressed in Appendix 2; the "Sampling Plan and Quality Assurance Plan for Monitoring Activities at The Palmer Street Landfill.

2.7 MAINTENANCE OF BENCHMARKS

A benchmark is located on the headwall for the stormwater discharge located between disposal areas 1 and 2. This benchmark will be maintained throughout the post-closure period.

2.8 SITE SECURITY

Following site closure, the property will not be used for any purpose that may jeopardize the integrity of the cover system, venting system or monitoring system. Site access will be restricted except for those vehicles and personnel necessary to provide routine inspection and maintenance as described in Sections 2.1 and 2.2 of this Closure plan. Unauthorized access to the site will be discouraged by virtue of the existing fence on the north, south and west boundaries. The natural boundary of the steep creek bank on the east should be sufficient to restrict unauthorized access which might lead to potential damage of the closure appurtenances of the site from this direction.

2.9 Contingency Sampling in the event of parameter detection above the "GA" Standard.

-Because regional groundwater may be potentially impacted by the landfill discharge directly into Cattaraugus Creek, the contingency monitoring focus on potential impact to the Creek. This does not pertain to the wells that are screened in the waste. The following monitoring is proposed:

-Contingency Monitoring Trigger: Groundwater concentration detected above the GWQS in routine monitoring locations downgradient of the landfill. A confirmation sample(2^{nd}) from the affected location will be analyzed prior to triggering the contingency monitoring program.

-Sample locations: Surface water in Cattaraugus Creek approximately 3 to 5 feet off the bank, near BS-1. Sampling procedures should include the direct filling of sample bottles from the Creek.

- Sample analysis: Parameters of concern and analytical methodology as indicated in the current Post-Closure and Quality Assurance Plan.
- An upstream sample will be taken if parameters of concern are detected at the downstream location above 6NYCRR Part 700-703 Standards for Class C water. If the parameter of concern are determined to be from an upstream source, contingency monitoring will be terminated.
- Contingency Monitoring Frequency: The Detection Monitoring Program will now be performed twice a year.(wet/dry). If a parameter is detected above the Standard, at a location, special review will be done for that location for the next four sample events. After four samples, the data will be reviewed, and one of the following responses implemented.
- If the GWQS is not exceeded in the groundwater sample for four consecutive samples, contingency monitoring will be terminated, and the regular Detection Monitoring Plan resumed.
- If the standards are not exceeded in the surface water and the GWQS continues to be exceeded in the groundwater, contingent creek sampling will continue, to confirm that the creek is not impacted. Creek sampling will be discontinued after four consecutive samplings showing no impact of the creek.
- If both Class C surface water and GWQS for groundwater are exceeded for four consecutive samples, Moench Company will assess the risk posed by the elevation. If necessary Moench will implement corrective measures, assess the characteristic of the cause, nature, and extent If the release; and select feasible remedy. Remedial measures, if needed, will be implemented after NYSDEC review.

3.0 POST-CLOSURE COST AND FINANCIAL ASSURANCE

3.1 POST CLOSURE COST ESTIMATES

Preliminary post-closure costs associated with groundwater monitoring and site maintenance as described in Section 2 of the Post-Closure Plan are present in Table 3-1. The post-closure cost estimate will be adjusted annually for inflation and will be a change in the plans increase/decreases costs.

(11/06) The Post Closure Cost has been greatly reduced, due to reduction of sampling events per year. Also, parameters have been reduced. The sampling and report writing is performed by Moench Company personnel and not a Environmental Consultant.

3.2 FINANCIAL ASSURANCE AND LIABILITY COVERAGE

As required by 40CFR 264.143(f) and 264.147(f) and 6NYCRR 373-2.8(g)(h), documentation that the Brown Group Inc. meets the requirements for financial assurance and liability coverage for the post-closure period will be provided under separate cover.

Table 3-1

November 2006

Palmer Street Landfill
Post Closure Plan Projected Costs-For Remaining 15 years

	Item	Unit of Measure	Quantity	Unit Costs($)	Estimated Costs ($)
1.	Laboratory Tests (1) (Detection Sample)	Sample Occasion	30	$ 1680/event	$ 50,400
2.	Sample Collection(2)	Manhours	1200	$ 50	$ 60,000
3.	Annual Detection(3) Report.	Manhours	450	$ 50	$ 22,500
4.	Site Inspection(4)	Manhours	120	$ 50	$ 6,000
5.	Site Maintenance(5)	Years	15	$ 2000(7)	$ 30,000
				Subtotal	$ 168,900
				Contingency 10%	16,900
				Total Post Closure Costs, 15 yrs.	$ 185,800
				Average cost per year, in 2006 $..	$ 12,387

(1) Laboratory costs based on the remaining 15 years of the Post Closure Period. 2006 Geomatrix/Severn Trent Lab costs of $ 1680/sample event. Performance Monitoring has been eliminated.

(2) Detection sampling; One person x 10 days per year= 80hrs/yr. = 1,200 hours.

(3) Semi-annual reports and Annual report by Moench Co. personnel; 30 manhours per yr. x 15 years= 450 manhours.

(4) Semi-Annual inspection by Moench personnel; one person, 2- ½ days per year x 15 years.

(5) Costs are based on 2006 dollars; actual cost may vary based on cost inflation.

(6) New Detection Monitoring samples(7/06), assumes 9 monitoring wells and 3 bank seeps, plus QA/QC samples. Each event analyzed for soluble arsenic, Chrome, Lead, Volatile Organics. PH, conductivity, Turbidity and temperature measured in the field.

(7) Lump sum unit costs because scope of work is unpredictable. Routine maintenance not included; grass cutting, trimming around wells, painting wells, maintaining locks, removing growth off fences, routine road maintenance/gravel.

MALCOLM PIRNIE

TABLE 3-2

PALMER STREET LANDFILL
MOENCH TANNING COMPANY

ANALYTICAL PARAMETERS/METHODS/PROTOCOL

Parameter	Method	Method Ref.	Maximum Detection Limits (mg/L) (Note 1)	Holding Time	Preservation (Note 2)	Container (Note 3)
Soluble Arsenic	3020/7060	1	0.010	Note 4	HNO_3 to pH <2	500 ml plastic or glass
Soluble Chromium	3020/7191	1	0.010	Note 4	HNO_3 to pH <2	500 ml plastic or glass
Soluble Lead	3020/7421	1	0.010	Note 4	HNO_3 to pH <2	500 ml plastic or glass
Purgeable Halocarbons/	5030/8260	1		Note 5	Cool to 4°C	40 ml glass VOA vial with Teflon septum
Volatile Aromatics	5030/8260	1		Note 5	Cool to 4°C	40 ml glass VOA vial with Teflon septum
Methyl Ethyl Ketone	5030/8260	1		Note 5	Cool to 4°C	40 ml glass VOA vial with Teflon septum

References:

1. Test Methods for Evaluation of Solid Wastes. USEPA SW-846, 3rd Edition. 11/86.
2. Methods for Chemical Analysis of Water and Wastes. USEPA, Cincinnati, Ohio. EPA 6W/4-79-020. Revised March 1983.

Notes:

1. The laboratory shall make every reasonable effort to achieve analytical detection limits that are less than or equal to those cited above.
2. Preservations will be added to the sample bottles in the field bottles in the field immediately after sample has been collected. Ice will be used to cool samples in the field and in transit to the laboratory.
3. Containers shown are those necessary to satisfy volume requirements for water analysis.
4. Analysis of water for all metals must be completed within 180 days of the VTSR (Validated Time of Sample Receipt). The VTSR shall be the date on which a sample is received at the laboratory, as recorded on the chain-of-custody form and the lab's central sample log.
5. All field samples will be delivered to the lab within one (1) day of their collection. VOA analysis of water samples must be completed within seven days of VTSR.

REFERENCES:

1. **Malcolm Pirnie, Inc., November 1987**. Palmer Street Landfill, Supplimental Hydrogeologic Investigation.

2. **Malcolm Pirnie,Inc., August 1985.** Groundwater Quality Assessment Program, Palmer Street landfill.

3. **Malcolm Pirnie, Inc., 1983.** Site Investigation. Palmer Street Landfill.

4. **Malcolm Pirnie, Inc, March 1986.** Groundwater Quality Assessment Report, Palmer Street Landfill.

5. **Malcolm Pirnie, Inc., January 1989.** Palmer Street Landfill, Evaluation Alternative Cover Systems, Volume 1, 2 & 3 Reports.

6. **Malcolm Pirnie, Inc., July 1991.** Post-Closure Investigation Report-Palmer Street Landfill.

7. **Malcolm Pirnie Inc., 1985, revised August 1989.** Palmer Street Landfill Closure/ Post-Closure Plan.

8. **Moore R. B. and Staubitz, W.E., 1984**. "Distribution and Source of Barium in Groundwater At Cattaraugus Indian Reservation, Southwestern, New York", U. S. Geological Survey, Water Resource Investigation Report, 84-4129.

9. **U.S. D. A. Soil Conservation Service, 1977**. Conservation Planting on Critical Erosion Areas, Syracuse, NY, Pg.2.

10. **Malcolm Pirnie Inc., October 1995, revised December 1996**. Cover System Performance Evaluation, Palmer Street Landfill.

11. **Malcolm Pirnie, Inc., March 1999.** 1998 Cover System Performance Evaluation, Palmer Street Landfill.

12. **Geomatrix Consultants; February 2004. 2003 Landfill Cover** System Performance Evaluation Report; Palmer St.

13. Geomatrix Consultants; July 27, 2006. Letter to Stan Radon(NYSDEC9) documenting The meeting and agreement to changes to the "Detection Monitoring Program".(following page)

14. New York State Dept. of Environmental Conservation; Sept. 7, 2006 letter to Jeffrey Smith(Moench), agreeing and confirming the changes to the "Detection Monitoring Program", and elimination of the "Performance Monitoring Program".

Geomatrix

July 27, 2006

REF # 13

Mr. Stan Radon
New York State Department of Environmental Conservation
Region 9 Office
270 Michigan Avenue
Buffalo, New York 14203-2999

Subject: **Revised Monitoring Program Summary**
Palmer Street Landfill – Moench Company Site
Gowanda, New York

Dear Mr. Radon:

Geomatrix Consultants, Inc. (Geomatrix) and Moench Company appreciate your time on July 19, 2006 discussing the results of landfill cover system performance evaluations and nearly two decades of groundwater quality monitoring at the landfill site. This letter summarizes the conclusions from our meeting and identifies actions that will be undertaken by Moench.

Cover system performance evaluations have demonstrated that the alternative cover system installed at the landfill more than 15 years ago adequately limits vertical infiltration of precipitation and steady-state groundwater quality conditions exist at the site. It was agreed that an effective and efficient method of assessing cover system performance is through continued evaluation of downgradient groundwater quality data obtained from wells screened in the overburden (that sometimes includes saturated waste) and upper bedrock located closest to Cattaraugus Creek. In addition to sampling of wells near the Creek, evaluation of water quality data from sampling bank seeps existing along the Creek bank would be sufficient to assess potential releases from the landfill. The evaluation of these data would be conducted in-lieu of the stand-alone landfill cover system performance evaluation reports that have been submitted to the Department previously on a five year basis.

During our discussion, it was mutually agreed upon that the following downgradient and upgradient monitoring wells and bank seeps would be sampled on a semi-annual basis:

Downgradient Wells				**Upgradient Wells**		**Bank Seeps**
Overburden/Waste		*Bedrock*				
MW-3		MW-3D		MW-7D		BS-1
MW-4SR		MW-4D		MW-8D		BS-2
MW-5		MW-6D				BS-3
MW-6						

908 John Muir Drive, Suite 104
Amherst, New York 14228-1148
Tel 716.565.0624
Fax 716.565.0625
www.geomatrix.com

REF # 13

No changes to the parameter list were discussed.

It should be recognized that some of the wells screened in the waste do not always yield representative water samples. This is due to the fact that the cover system has lowered the saturated level in the landfill and has caused some of the wells to yield insufficient quantities of water to be sampled. Wells will not be sampled if they are dry or have less than 0.5 ft of standing water (water collecting in the bottom sump at the well bottom from condensation). Water level monitoring will continue to be measured in the detection wells listed above and other on-Site wells in order to prepare potentiometric surface maps for the overburden and upper bedrock water-bearing zones. In addition, measurements will be recorded in the infiltrometers used to evaluate infiltration through the cover.

The change to the monitoring program was agreed to be effective for the second sampling event in 2006 (scheduled for August 2006). It was also agreed that Moench will incorporate these plan modifications into a revised Post-Closure Monitoring Plan for the Site to be submitted to the Department prior to the first sampling event in 2007.

Please contact the undersigned or Mr. Jeff Smith at Moench Company (716) 532-2201 if these changes are not documented as discussed during our meeting or if you have any questions.

Sincerely yours,
GEOMATRIX CONSULTANTS, INC.

Richard H. Frappa, P.G.
Senior Hydrogeologist

cc: J. Smith (Moench)

New York State Department of Environmental Conservation
Division of Solid and Hazardous Materials, Region 9
270 Michigan Avenue, Buffalo, New York, 14203-2999
Phone: (716) 851-7220 • **FAX:** (716) 851-7226
Website: www.dec.state.ny.us

Denise M. Sheehan
Commissioner

REF # 14 cc: Virgil S.

September 7, 2006

Mr. Jeffrey Smith
Site Manager
Moench Company
Division of Brown Shoe Company
465 Palmer Street
Gowanda, New York 14070

Mr. Smith:

Alternate Groundwater Monitoring Program

The New York State Department of Environmental Conservation (the "Department") has reviewed your July 27, 2006 (sent by Geomatrix) letter, as well as prior correspondence associated with the proposed alternate Groundwater Monitoring System. The following are the Department's comments.

The Department approves of the groundwater monitoring network provided in the July 27, 2006 letter. As a result of the consistent cover system performance evaluations, the modified groundwater monitoring network, and steady-state groundwater quality conditions, the Department agrees to eliminate the requirement of future cover system performance evaluations. Moench shall submit a revised Post-Closure Monitoring Plan that incorporates all modifications to the Department by December 31, 2006.

If you have any questions regarding this letter, please contact me at (716)851-7220.

Sincerely,

Stanley Radon
Senior Engineering Geologist

cc: Mr. James Strickland, DEC Buffalo
Mr. Richard Frappa, Geomatrix Consultants, Inc.

MALCOLM PIRNIE

APPENDIX 1

SITE INSPECTION CHECKLIST AND MAINTENANCE SCHEDULE

SITE INSPECTION CHECKLIST

Date:

Inspected By:

	CONDITION: (Check)				
	Acceptable	Not Acceptable	Present	Not Present	REMARKS
1) Vegetative Cover					
a) Landfill Site	___	___			
b) Mining Area	___	___			
c) Drainage Ditches	___	___			
d) Leachate Collection System	___	___			
2) Integrity of Drainage Ditches					
a) sediment build-up	___	___			
b) pooling or ponding	___	___			
c) slope integrity	___	___			
d) overall adequacy	___	___			
e) anti-erosion matting	___	___			
f) lining	___	___			
3) Integrity of Gas Vents	___	___			
4) Condition of Access Road					
a) road condition	___	___			
b) gates/locks	___	___			
5) Integrity of Groundwater Monitoring Wells	___	___			
6) Integrity of Landfill Cap					
a) erosion damage			___	___	
b) leachate breakthrough			___	___	
c) settlement			___	___	
d) cracking			___	___	

SITE INSPECTION CHECKLIST - continued

Date:

Inspected By:

	CONDITION: (Check)				
	Acceptable	Not Acceptable	Present	Not Present	REMARKS
7) Leachate Collection System					
a) flow in pipe	—	—			
b) sediment in pipe			—	—	
c) storage tank - structural integrity	—	—			
d) high water level in leachate storage tank			—	—	
8) Other (e.g. litter, unauthorized dumping, etc.					

MAINTENANCE SCHEDULE

Date:

MAINTENANCE PERFORMED (check)	ITEM	REMARKS
	1) Vegetative Cover:	
___	a) seeding	
___	b) fertilizing	
___	c) topsoil replaced	
___	d) removal of undesirable vegetation	
	2) Drainage Ditches:	
___	a) excavation	
___	b) landfill cap replacement	
___	c) fill	
___	d) regrading	
___	e) vegetative cover placement	
___	f) stone lining replacement	
___	g) anti-erosion matting replacement	
	3) Leachate Collection System	
___	a) collection pipe flushing	
___	b) sediment removal	
	c) repair/replacement:	
___	i) collection piping	
___	ii) excavation	
___	iii) gravel backfill	
___	iv) non-woven filter fabric	
___	v) fill/cover	
___	vi) vegetative cover	
___	vii) storage tank	
	4) Access Road	
___	a) fill	
___	b) grading	
	c) Repair/Replacement:	
___	i) gate	
___	ii) locks	
___	iii) signs	

MAINTENANCE SCHEDULE - continued

Date:

MAINTENANCE PERFORMED (check)	ITEM	REMARKS
	5) Repair/Replacement:	
	a) Gas Vents	
___	i) excavation	
___	ii) gravel fill	
___	iii) vent pipe	
___	iv) screen	
___	v) cover	
___	vi) vegetative cover	
	b) Landfill Cap	
___	i) excavation	
___	ii) cover	
___	iii) compaction	
___	iv) testing	
___	v) grading	
___	vi) vegetative cover	
	c) Groundwater Monitoring Wells	
___	i) drilling	
___	ii) screening	
___	iii) casing	
___	iv) pipe	
___	v) fill/grout	
___	vi) cap	

SAMPLING PLAN AND QUALITY ASSURANCE PLAN FOR MONITORING ACTIVITIES AT THE PALMER STREET LANDFILL.

MOENCH COMPANY
Division of Brown Shoe Company
GOWANDA, NEW YORK 14070

JULY 1993
Revised March 1994
Revised March 2001
Revised December 2006

Jeffrey Smith
Site Manager

APPENDIX 2

SAMPLING & QUALITY ASSURANCE PLAN- POST CLOSURE PLAN
PALMER STREET LANDFILL
MOENCH COMPANY

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APPENDIX 2

THE BROWN GROUP
PALMER STREET

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APPENDIX 2

THE BROWN GROUP
PALMER STREET

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LIST OF ATTACHMENTS

REVISE PCP

Detection Monitoring Program: 10/06
Palmer Street Landfill.

Revisions due to meetings with Stan Radon of the NYSDEC-9 over a two year period.

Moench Company and the NYSDEC, region 9, met over a two year period to discuss revisions to the Palmer St. landfill Detection Monitoring program. Richard Frappa, of Geomatrix Consultants, was our Environmental advisor.

Three rounds of the Cover System Performance Evaluation had also been completed and evaluated. In a meeting of March 2005; Stan Radon stated that now was a relevant time to evaluate the entire Groundwater Sampling system. Stan continued: NYSDEC is now more concerned about the wells along the Cattaraugus Creek, as the creek receives the majority of the discharge from the landfill. He will accept elimination of some interior, deep wells that are not relevant to groundwater migration. NYSDEC agrees that Moench Co. may eliminate the 5 year Cover System Performance Evaluation , with some modification/additions to the Detection Monitoring program.

M/S WORD

1.0 INTRODUCTION

1.1, 1.2,1.3 BACKGROUND-LANDFILL.& DESCRIPTION

THE MOENCH COMPANY, A DIVISION OF BROWN SHOE CO, AND IS LOCATED NEAR THE SOUTHEAST CORNER OF THE VILLAGE OF GOWANDA, CATTARAUGUS COUNTY, NEW YORK.(FIGURE 1). THE PALMER STREET LANDFILL, WHICH WAS OPERATED BY MOENCH TANNING FROM 1900(APPROX), THROUGH JULY 1983, LIES IMMEDIATELY SOUTHWEST OF THE (FORMER) TANNERY COMPLEX ON AN APPROXIMATELY 25-ACRE, PARCEL OF LAND. A VARIETY OF WASTE GENERATED BY MOENCH TANNING WERE DISPOSED OF AT THE PALMER STREET LANDFILL SITE. THESE WASTES INCLUDED SOLE LEATHER EXTRACT, RENDERING WASTE, SPRAY BOOTH CLEAN UP WASTE, WASTE FINISH, WASTE HAIR/LEATHER SCRAPS, WASTEWATER TREATMENT PLANT SLUDGE, AND OCCASIONAL CONSTRUCTION DEBRIS.

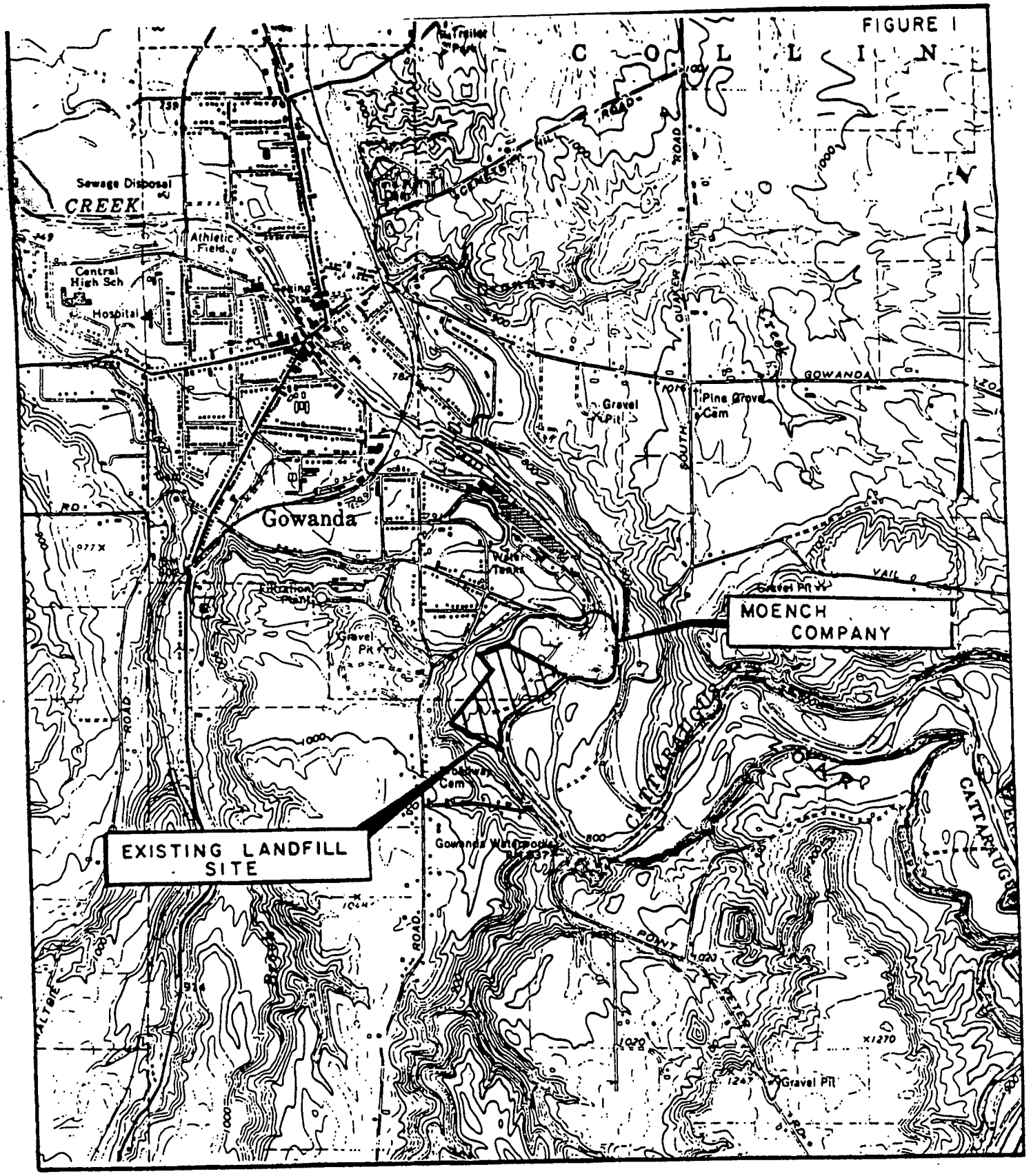
MOENCH TANNING HAS CLOSED THE PALMER STREET LANDFILL. ACCORDINGLY, THE CLOSURE/POST CLOSURE PLAN(REFERENCE 1), IS BEING PERFORMED. THE LONG-TERM POST CLOSURE MONITORING PROGRAM HAS BEEN APPROVED & IMPLIMENTED.(JULY 1993, REVISED MARCH 1994 & MARCH 2001)

IN JULY OF 2006, A PROPOSAL WAS MADE TO THE NEW YORK STATE DEPT. OF ENVIRONMENTAL(NYSDEC), TO RECONFIGURE THE GROUNDWATER MONITORING SYSTEM(REF#7). THIS WAS AGREED UPON IN EXCHANGE FOR THE ELIMINATION OF THE FIVE YEAR "COVER SYSTEM EVALUATION". THE NEW MONITORING SYSTEM IS DESCRIBED IN SECTION 2.0

1.2 PURPOSE AND SCOPE(EXAMPLE)

SAMPLES ASSOCIATED WITH THE SECOND EVENT OF TWO, WATER QUALITY MONITORS, FOR 2006 YEAR, WERE COLLECTED ON AUGUST 7TH TO AUGUST 9TH, 2006. THE AREA HAD A SLIGHTLY WET SUMMER. SAMPLES WERE NOT OBTAINED IN BS1, BS2, MW5(new), OR MW3(new).

A CREEK SAMPLE WAS OTAINED IN PLACE OF THE BANK SEEPS, JUST ADJACENT TO THE BANK SEEP LOCATION.



{Figure 1}

NOTE:
TOPOGRAPHY TAKEN FROM 1963 GOWANDA, N.Y.
U.S.G.S. QUADRANGLE 7.5 MIN. SERIES
SCALE: 1" = 2000'

Lat. 42°, 27'0"
Long. 78°, 55'30"

QUADRANGLE LOCATION

SITE LOCATION MAP
PALMER STREET LANDFILL
GOWANDA, N.Y.

6-94

MOENCH Co.

2.0 MONITORING SYSTEM(RECONFIGURED 7/06)

THE RECONFIGURED GROUNDWATER MONITORING SYSTEM FOR THE PALMER STREET LANDFILL(FIG. 2), CONTAINS NINE(9) MONITORING WELLS AND THREE(3) BANK SEEPS. A REVISED POST CLOSURE PLAN, DESCRIBING THE DETAILS, WILL BE SUBMITTED TO THE NYSDEC 9, BY JANUARY 2007.

UPGRADIANT WELLS	OVERBURDEN/WASTE WELLS	BEDROCK WELLS
	MW-3	MW-3D
MW-7D	MW-4SR	MW-4D
MW-8D(ONCE/YR.)	MW-5	MW-6D
	MW-6	

IN ADDITION TO THE WELLS, NYSDEC ALSO REQUIRES THE MONITORING OF THREE (3) BANK SEEPS DESIGNATED AS BS-1, BS-2 AND BS-3, RESPECTIVELY. THE ABILITY TO OBTAIN SAMPLES FROM THESE BANKSEEPS IS SPORADIC DUE TO VARYING WEATHER/MOISTURE CONDITIONS. BANK SEEP BS-1 AND BS-2 WERE DRY, BUT BS-3 EXISTED AND WAS SAMPLED. A CREEK SAMPLE WAS OBTAINED IN PLACE OF BS-1/2.

TO AID IN THE EVALUATION OF COVER PERFORMACE, WATER LEVELS FROM FIVE (5) INFILTROMETERS ARE ALSO MONITORED. LOCATIONS OF MONITORING POINTS ARE SHOWN ON FIGURE 2. THE RESULTS CONTINUE TO INDICATE THAT THE COVER SYSTEM IS PERFORMING AS PLANNED. THESE SHOWED MINIMAL INFILTRATION FOR THIS SAMPLING EVENT. TABLE #4

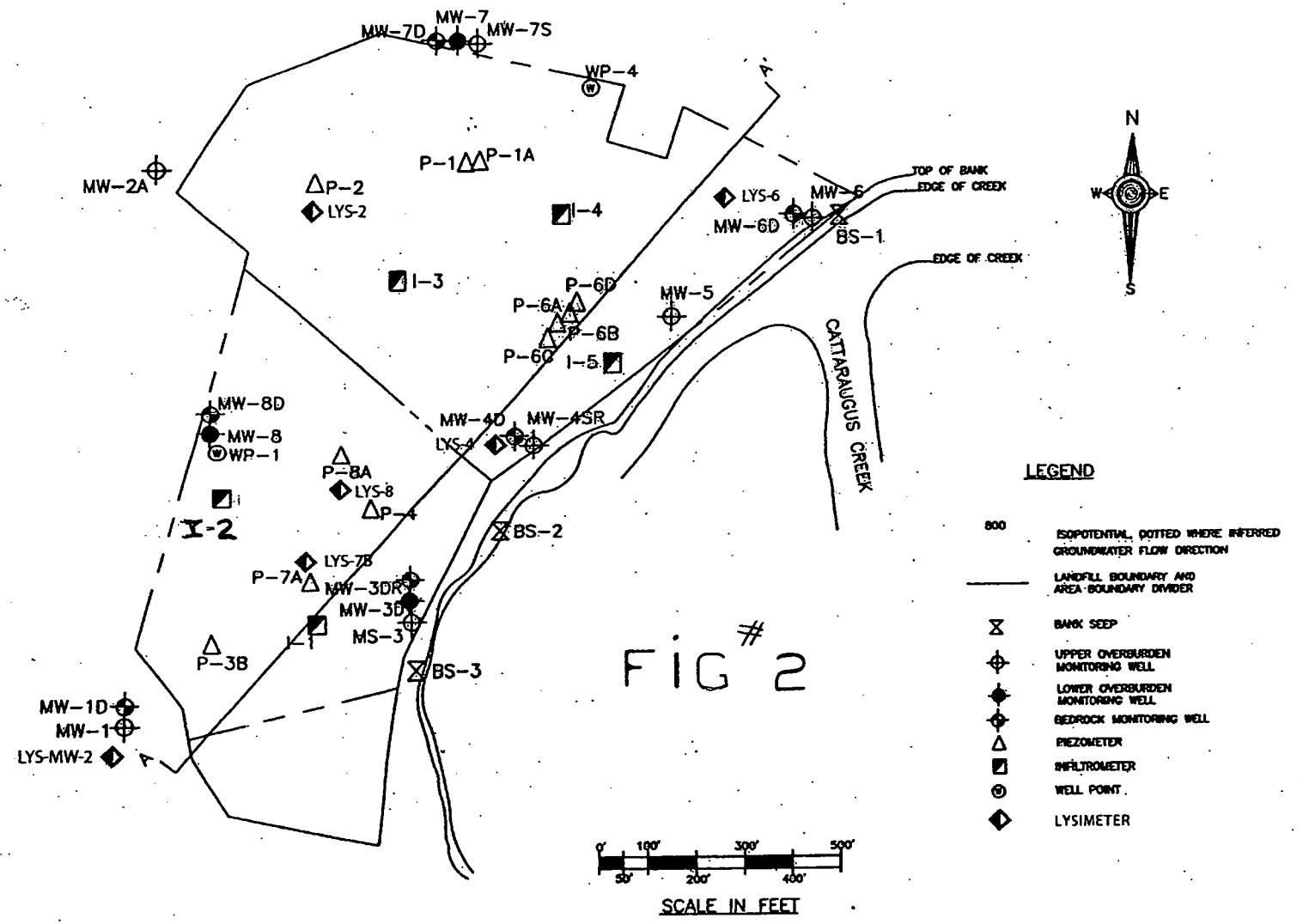


FIG # 2

Geomatrix Consultants, Inc.
~~338 Harris Hill Road, Suite 201~~
Williamsville, NY

PALMER STREET LANDFILL

SITE PLAN

DATE	PROJ. NO.
NOV/05/03	8104
FILE NO.	DWG. NO.
N/A	FIGURE 1.2

TABLE 1–1
MOENCH TANNING COMPANY
PALMER STREET LANDFILL
SAMPLING PLAN & QUALITY ASSURANCE PLAN
CORRELATION OF GEOLOGIC AND HYDROGEOLOGIC UNITS

GEOLOGIC UNITS	HYDROGEOLOGIC UNITS
Uppermost Aquifer	
Waste/Fill Alluvial Silt, Sand & Gravel Glaciolacustrine Silt & Sand	Upper Overburden Unconfined Water/Leachate Bearing Zone
Glaciolacustrine Silt & Clay Glacial Till Glaciofluvial Sand & Gravel	Lower Overburden Confining Water Bearing Zone
Regional Aquifer	
Bedrock Deposits	Regional Confined Water Bearing Zone

TABLE 2-1
MOENCH TANNING COMPANY
PALMER STREET LANDFILL
POST CLOSURE INVESTIGATION
MONITORING WELL CONSTRUCTION SUMMARY

	ELEVATIONS		DEPTHS				DIMENSIONS				
WELL NO.	GROUND SURFACE	WELL RISER ELEVATION	TOP OF SAND PACK	TOP OF SCREEN	BASE OF WELL	BASE OF SAND PACK	BOREHOLE DIAMETER	WELL DIAMETER	TYPE OF SAND PACK	SCREEN LENGTH X SLOT SIZE	NOTES
MW-1-83	822.00	825.00 826.05 (1)	8.0	9.0	29.5	29.5	7 in.	2"	#4	20' x .010"	
MW-1D-90	821.56	822.70 827.81 (1)	172.4	174.3	184.3	186.1	6 in.	2"	#4	10' x .010"	6" Overburden casing SCH 80 PVC
MW-2-83	808.00	811.42	9.0	10.0	30.0	30.0	7 in.	2"	#4	20' x .010"	Replaced
MW-2A-90	808.22	810.62	7.0	9.0	14.0	14.0	10.5 in.	2"	#1	5' x .006"	
MW-3-83	804.20	807.21 810.81 (2)	3.0	3.5	13.5	13.5	7 in.	2"	#4	10' x .010"	
MW-3D-87	804.49	807.22 810.73 (2)	51.0	56.5	61.5	69.5	4.5 in.	2"	#2	5' x .010"	
MW-3DR-88	804.79	806.96 810.47 (2)	86.0	87.0	97.0	100.0	6 in.	2"	#4	10' x .010"	
MW-4-83	800.50	803.85 806.75 (2)	6.5	7.0	17.0	17.5	7 in.	2"	#4	10' x .010"	Abandoned
MW-4S-93	802.95	805.22	11.0	13.0	23.0	23.3	10.5 in.	2"	#1	10' x .006"	
MW-4D-93	803.47	805.93	60.5	62.5	72.5	72.9	4.0 in.	2"	#2	10' x .010"	
MW-5-83	795.60	798.91 805.35 (2)	6.0	6.5	16.5	17.0	7 in.	2"	#4	10' x .010"	
MW-6-83	795.60	798.65 800.48 (2)	4.0	4.0	14.0	14.6	7 in.	2"	#4	10' x .010"	
MW-6D-90	795.78	798.15 800.63 (2)	20.5	22.5	32.5	33.8	4 in.	2"	#2	10' x .010"	6" overburden casing SCH 80 PVC

TABLE 2-1 CONT'D.
MOENCH TANNING COMPANY
PALMER STREET LANDFILL
POST CLOSURE MONITORING
MONITORING WELL CONSTRUCTION SUMMARY

	ELEVATIONS		DEPTHS				DIMENSIONS				
WELL NO.	GROUND SURFACE	WELL RISER ELEVATION	TOP OF SAND PACK	TOP OF SCREEN	BASE OF WELL	BASE OF SAND PACK	BOREHOLE DIAMETER	WELL DIAMETER	TYPE OF SAND PACK	SCREEN LENGTH X SLOT SIZE	NOTES
MW-7-87	797.60	800.50	20.7	22.5	27.5	28.0	7.5 in.	2"	#2	5' x .010"	
MW-7S-87	797.60	800.38	4.5	7.0	12.0	13.0	7.5 in.	2"	#2	5' x .010"	
MW-7D-87	797.60	800.40	32.0	34.0	39.0	39.5	4 in.	2"	#2	5' x .010"	
MW-8-87	816.00	818.31 821.82 (1)	97.0	100.5	105.5	105.5	3 in.	2"	*	5' x .010"	*collapsed sand/gravel
MW-8D-87	816.00	818.45 821.89 (1)	114.5	117.0	122.0	123.0	4 in.	2"	#2	5' x .010"	

Notes: All elevations are in feet above mean sea level.
All depths are in feet below ground surface.

(1) Well casings raised August 16-18, 1990
Resurveyed on September 13, 1990.

(2)Well casings raised June 1991.
Resurveyed 09/11/91 by Hayes Enterprises

TABLE 2-2
MOENCH TANNING COMPANY
PALMER STREET LANDFILL
POST CLOSURE INVESTIGATION
PIEZOMETER/WELL POINT CONSTRUCTION SUMMARY

PIEZOMETER NUMBER	ELEVATIONS		DEPTHS (below orginal grade)				DIMENSIONS				NOTES
	ORIGINAL GRADE (4)	WELL RISER	TOP OF SAND PACK	TOP OF SCREEN	BASE OF WELL	BASE OF SAND PACK	BOREHOLE DIAMETER	WELL DIAMETER	TYPE OF SAND PACK	SCREEN LENGTH x SLOT SIZE	
P-1-88	801.26	803.86 811.85 (2)	5.0	7.0	18.0	18.0	10.5 in.	2"	#2	10' x .010"	
P-1A-88	801.53	804.00 811.91 (2)	4.0	5.0	7.5	7.5	10.5 in.	2"	#2	2' x .010"	
P-2-88	802.63	804.99 811.94 (2)	4.5	5.5	11.0	11.0	10.5 in.	2"	#2	5' x .010"	
P-3B-88	814.97	817.68 822.07 (1)	4.0	5.0	10.5	12	10.5 in.	2"	#2	5' x .010"	
P-4-88	806.53	808.38 813.54 (1)	5.0	8.0	14.0	14.0	10.5 in.	2"	#2	5' x .010"	Screen plug dislodged
P-5A-88	802.99	805.89	5.0	6.7	13.0	13.0	10.5 in.	2"	#2	5' x .010"	Destroyed
P-6-88	800.12	801.77	6.0	8.0	14.0	14.0	10.5 in.	2"	#2	5' x .010"	Destroyed
P-6A-90	804.34	805.56 810.37 (2)	17.4	18.4	20.8	20.8	7.25 in.	1"	#1	2' x .006"	1" Riser/10" Surface Casing
P-6B-90	804.08	808.56 810.35 (2)	32.0	33.0	35.0	35.0	7.25 in.	1"	#1	2' x .006"	1" Riser/10" Surface Casing
P-6C-90	803.89	805.86 810.36 (2)	9.0	11.0	16.0	16.0	7.5 in.	2"	#1	5' x .006"	
P-6D-90	804.40	806.59 810.30 (2)	48.1	50.4	55.4	55.4	7.25 in.	2"	#1	5' x .006"	10" Surface Casing
P-7A-88	809.45	811.55 816.92 (1)	9.5	11.7	16.7	16.7	7.5 in.	2"	#2	5' x .010"	
P-8A-88	805.29	806.66 809.0 (1,3)	6.7	8.5	13.5	14.2	7.5 in.	2"	#2	5' x .010"	
WP-1-88	-	816.29 822.16 (2)	-	-	-	-	-	-	-	-	Steel Well Point
WP-4-88	-	800.34 806.31 (4)	-	-	-	-	-	-	-	-	Steel Well Point

Notes: All elevations are in feet above mean sea level.
All depths are in feet below ground surface.

(1) Well casings raised August 16-18, 1990
Resurveyed Sept. 13, 1990

(2) Well casings raised June 1991.
Resurveyed 09/11/91

(3)Estimated from well depths.

(4) Original grade elevations changed due to regrading.

3.0 MONITORING METHODS

3.1 GROUNDWATER MONITORING -LANDFILL

SAMPLES COLLECTED DURING THE AUGUST 2006 MONITORING EVENT PERIOD, WERE COLLECTED BY MOENCH COMPANY PERSONNEL, AND ANALYZED BY SEVERN TRENT LABORATORY, INC., BUFFALO, NEW YORK. THIS IS A CHANGE IN LABORATORY, (1/2005) FROM PRIOR YEARS. THE LAB IS USED BY GEOMATRIX CONSULTANT, OF WILLIAMSVILLE, NEW YORK, OFFICE. THE ANALYSIS IS PERFORMED IN ACCORDANCE WITH THE SAMPLING PLAN/QUALITY ASSURANCE PLAN FOR THE PALMER STREET LANDFILL (REFERENCE 3). LABORATORY ANALYSIS WERE PERFORMED IN ACCORDANCE WITH THE USEPA SW-846, 3RD EDITION. THE MONITORING PARAMETERS ARE LISTED IN TABLE 1. SAMPLES TO BE COLLECTED FROM EACH OF THE NINE (9) MONITORING WELLS & (3) BANK SEEPS, IDENTIFIED IN SECTION 2.0.

PRIOR TO SAMPLING, STATIC WATER LEVEL ELEVATIONS WERE MEASURED IN THE MONITORING WELLS AND THE WELLS WERE PURGED (SEE TABLE 2. GROUNDWATER ELEVATIONS WERE ALSO MEASURED IN THE PIEZOMETERS, INFILTROMETERS, AND WELLS ON-SITE.

FIELD SAMPLES WERE COLLECTED AND MEASURED FOR THE FIELD PARAMETERS IDENTIFIED IN TABLE 1. THE FIELD MEASUREMENTS ARE SUMMARIZED IN TABLE #3.....

3.1.1 New YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION, REGION 9, WILL BE NOTIFIED THE PRIOR WEEK OF SCHEDULED DETECTION SAMPLING.

3.2 INFILTROMETER MONITORING

FIVE INFILTROMETERS HAVE BEEN INSTALLED BENEATH THE LANDFILL CAP TO AID IN THE ASSESSMENT OF PERFORMANCE OF THE CAP. DURING EACH SAMPLING EVENT, WATER LEVELS IN THE INFILTROMETER ARE MEASURED AND THE AMOUNT OF WATER INFILTRATING CALCULATED.
NOTE: IT IS BELIEVED THAT INFILTROMETER #1, IS OFTEN FLOODED DUE TO NEIGHBORING SPRINGS AND GRAVEL SETTLING PONDS. THS CREATES A HIGH WATER TABLE, IN THE SOUTH END OF AREA #2.

A SCHEMATIC SHOWING THE DESIGN AND DIMENSIONS OF THE INFILTROMETERS IS PRESENTED IN APPENDIX "B".

TABLE 4

MOENCH COMPANY
PALMER STREET LANDFILL
8/4/06 MONITORING EVENT

{SAMPLE}

INFILTROMETER MEASUREMENTS

Infiltrometer	8/4/06 Static Water Level (ft)	3/28/06 Static Water Level (ft)	Δ Depth (ft)	# Days Between Readings (#)	Infiltration Rate gal/day.ft²	Infiltration Rate (cm/sec)	Approx. Total Rainfall This Period (ft)	Infiltration (%)
I-1 Ⓐ	4.40	Ⓐ 4.38	No Chg.	129	—	—	1.22	—
I-2	7.55	7.54	No Chg.	"	—	—	"	—
I-3	6.98	6.92	−.06	"	—	—	"	—
I-4	7.15	7.25	.10	"	.00039	1.8×10^{-8}	"	.57
I-5	6.85	6.87	NoChg.	"	—	—	"	—

Note:
** Negative ΔD precludes calculation of meaningful data.

Ⓐ FREQUENTLY FLOODED DUE TO UPGRADIENT SPRINGS + GERNATT PONDS.

WELL DEVELOPMENT/PURGING LOG

MOENCH CO.

PROJECT TITLE: PALMER ST. LANDFILL - G.W.M.

PROJECT NO.: OF 2 ANNUAL EVENTS

STAFF: JEFF SMITH

DATE:

WELL NO.: MW - 6D

1	TOTAL CASING AND SCREEN LENGTH (ft.)	37.80
2	CASING INTERNAL DIAMETER (in.)	2"
3	WATER LEVEL BELOW TOP OF CASING (ft.)	
4	VOLUME OF WATER IN CASING (gal.)	

WELL I.D.	VOL. GAL./FT.
1"	0.04
(2")	(0.17)
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$V = 0.0408 (\quad ^2 \times (1 - 3) = \quad$ gal.

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
PH										
TURBIDITY										
CONDUCTIVITY										
TEMP. °C										

COMMENTS:

WATER SAMPLING FIELD DATA SHEETS

PROJECT: PALMER ST. LANDFILL
MOENCH CO.
OF 2 ANNUAL EVENTS.

TYPE OF SAMPLE: GROUNDWATER
LOCATION NO.: MW-6D

WELL DATA: DATE: TIME:
Casing Diameter (inches): 2 Casing Material: PVC
Screened Interval (ft BGS): NA Screen Material: PVC
Static Water Level Below TOR (ft.): Bottom Depth (ft.)
Elevation Top of Well Riser: 800.63 Datum Ground Surface:
Elevation Top of Screen: NA

PURGING DATA: DEDICATED DATE: TIME: Start: Finish:
Method: TEFLON BAILER-HAND Pumping Rate (gal/min): ~ 5gpm
Well Volumes Purged ($\pi r^2 h/231$): Was well purged dry? Yes ____ No ____
Standing Volume (GAL.) Was Well purged below sand pack? Yes ____ No ____
Volume Purged (GAL.)

Well I.D. (inches)	Volume (gal/ft)
2	0.17
4	0.66
6	1.50

Is purging equipment dedicated to sample location?
Yes * No
Field Personnel: JS

SAMPLING DATA: DATE: TIME: Start: Finish:
Method: DEDIC. TEFLON BAILER-HAND Sampler: J.Smith
Present Water Level (ft.): Air Temperature (F°):
Depth of Sample (ft.): Weather Conditions:
Is sampling equipment dedicated to sample location: Yes * No
Source and type of water used in field for QC purposes: SEV. TRENT LAB (STL)

PRESERVATION DATA: DATE: By STL-BFI TIME: Start: Finish:
Filtered: Yes * No Cool to 4°C: *
Preservative: H_2SO_4 ____ HNO_3 * NaOH ____ Other HCl

PHYSICAL AND CHEMIC
Appearance: Clear: ____ Turbid: ____ Color:
Contains Sediment ____ Odor: ____ Other:
Temperature (°C): ____ pH ____ Specific Conductivity (μmhos/cm):
Turbidity (NTU): ____ Other:

REMARKS: E. FLASK +/OR TEFLON BAILER USED FOR SAMPLING WAS WASHED WITH SOAP, RINSED WITH LABORATORY WATER / RINSED WITH 10% NITRIC WASH THEN FINAL RINSE WITH LAB. GRADE WATER PRIOR TO USE.

TABLE 3

MOENCH TANNING COMPANY
PALMER STREET LANDFILL

MONITORING PARAMETERS

Soluble Arsenic[1]
Soluble Chromium[1]
Soluble Lead[1]

Volatile Organics[2][3]

pH[4]
Specific Conductance[4]
Turbidity[4] – VISUAL
Groundwater Elevation[4]
Temperature[4]
Odor[4]
Sample Appearance[4]

Notes:

1. *All samples collected for analysis of soluble metals are pressure-filtered in the field immediately upon sample collection.*

2. *The list of VOC analytes are those compounds included in SW-846, Method 8260.*

3. *Analysis for VOCs are not performed on pore water samples during performance monitoring events.*

4. *Field parameters (i.e., pH, specific conductance, temperature and turbidity) are measured in the field by sampling personnel. Laboratory analysis of these parameters will not be required.*

4.0 GROUNDWATER QUALITY MONITORING RESULTS: {SAMPLE}

4.1 EVALUATION OF GROUNDWATER ELEVATION DATA:

GROUNDWATER ELEVATION MEASUREMENTS WERE TAKEN AT EACH OF THE ACCESSIBLE ON-SITE MONITORING WELLS, PIEZOMETERS, AND WELL POINTS, DURING THE AUGUST 2006, MONITORING EVENT. THE DATA ARE SUMMARIZED IN TABLE 2.

PLOTS OF THE GROUNDWATER ELEVATIONS MEASURED IN THE MONITORING WELLS WITH RESPECT TO TIME ARE PRESENTED IN FIGURE 3,4, AND 5, FOR THE SHALLOW OVERBURDEN, DEEP OVERBURDEN AND BEDROCK WELLS, ON THE LANDFILL, RESPECTIVELY. AS SHOWN IN FIGURES 3 AND 4, OVERBURDEN GROUNDWATER ELEVATIONS WERE GENERALLY CONSISTENT, THROUGHOUT THE MONITORING PERIOD. WATER LEVELS HAVE STABLIZED, AFTER THREE YEARS OF INCREASES.('92-'94). THIS OCCURRED DUE TO CESSATION OF VILLAGE AND TANNERY PUMPING OF THE DEEP AQUIFERS. SOME SLIGHT SEASONAL FLUCTUATION DOES OCCUR.

4.2 THE GROUNDWATER AND SURFACE WATER QUALITY RESULTS FOR THE AUGUST 2006, MONITORING EVENTS, AT THE PALMER STREET LANDFILL, ARE PRESENTED IN TABLES #3 THROUGH #5.
. IT SHOULD BE NOTED THAT THESE TABLES INCLUDE ONLY THOSE PARAMETERS, WHICH WERE DETECTED ABOVE ANALYTICAL DETECTION LIMITS, AT A MINIMUM OF ONE LOCATION. COMPARISON OF THE MONITORING EVENT DATA TO THE NYSDEC CLASS "GA" GROUNDWATER QUALITY STANDARDS/GUIDANCE VALUES IS ALSO PRESENTED THESE TABLES.

BOTH THE SOIL AND WASTE AT THE PALMER STREET LANDFILL CONTAIN METALS-OF-INTEREST AS A COMPONENT OF THE SOIL OR WASTE PARTICLES (REFERENCE 5). THEREFORE, THE SEDIMENT (OR TURBIDITY) CONTENT OF ANY GROUNDWATER OR SURFACE WATER QUALITY SAMPLES WILL DIRECTLY IMPACT THE TOTAL METAL CONCENTRATION OF THE SAMPLES. THE TURBIDITY CONTENT OF THE GROUNDWATER SAMPLES COLLECTED AT THE SITE IS EXTREMELY VARIABLE AND RELATIVELY HIGH BECAUSE THE SOIL AND WASTE FILL BOTH CONTAIN HIGH PERCENTAGES OF FINE-GRAINED PARTICLES. AS NYSDEC HAS PREVIOUSLY AGREED, IN ORDER TO AVOID MISINTERPRETATION OF WATER QUALITY DATA, TOTAL METALS WILL NO LONGER SAMPLED FOR GROUNDWATER QUALITY STANDARDS OR EVALUATIONS, OF GROUNDWATER QUALITY IMPACTS WILL BE BASED ON SOLUBLE METAL CONCENTRATIONS.

ALSO, TOTAL NOR SOLUBLE BARIUM WILL NO LONGER BE SAMPLED FOR IN THE AGREEMENT WITH NYSDEC, AS THE ELEMENT, IS NATURALLY HIGH IN CONCENTRATION IN NATIVE SOIL.

I SHOULD BE NOTED THAT SEVERAL ON THE "ADDED" MONITORING WELL, ARE SCREENED IN THE WASTE. SUMMARY OF THE SAMPLING RESULTS IS AS FOLLOWS:

-THE ONLY DETECTION OF A SOLUBLE METAL OF CONCERN(As, Cr, Pb), ABOVE THE CLASS "GA" STD, WAS IN MW-6, FOR SOLUBLE ARSENIC. IT WAS JUST SLIGHTLY ABOVE THE STD(.026PPM)

-ACETONE & XYLENE WERE DETECTED ABOVE THE CLASS "GA" STANDARD/GUIDANCE VALUE, IN MONITORING WELL MW-4SR. THIS WELL IS SCREENED IN THE WASTE. AS A RESULT, OTHER DETECTIONS OF CHLOROBENZENE, ETHYLBENZENE AND ISOPROPBENZENE WERE EVIDENT. THESE HAVE BEEN DETECTED PREVIOUSLY IN 'COVER SYSTEM EVALUATIONS".

TABLE 3-2

PALMER STREET LANDFILL
Moench ~~Tanning~~ Company
Analytical Parameters/Methods/Protocol

Parameter	Method	Method Ref.	Maximum Detection Limits (mg/L) (Note 1)	Holding Time	Preservation (Note 2)	Container (Note 3)
Soluble Arsenic	3020/7060	1	0.010	Note 4	HNO3 to pH < 2	500 ml plastic or glass
Soluble Chromium	3020/7191	1	0.010	Note 4	HNO3 to pH < 2	500 ml plastic or glass
Soluble Lead	3020/7421	1	0.010	Note 4	HNO3 to pH < 2	500 ml plastic or glass
Purgeable Halocarbons	5030/8260	1		Note 5	Cool to 4 deg.C	40ml glass VOA vial with Teflon septum
Volatile Aromatics	5030/8260	1		Note 5	Cool to 4 deg.C	40ml glass VOA vial with Teflon septum
Methyl Ethyl Ketone	5030/8260	1		Note 5	Cool to 4 deg.C	40ml glass VOA vial with Teflon septum

References

1. Test Methods For Evaluation of Solid Wastes. USEPA SW-846, 3rd Edition. 11/86
2. Methods For Chemical Analysis of Water and Wastes. USEPA, Cincinnati, Ohio. EPA 6W/4-79-020. Revised March 1983.

NOTES:

1. The laboratory shall make every reasonable effort to achieve analytical detection limits that are less than or equal to those cited above.
2. Preservations will be added to the sample bottles in the field bottles in the field immediately after sample has been collected. Ice will be used to cool samples in the field and in transit to the laboratory.
3. Containers shown are those necessary to satisfy volume requirements for water analysis.
4. Analysis of water for all metals must be completed within 180 days of the VTSR (Validated Time of Sample Receipt). The VTSR shall be the date on which a sample is received at the laboratory, as recorded on the chain-of-custody form and the lab's central sample log.
5. All field samples will be delivered to the lab within one (1) day of their collection. VOA analysis of water samples must completed within seven days of VTSR.

5.0 LABORATORY ANALYSIS PROGRAM

5.1 PARAMETERS FOR PHYSICAL/CHEMICAL ANALYSIS

A summary of the environmental samples collected during the detection monitoring program and the analyses performed is presented in Table 4-1. A summary of environmental samples collected during the performance monitoring program and the analyses performed is presented in Table 4-2.

5.2 ANALYTICAL METHODOLOGY/PROTOCOL

The methods that will be used for chemical analysis of all groundwater samples collected during this monitoring program are presented in Table 3-2. The sampling holding times, preservation, and container requirements are also presented.

5.3 LABORATORY QC/REPORTING REQUIREMENTS

Laboratory quality control and reporting requirements will be as identified below.

5.3.1 Quality Control Requirements

- A subcontract laboratory will perform all standard in-house QA/QC necessary to control the introduction of contamination in the laboratory and to insure the accuracy and precision of the data.
- The laboratory will strictly adhere to the quality control requirements specified in the analytical method references given in Table 3-2.
- The laboratory will provide trip blanks for aqueous volatile organic compounds analyses.

5.3.2 Reporting and Deliverable Requirements

- The contract laboratory will submit two (2) copies of a final complete analytical report to the owner or its representative within 20 business days of receipt of the samples.

- The analytical report submitted by the laboratory will conform to all reporting and deliverable requirements specified below. The analytical report will include for each sample:

  - Date collected
  - Date extracted or digested
  - Date analyzed
  - Analytical methodology
  - Method detection limits
  - Sample dilution factor
  - A case narrative including a discussion of all QC problems and corrective actions taken
  - Chain-of-custody record

- QC data that will be submitted with each report will include:

  - Field Duplicates
  - Method blank
  - Trip blank
  - Reference standard sample recoveries

- The analytical report prepared by the laboratory will describe, in lay terms, any and all QA/QC problems encountered during analysis of the samples.

- The owner or its representative will incorporate the analytical results into a comprehensive sampling report that will be submitted to NYSDEC within ten (10) weeks of completion of the sampling event.

TABLE 4-1

MOENCH TANNING COMPANY
PALMER STREET LANDFILL

MONITORING PARAMETERS

Soluble Arsenic[1]
Soluble Chromium[1]
Soluble Lead[1]

Volatile Organics[2][3]

pH[4]
Specific Conductance[4]
Turbidity[4] – VISUAL
Groundwater Elevation[4]
Temperature[4]
Odor[4]
Sample Appearance[4]

Notes:

1. *All samples collected for analysis of soluble metals are pressure-filtered in the field immediately upon sample collection.*

2. *The list of VOC analytes are those compounds included in SW-846, Method 8260.*

3. *Analysis for VOCs are not performed on pore water samples during performance monitoring events.*

4. *Field parameters (i.e., pH, specific conductance, temperature and turbidity) are measured in the field by sampling personnel. Laboratory analysis of these parameters will not be required.*

TABLE 4-1

PALMER STREET LANDFILL

Summary of Sample Collection, Analytical Program for Detection Monitoring

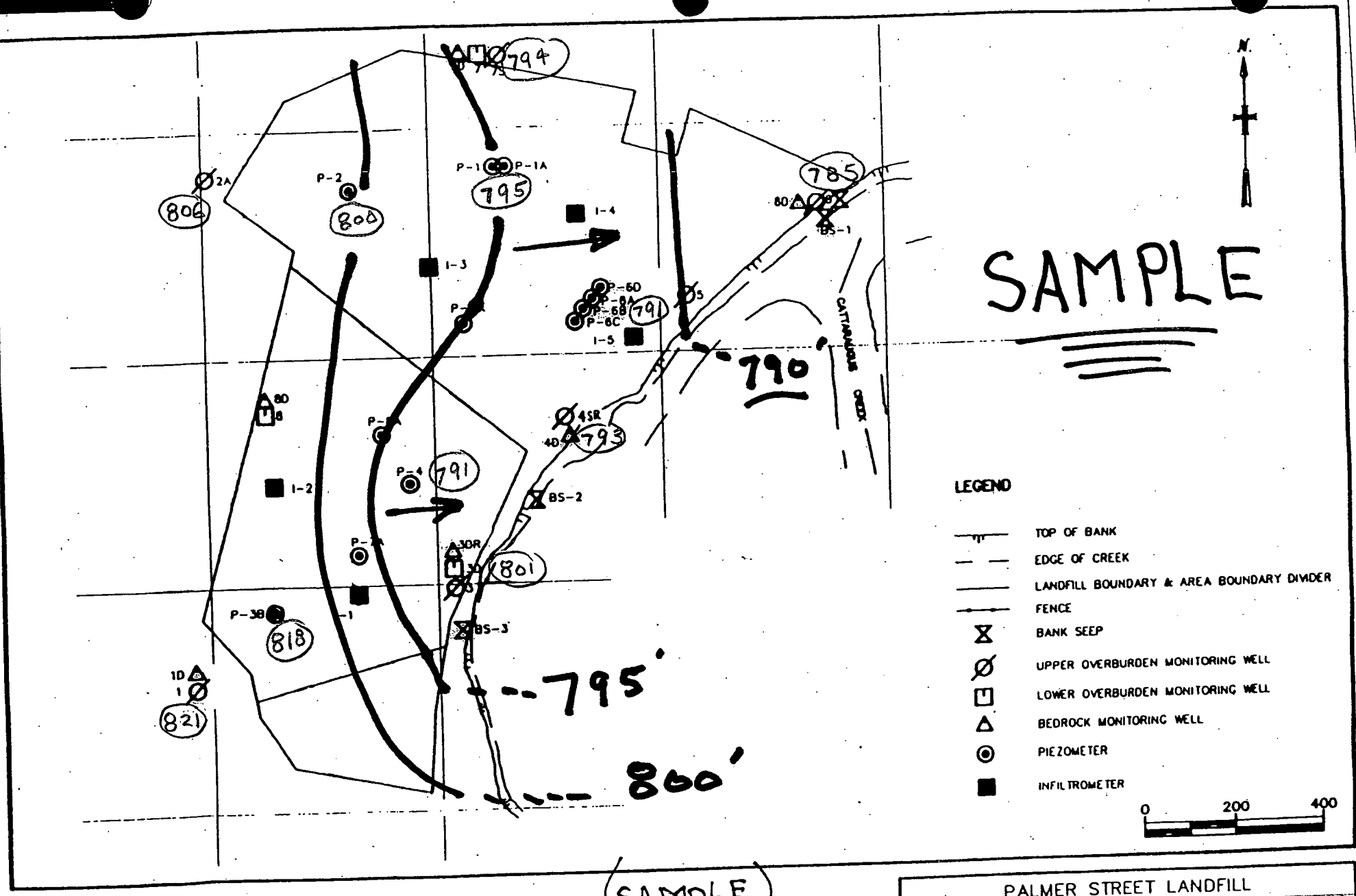
1. **GROUNDWATER**
   - A. Summary of Samples
     1. Seven (7) wells will be sampled quarterly (i.e. approximately every three (3) months) each calendar year.
     2. Well MW-8D will be sampled during one quarter per year. After 3 years of sampling, Moench Tanning may petition the Department to discontinue sampling Well MW-8D.
   - B. Analytical Parameters/Methods
     1. The samples collected at all wells during each sampling event will be analyzed for the parameters listed in Table 3-1 using the methods identified in Table 3-2.
     2. Field measurements of pH, specific conductivity, temperature and turbidity will be taken at all wells during each quarterly monitoring event.

2. **BANK GROUNDWATER SEEP SAMPLES**
   - A. Summary of Samples
     1. One (1) bank seep sample will be collected as a grab from a drainage ditch located along the north landfill boundary near MW-6.
     2. One (1) bank seep sample will be collected as a grab along the bank of the Cattaraugus Creek at a point south of monitoring well MW-3.
     3. Sampling frequency will be the same as given in item 1.A.1.
   - B. Analytical Parameters/Methods
     1. Same as item 1.B.1.

3. **QUALITY CONTROL SAMPLES**
   - A. Summary of Samples
     1. One (1) equipment blank will be prepared during each quarterly sampling event in which sampling equipment is required to be cleaned between sampling locations (a maximum of 4 equipment blanks). One (1) trip blank will be prepared and accompany the samples collected each day.
     2. One (1) duplication sample will be analyzed each quarterly sampling event.
   - B. Analytical Parameters/Methods
     1. Equipment blanks
        a. Same as Item 1.B.1.
     2. Trip blanks
        b. Only the volatile organic parameters will be analyzed using the methods identified in Table 3.

6.0 GROUNDWATER FLOW

A WATER TABLE ISOPOTENTIAL MAP, BEDROCK ISOPOTENTIAL MAP AND A BEDROCK WATER LEVEL HYDROGRAPH HAVE BEEN PREPARED FOR THE PALMER STREET LANDFILL AND ARE PRESENTED IN FIGURES 3,4 AND 5, RESPECTIVELY. GROUNDWATER ELEVATIONS MEASURED ON AUGUST 4, 2006, WERE USED IN PREPARING THE WATER TABLE AND BEDROCK ISOPOTENTIAL MAP. THEY INDICATE THAT THE SHALLOW GROUNDWATER FLOW IS PRIMARILY TO THE EAST, TOWARD CATTARAUGUS CREEK. THE BEDROCK ISOPOTENTIAL MAP AND THE BEDROCK WATER LEVEL HYDROGRAPH ILLUSTRATE A "LEVELING OFF" AFTER 3 YEARS('92-94) OF RISING GROUNDWATER LEVELS AT WELLS MW-1D, MW-3DR AND MW-8D. MW-1D AND MW-8D, WHICH WERE FORMERLY(BEFORE '92) DOWNGRADIENT WELLS, ARE NOW UPGRADIENT OF THE LANDFILL.



(SAMPLE)

FIG. 3

PALMER STREET LANDFILL
WATER TABLE ISOPOTENTIAL MAP
8-4-06 MONITORING EVENT

MOENCH [illegible] COMPANY JULY 1992

FIGURE

7.0 QUALITY ASSURANCE PLAN

This Quality Assurance (QA) Plan presents, in specific terms, the policies, organizations, objectives, functional activities, and specific QA and quality control (QC) activities designed to achieve the data quality goals of the Palmer Street Landfill monitoring program. This plan describes the elements that are considered to be an essential part of a QA Plan as defined by the USEPA Office of Research and Development.

The QA applicable to both the field sampling activities and the laboratory analysis of these samples is addressed in this document. The QA/QC that will be employed during the acquisition of field samples is based on the use of accepted sampling procedures as specified in Appendices B, C and D. The laboratory analyses and QA/QC procedures will be in accordance with the requirements of 40 CFR Part 136. Analytical services will be performed by a contract laboratory that has written QA/QC standard operating procedures (SOPs) that describe the in-house procedures employed to guarantee, to the extent possible, the quality of all analytical data. The contract laboratory will be a NYS Department of Health ELAP-approved laboratory.

7.1 QUALITY ASSURANCE OBJECTIVES

The QA sample collection and analysis objectives are stated in terms of accuracy, precision, completeness, representativeness and comparability.

7.1.1 Accuracy and Precision

Accuracy will be determined on the basis of analyte recoveries from spiked samples. Precision will be determined in terms of the coefficient of variance based on duplicate sample analysis.

7.1.2 Completeness

The QA objective for completeness is to collect and analyze all environmental samples in a manner such that valid data is obtained from 100% of the samples. Achievement of this objective will rely on the use of strict sample identification and custody procedures, analysis of samples within required holding times, use of standard reference

materials, proper instrument calibration and maintenance, analysis of quality control samples, performance audits, and corrective action anytime QC acceptance criteria are exceeded.

7.1.3 Representativeness

An objective of the sampling is the collection of samples that are representative of the matrix (i.e., ground water, surface water, leachate, etc.) from which they were collected. Achievement of this objective will rely on the use of sampling procedures, as described in Section 3.3 and Appendix A, that have been designed with the goal of obtaining representative samples.

7.1.4 Comparability

The QA objective for comparability is the generation of data that can be used to make valid comparisons with other data that may be generated in the future at this or other sites. The objective also involves the analysis of the samples in a manner that produces results comparable to the results that would be obtained by another laboratory using the same analytical procedure. This objective is achieved by the use of standard materials traceable to the National Bureau of Standards; the use of accepted procedures for sample collection and analysis; and analysis of quality control samples to validate the analytical results.

7.2 SAMPLING PROCEDURES

The procedures that will be used for the collection, handling, preservation and analysis of samples are presented in Attachment B.

7.3 SAMPLE CUSTODY

Immediately following sample collection, each sample container will be marked with the following information:

- Sample Code
- Project Number
- Date/Time of Collection

- Sampler's Initials

The sample code will indicate the site location, media sampled, and sample station. All samples will be recorded and tracked under strict chain-of-custody protocols. In the field, each sample will be checked for proper labeling. The samples will then be packed into coolers with ice and transported to the laboratory. A chain-of-custody form (Figure 5-1) will be completed for each cooler. The form will be signed and dated by the person who collected the samples, the person to whom the samples were relinquished for transport to the laboratory, and the laboratory sample controller/custodian who receives the samples. The sample chain-of-custody procedures that will be followed once the samples are at the laboratory are described in the laboratory's QA/QC Plan.

7.4 CALIBRATION PROCEDURES AND FREQUENCY

The field instruments that will be used to make measurements in the field during the Project are the following:

- Slope indicator-water level
- pH/Temperature
- Conductivity Meter

The procedures that will be used to calibrate and maintain these instruments are in accordance with the manufacturer's instructions. Calibration of laboratory analytical instruments will be as specified by 40 CFR, Part 136 for the appropriate methods.

7.5 ANALYTICAL PROCEDURES

Analytical procedures that will be used for chemical analysis of the environmental samples collected during this project are presented on Table 3-2.

WATER SAMPLING FIELD DATA SHEET

PROJECT: _____ TYPE OF SAMPLE: _____

CLIENT: _____ LOCATION NO.: _____

JOB NO.: _____ LAB SAMPLE NO.: _____

WELL DATA: DATE: _____ TIME: _____

Casing Diameter (inches): _____ Casing Material: _____

Screened Interval (ft BGS): _____ Screen Material: _____

Static Water Level Below TOR (ft): _____ Bottom Depth (ft): _____

Elevation Top of Well Riser: _____ Datum Ground Surface: _____

PURGING DATA: DATE: _____ TIME: Start: _____ Finish: _____

Method: _____ Pumping Rate (gal/min): _____

Well Volumes Purged ($V=\pi R^2H/231$): _____ Was well purged dry? _____ Yes _____ No

Standing Volume (gal): _____ Was well purged below sand pack? ___ Yes ___ No

Volume Purged (gal): _____

Well I.D. (inches)	Volume (gal/ft)
2	0.17
4	0.66
6	1.50

Is purging equipment dedicated to sample location?

Yes _____ No _____

Field Personnel: _____

SAMPLING DATA: DATE: _____ TIME: Start: _____ Finish: _____

Method: _____ Sampler: _____

Present Water Level (ft): _____ Air Temperature (°F): _____

Depth of Sample (ft): _____ Weather Conditions: _____

Is sampling equipment dedicated to sample location? Yes _____ No _____

PRESERVATION DATA: DATE: _____ TIME: Start: _____ Finish: _____

Filtered: _____ Yes _____ No Cool to 4°C: _____

Preservative: _____ H_2SO_4 _____ HNO_3 _____ NaOH _____ Other

PHYSICAL AND CHEMICAL DATA:

Appearance: Clear: _____ Turbid: _____ Color: _____

Contains Sediment: _____ Odor: _____ Other: _____

Temperature (°C): _____ pH: _____ Specific Conductivity (μmhos/cm): _____

Turbidity (NTU): _____ Other: _____

REMARKS:

fig.#5-2

WELL DEVELOPMENT/PURGING LOG

SAMPLE

MOENCH CO.

PROJECT TITLE: PALMER ST. LANDFILL - G.W.M.

PROJECT NO.: OF 2 ANNUAL EVENTS

STAFF: JEFF SMITH

DATE: _____

WELL NO.: MW-6D

1	TOTAL CASING AND SCREEN LENGTH (ft.)	37.80
2	CASING INTERNAL DIAMETER (in.)	2"
3	WATER LEVEL BELOW TOP OF CASING (ft.)	_____
4	VOLUME OF WATER IN CASING (gal.)	

WELL I.D.	VOL. GAL./FT.
1"	0.04
(2")	(0.17)
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$V = 0.0408 (\quad ^2 \times (1 - 3) = \_\_\_ \text{ gal.}$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
PH										
TURBIDITY										
CONDUCTIVITY										
TEMP. °C										

COMMENTS:

7.6 DATA REDUCTION, VALIDATION AND REPORTING

7.6.1 Field Activities

The results of all field measurements and associated calculations will be recorded on standard forms (Figure 5-2). During all activities, the following general information will be recorded in the log book:

1. Date
2. Sampling Team
3. Meteorological conditions
4. Location where work is performed
5. Problems encountered and corrective actions taken
6. Field measurements or descriptions made
7. Any modifications made to work plan to obtain representative samples

The following information will be recorded by the sampling team leader and/or field technicians during the collection of field samples:

1. Sample locations and summary of samples collected
2. Completeness of the sampling effort (e.g., were all the samples collected that were intended to be collected and if not, what were the reasons?)
3. Chain-of-custody information
4. Results of field measurements
5. Results of field instrument calibrations

Original forms and field notebooks will be placed in the project record file that will be maintained by the owner or its representative. Records will be initially audited by the owner or its representative. Records will be available for QC audits by NYSDEC.

Data validation will be facilitated by adherence to Standard Operating Procedures (SOPs) identified for the performance of all field activities, calibration checks on all field instruments at the beginning and end of each day of use, and manual checks of field calculations.

7.6.2 Laboratory Analysis

The laboratory procedures for data reduction, validation and reporting for all chemical parameters analyzed during this project will be in accordance with the requirements of 40 CFR Part 136 and the procedures presented in the laboratory's QA/QC Plan. The laboratory report will include a discussion of the validity of the data which is consistent with the level of Quality Control required for the project.

7.7 INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY

Quality control sample analyses that will be performed during this project to document the acceptability of the data will include method blank, trip blank, and reference standard sample analyses.

Quality control sample analytical results will be reported on standard forms in conjunction with data acceptance criteria. The acceptance criteria applicable to this project will be those specified in 40 CFR Part 136.

7.8 PERFORMANCE AND SYSTEM AUDITS

Performance and system audits routinely conducted at the laboratory to ascertain the potential of all analytical measurements systems to generate data that are representative, valid, and meet completeness requirements are described in the laboratory's QA/QC Plan.

7.9 PREVENTATIVE MAINTENANCE PROCEDURES AND SCHEDULES

7.9.1 Field Equipment

Maintenance procedures that will be employed to assure the proper operation of all field equipment are presented in Attachment C.

7.9.2 Laboratory Equipment

Preventative maintenance will be performed on critical laboratory instruments as described in the laboratory's QA/QC Plan.

7.10 QUALITY CONTROL OF DATA

.A number of general and specific measures will be employed to ensure that the analytical data produced during this project are generated within known and acceptable limits of accuracy and precision. General control measures will include the following:

- Proper cleaning of sample containers
- Use of formal written sample labeling, logging and chain-of-custody

- Use of USEPA-accepted methods for sample preservation
- Use of laboratory reagents that meet or exceed American Chemical Society "Analytical Reagent Grade" quality standards
- Use of laboratory water that meets or exceeds quality standards for Type I water
- Proper cleaning of laboratory glassware

These measures are addressed in the laboratory's QA/QC Plan.

Field quality control samples will include one equipment blank per sampling event in which sampling equipment is required to be field cleaned between sample locations.

7.11 CORRECTIVE ACTION

Whenever calibration checks of field or laboratory instruments fail to compare with initial calibrations and/or laboratory data precision and/or accuracy acceptance limits are exceeded, corrective actions will be implemented. These actions will include:

- Recalibration or standardization of instruments
- Acquiring new standards
- Repairing instrumentation
- Replacing instruments that cannot be repaired
- Reanalyzing samples for which unacceptable or suspect analytical results were obtained

If problems are encountered which require corrective action, these problems will be addressed and resolved before additional samples are analyzed in order to minimize the quantity of re-analyses required. Specific corrective actions that will be implemented, if needed, and the individuals assigned the responsibility for initiating and approving such corrective actions are identified in the laboratory's QA/QC Plan.

7.12 QUALITY ASSURANCE REPORTS TO MANAGEMENT

Periodically during the performance of this investigation, field and laboratory personnel will be required to report the performance of measurement systems to

management. Field personnel will report to the Monitoring Program Manager. Laboratory personnel reporting requirements are defined in the laboratory's QA/QC Plan.

The frequency of reporting will be as appropriate during the period of time that measurements are being made in the field and/or laboratory. Reporting of measurement system performance generally will be verbal. However, if a problem requiring corrective action is encountered, a formal written report will be prepared. If a QC problem arises in the laboratory, the laboratory operation manager will immediately contact the owner or its representative to discuss an appropriate corrective action. Final approval of the corrective action to be implemented will be made by the laboratory operation manager.

8.0 HEALTH AND SAFETY CONSIDERATIONS

8.1 HEALTH AND SAFETY TRAINING REQUIREMENTS

Prior to any site activities, the field investigation team will participate in formal health and safety training. At a minimum, the training will cover:

- First aid (recognition of conditions requiring emergency or medical care and simple steps to take until help arrives).
- Emergency and routine communications.
- Decontamination procedures.
- Personnel protective equipment use, maintenance, and limitations.

8.2 HEALTH AND SAFETY PLAN

Monitoring activities at the Palmer Street Landfill shall be performed in strict conformance with the site-specific Health and Safety Plan. All field personnel will be familiar with the requirements of the Health and Safety Plan prior to beginning any field work.

MALCOLM PIRNIE

ATTACHMENT A

GEOLOGIC LOGS, WELL COMPLETION REPORTS AND INFILTROMETER DESIGN

BORING 1

PROJECT: MOENCH TANNING	PROJECT NO: 605-03-9
DATE: 9-20-83	LOCATION: GOWANDA, N.Y.
DRILLING CONTRACTOR: EARTH DIMENSIONS	INSPECTOR: K. McMANUS
DRILLING METHOD: 3½" HALLOW STEM AUGERS	SAMPLING METHOD: 2-INCH SPLIT SPOON STANDARD PENETRATION TEST
ELEVATION:	DATUM:

SAMPLE no.	SAMPLE depth	blows per 6"	DEPTH	STRATA	SOIL DESCRIPTION (density, color, SOIL, admixtures, moisture, other notes, ORIGIN)	WELL CONST	REMARKS
S-1	0-2'	3 9 / 17 17			6" TOPSOIL, LEAVES, ROOTS		PROTECTIVE STEEL SLEEVE
					MEDIUM DENSE, BROWN SAND, WITH SOME SILT & GRAVEL, MOIST & ROOTS, NON PLASTIC		
S-2	4.5-6.5'	8 13 / 9 7	5		(1" SAND & FINE GRAVEL LENS WITH RED TINT)		CEMENT BENTONITE SLURRY
					MEDIUM DENSE, BROWN, SILT WITH SOME SAND, LITTLE GRAVEL, MOIST NON-PLASTIC (AUGER CHANGE AT 8.5', NO RECOVERY UNTIL 11', POSSIBLE FINE SAND LENS)		
S-3	9.5-11.5'	1 1 / 4 10	10				
					MEDIUM DENSE, GRAY, SILT WITH SOME GRAVEL, MOIST, NON-PLASTIC		
S-4	14.5-16.5'	7 17 / 19 19	15		GRADING TO TRACE CLAY, SLIGHTLY PLASTIC		#4 SAND
					VERY STIFF, GRAY, CLAY, TRACE GRAVEL, MOIST, PLASTIC		
S-5	19.5-21.5'	9 15 / 24 26	20		(OCCASIONAL FINE SAND LENS 1/64")		
					GRADING TO SILT & CLAY, TRACE GRAVEL, SLIGHTLY PLASTIC.		2-INCH MACHINE SLOTTED PVC WELL SCREEN
S-6	24.5-26.5'	8 32 / 41 36	25		VERY DENSE, GRAY, FINE SAND AND SILT, MOIST, NON PLASTIC		
S-7	29.5-31.5'	4 / 12 13	30		BOTTOM OF BORING AT 29.5'		
			35				

NOTES: MONITORING WELL INSTALLED. 20 FEET OF 2-INCH DIAMETER PVC WELL SCREEN BACKFILLED WITH #4 SAND TO 8 FEET. THERE IS A PROTECTIVE STEEL SLEEVE WITH LOCKING CAP OVER THE STICK-UP.

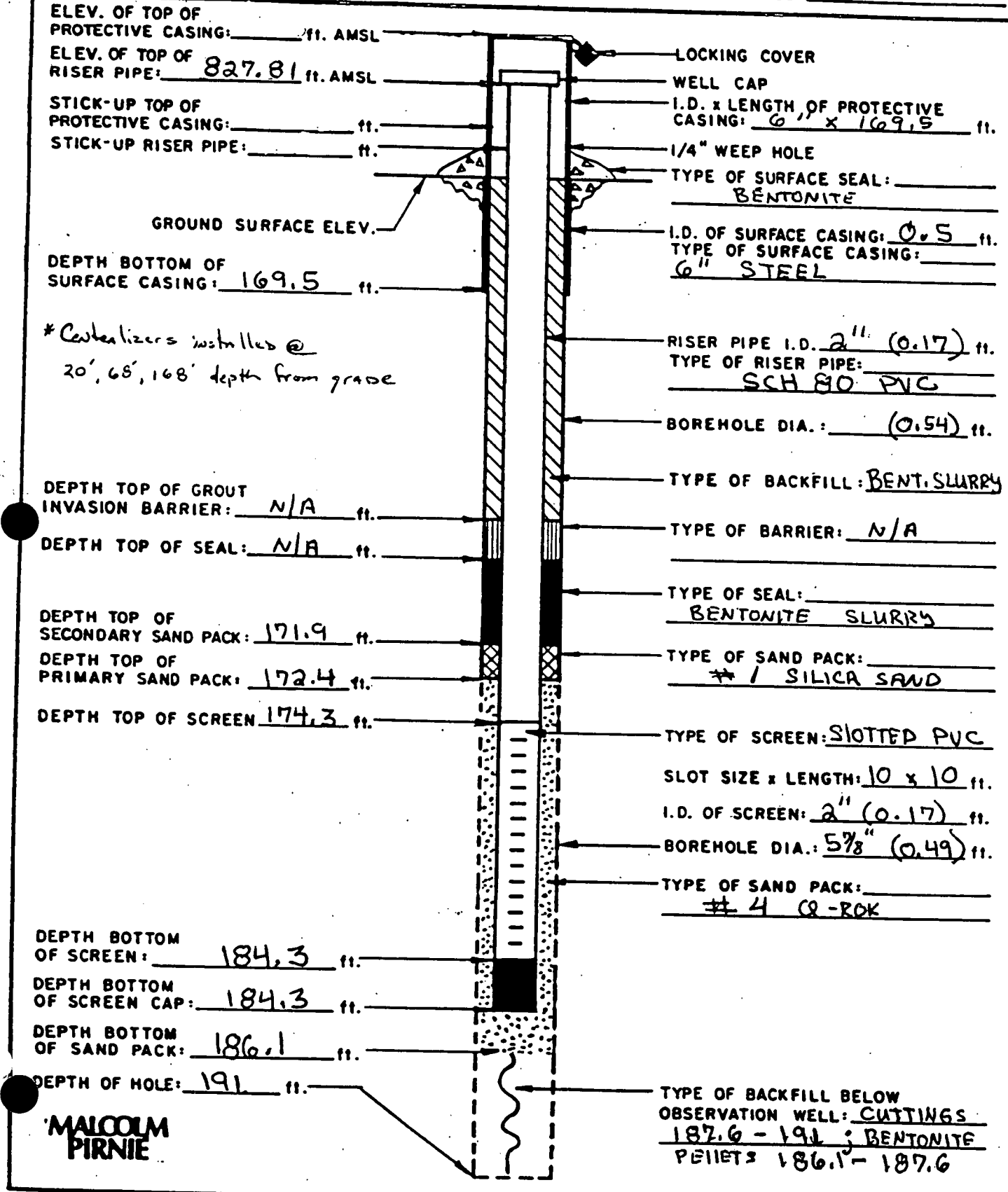
MALCOLM PIRNIE, INC.

MONITORING WELL CONSTRUCTION LOG

PROJECT: PALMER ST. LF
PROJECT NO.: 0605-17-1
GROUND ELEV.: 820.75
FIELD GEOLOGIST: JPH / RHO

LOCATION: GOWANDA
BORING: MW-1D (A)
DATE: 5-24-90

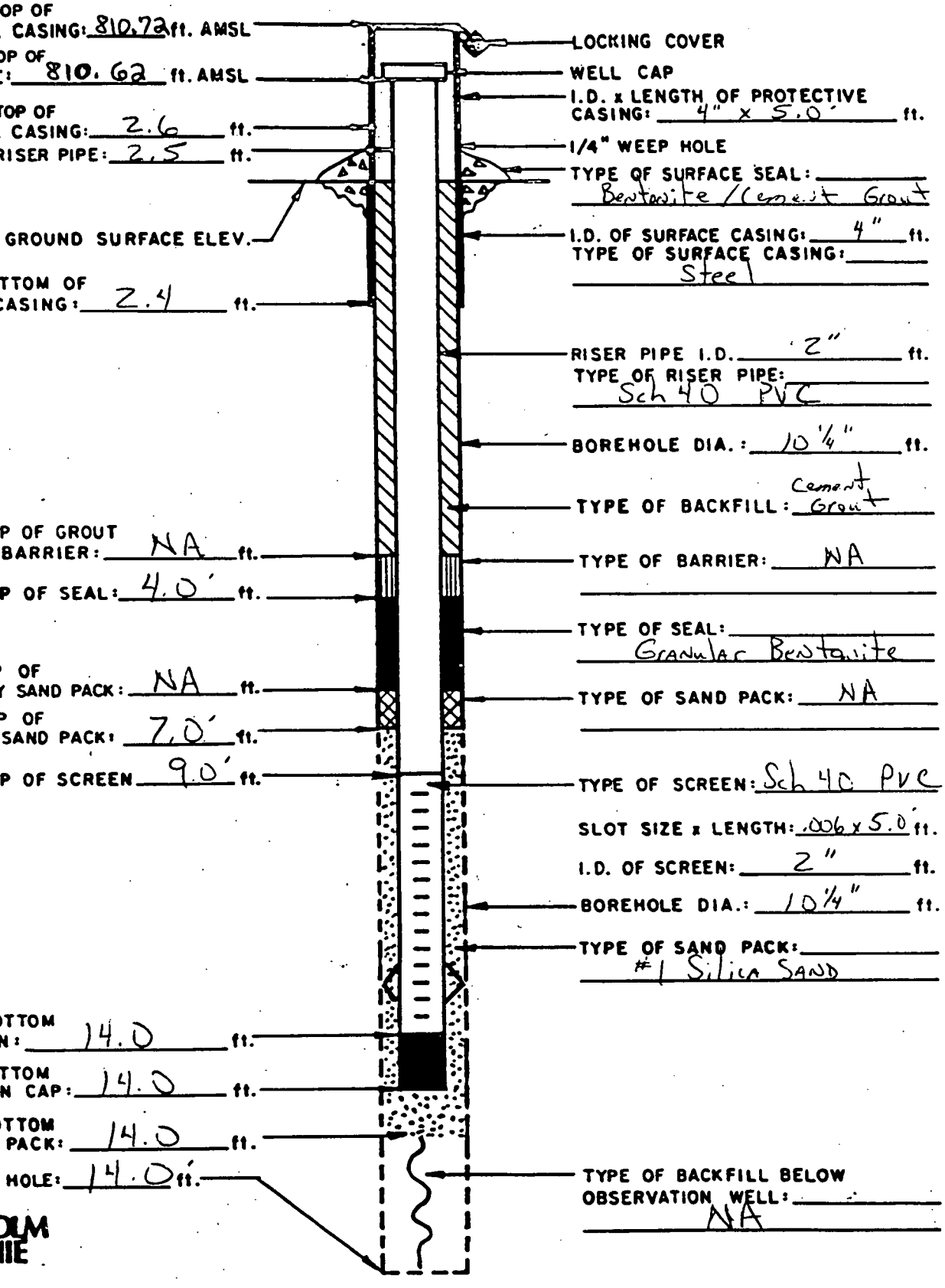
DRILLER: BUFF. DRLG. D. ALTROOGE
DRILLING METHOD: 5 7/8 ROLLER BIT
DEVELOPMENT METHOD:



MALCOLM PIRNIE

MONITORING WELL CONSTRUCTION LOG

PROJECT: Palace St Landfill
LOCATION: Pessia, NY
PROJECT NO.: 0605-17-1
BORING: MW-2A
GROUND ELEV.: 808.22
DATE: 4/19/90
FIELD GEOLOGIST: J.P. Hilton
DRILLER: T. Whitmeyer
DRILLING METHOD: 6¼" HSA
DEVELOPMENT METHOD:

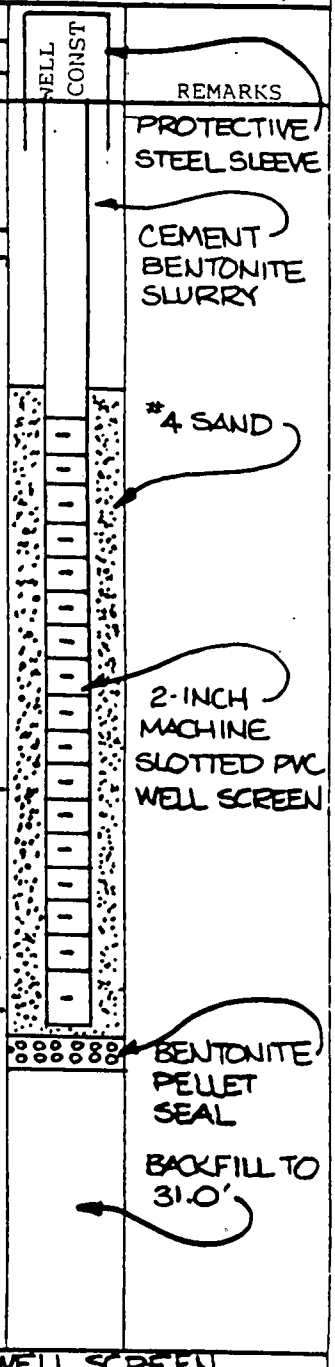


MALCOLM PIRNIE

BORING 2

PROJECT: MOENCH TANNING	PROJECT NO: 605-03-9
DATE: 9-13-83	LOCATION: GOWANDA, N.Y.
DRILLING CONTRACTOR: EARTH DIMENSIONS	INSPECTOR: C. KRAEMER / K. McMANUS
DRILLING METHOD: 3½-INCH HALLOW STEM AUGERS	SAMPLING METHOD: 2-INCH SPLIT SPOON STANDARD PENETRATION TEST
ELEVATION:	DATUM:

SAMPLE no.	SAMPLE depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (density, color, SOIL, admixtures, moisture, other notes, ORIGIN)
S-1	0-2'	3	2			SOFT, GRAY, CLAY AND SILT WITH A TRACE GRAVEL, MOIST PLASTIC
		2	2			
S-2	2-4'	2	1			
		2	8			
S-3	4-6'	9	14			
		11	14	5		DENSE, GRAY, SILT, LITTLE GRAVEL MOIST, NON PLASTIC
S-4	6-8'	6	17			
		17	19			
S-5	8-10'	6	12			
		14	15			
S-6	10-12'	6	10	10		GRADING TO TRACE CLAY, VERY SLIGHTLY PLASTIC
		14	17			
S-7	12-14'	8	11			
		12	20			
S-8	14-16'	7	13			
		19	23	15		
S-9	16-18'	4	10			
		18	27			
S-10	18-20'	9	20			
		29	36			
S-11	20-22'	6	16	20		GRADING TO HARD, OCCASIONAL SILT TO FINE SAND LENSES (1/64")
		28	36			
S-12	22-24'	5	8			VERY STIFF, GRAY, CLAY, MOIST PLASTIC
		12	19			
S-13	24-26'	5	10			
		16	23	25		(OCCASIONAL FINE SAND LENSES 1/64")
S-14	26-28'	11	14			
		44	56			GRADING TO HARD, TRACE GRAVEL AND SAND
S-15	28-29.2'	11	53			
		100				
S-16	30-30.7'	50	100	30		VERY DENSE, GRAY, FINE SAND & SILT, SOME GRAVEL, MOIST, GLACIAL TILL.
S-17	32-32.8'	60	100			
S-18	35-35.3'	100				
				35		



NOTES: MONITORING WELL INSTALLED. 20' OF 2" DIAMETER PVC WELL SCREEN BACKFILLED WITH #4 SAND TO 8 FEET. THERE IS A PROTECTIVE STEEL SLEEVE WITH LOCKING CAP OVER THE STICK-UP. THE BORING WAS ALLOWED TO BACKFILL UP TO 31 FEET AND A 1 FOOT BENTONITE PLUG WAS INSTALLED TO SEAL THE HOLE AT 30 FEET.

MALCOLM PIRNIE, INC.

BORING 6

PROJECT: MOENCH TANNING	PROJECT NO: 605-03-9
DATE: 9-19-83	LOCATION: GOWANDA, N.Y.
ELEVATION:	DATUM:

SAMPLE no.	SAMPLE depth	SAMPLE blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (density, color, SOIL, admixtures, moisture, other notes, ORIGIN)	WELL CONST.	REMARKS
S-19	40-42'	38	70			GRADING TO HARD, GRAY, CLAY AND SILT SOME GRAVEL, MOIST GLACIAL TILL		
		64	100					
S-20	45-45.9'	63	100	45				
S-21	50-50.4'	100		50		BOTTOM OF BORING AT 50'		
				55				
				60				
				65				
				70				
				75				
				80				

NOTES:

MALCOLM PIRNIE, INC.

BORING 3

PROJECT: MOENCH TANNING	PROJECT NO: 605-03-9
DATE: 9-22-83	LOCATION: GOWANDA, N.Y.
DRILLING CONTRACTOR: EARTH DIMENSIONS	INSPECTOR: K. McMANUS
DRILLING METHOD: 3½-INCH HALLOW STEM AUGERS	SAMPLING METHOD: 2-INCH SPLIT SPOON STANDARD PENETRATION TEST
ELEVATION:	DATUM:

SAMPLE no.	SAMPLE depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (density, color, SOIL, admixtures, moisture, other notes, ORIGIN)
S-1	0-2'	2	12			FILL, BROWN, SILT WITH SOME CLAY, TRACE SAND AND GRAVEL, MOIST, ROOTS THROUGHOUT (6" SAND LENSE AT 1.5')
		20	22			
S-2	4.5-6.5'	4	11	5		VERY STIFF, BLACK CLAY, TRACE SILT, MOIST PLASTIC, SMALL ROOTS GRADING TO GRAY
		16	18			
S-3	9.5-11.5'	27	35	10		VERY DENSE, BLACK, GRAVEL, MOIST GRADING TO VERY DENSE, GRAY, FINE SAND AND SILT, SOME GRAVEL, MOIST, NON PLASTIC, GLACIAL TILL
		21	19			
S-4	14.5-14.8'	100		15		
S-5	19.0-19.3'	100				BOTTOM OF BORING AT 19.0'
				20		
				25		
				30		
				35		

WELL CONST

PROTECTIVE STL. SLEEVE

REMARKS

CEMENT / BENTONITE SLURRY

#4 SAND

2-INCH MACHINE SLOTTED PVC WELL SCREEN

BENTONITE PELLET SEAL

BACKFILL TO 14.5'

NOTES: MONITORING WELL INSTALLED. 10 FEET OF 2-INCH DIAMETER PVC WELL SCREEN BACKFILLED WITH #4 SAND TO 3 FEET. THERE IS A PROTECTIVE STEEL SLEEVE WITH LOCKING CAP OVER THE STICK-UP. THE BORING WAS ALLOWED TO BACKFILL UP TO 14 FEET AND A 6" BENTONITE PLUG WAS INSTALLED TO SEAL THE HOLE AT 13.5 FEET.

MALCOLM PIRNIE, INC.

SHEET 1 OF 1

PIRNIE

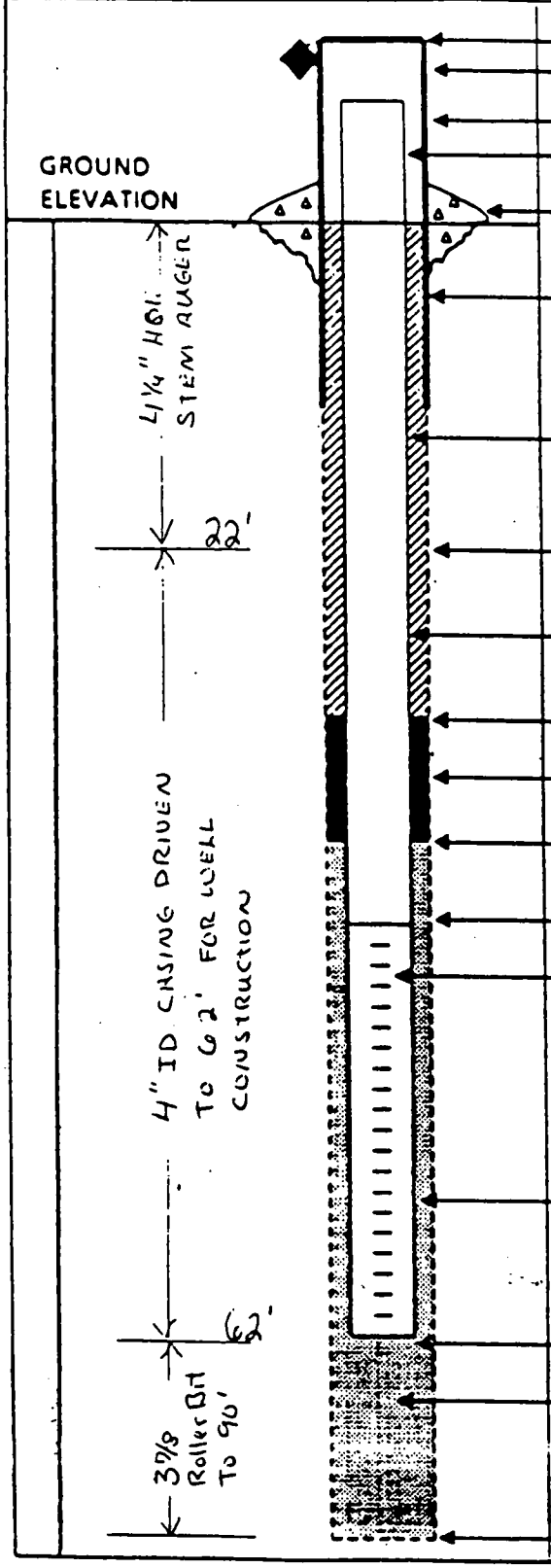
OVERBURDEN

MONITORING WELL SHEET

PROJECT PALMER ST LF
PROJECT NO. 0605-10-1
ELEVATION 804.2 ft.
FIELD GEOLOGIST RHO

LOCATION GOWANDA NY
BORING 3D
DATE 8/3/87

DRILLER BUFFALO DRILLING
DRILLING METHOD 4¼" HS AUGER / 3⅞" MUD ROTARY
DEVELOPMENT METHOD AIR



ELEVATION OF TOP OF SURFACE CASING: 807.38'
ELEVATION OF TOP OF RISER PIPE: 807.22'
STICK - UP TOP OF SURFACE CASING:
STICK - UP RISER PIPE :
TYPE OF SURFACE SEAL: CEMENT
I.D. OF SURFACE CASING: 4"
TYPE OF SURFACE CASING: STEEL
RISER PIPE I.D. 2"
TYPE OF RISER PIPE: PVC SCH 40
BOREHOLE DIAMETER: 8" to 22' and 4½" to 62'
TYPE OF BACKFILL: CEMENT/BENTONITE GROUT
ELEVATION / DEPTH TOP OF SEAL: 759'/47'
TYPE OF SEAL: BENTONITE PELLETS
DEPTH TOP OF SAND PACK: 753/51'
ELEVATION / DEPTH TOP OF SCREEN: 747.5/56½'
TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: .010 / 5 FT
I.D OF SCREEN: 2"
TYPE OF SAND PACK: #2 Q-ROC
ELEVATION / DEPTH BOTTOM OF SCREEN: 742.5/61½'
ELEVATION / DEPTH BOTTOM OF SAND PACK: 734.5/69½'
TYPE OF BACKFILL BELOW OBSERVATION WELL: CEMENT BENTONITE GROUT
ELEVATION / DEPTH OF HOLE: 722/90'

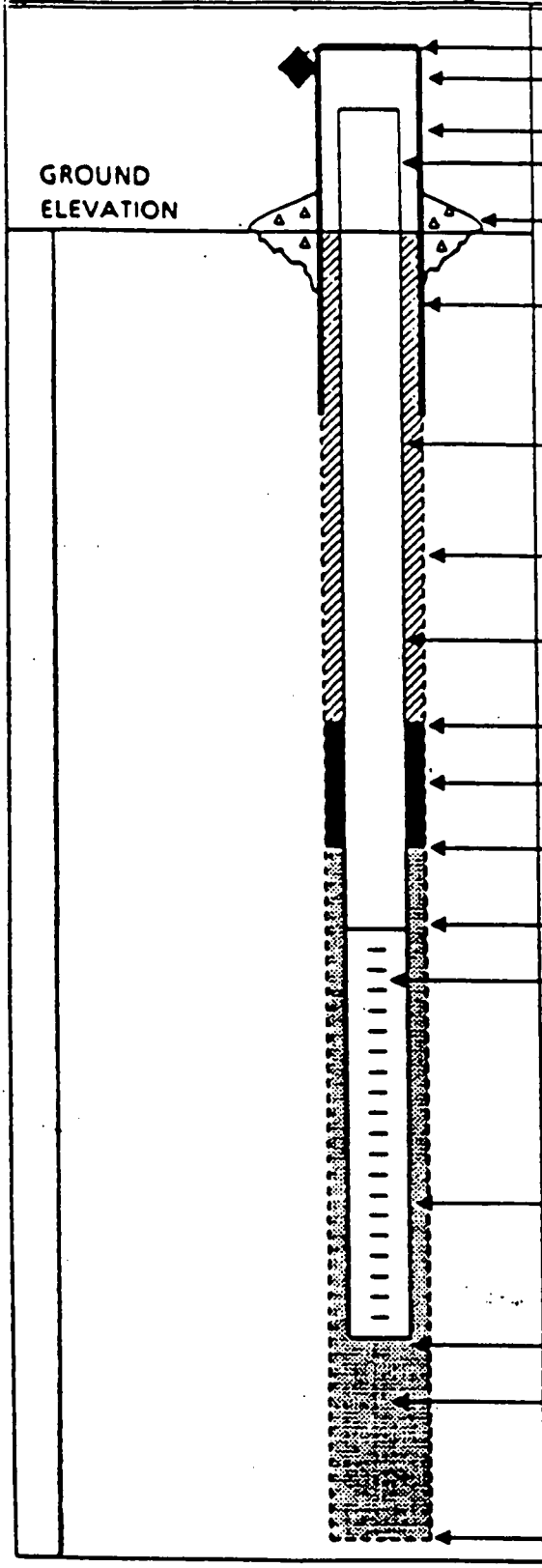
PIRNIE

MONITORING WELL SHEET

PROJECT Monarch Towing — Palmer St.
PROJECT NO. 0605-12-1
ELEVATION 804.79
FIELD GEOLOGIST D. Aloysius

LOCATION Gowanda NY
BORING 3DR
DATE 8/11/88

DRILLER Buffalo Drilling
DRILLING METHOD 6" casing to top of rock, then 6" roller bit.
DEVELOPMENT METHOD Surge/bail

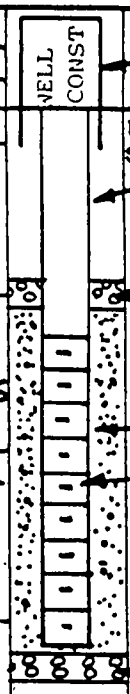


ELEVATION OF TOP OF SURFACE CASING: _____
ELEVATION OF TOP OF RISER PIPE: _____
STICK - UP TOP OF SURFACE CASING: _____
STICK - UP RISER PIPE: ~2.5ft
TYPE OF SURFACE SEAL: cement/bentonite grout
I.D. OF SURFACE CASING: 4"
TYPE OF SURFACE CASING: steel
RISER PIPE I.D. 2"
TYPE OF RISER PIPE: Sch 40 PVC
BOREHOLE DIAMETER: 10" above 84'; 6" below 84'
TYPE OF BACKFILL: cement/bentonite grout
DEPTH TOP OF SEAL: 82.0'
TYPE OF SEAL: bentonite pellet
DEPTH TOP OF SAND PACK: 86.0'
DEPTH TOP OF SCREEN: 87.0'
TYPE OF SCREEN: Sch 40 PVC
SLOT SIZE x LENGTH: 10 Slot
I.D. OF SCREEN: 2"
TYPE OF SAND PACK: #4 Q-ROK
DEPTH BOTTOM OF SCREEN: 97.0'
DEPTH BOTTOM OF SAND PACK: 100'
TYPE OF BACKFILL BELOW OBSERVATION WELL: #4 Q-ROK Sand
DEPTH OF HOLE: 100'

BORING 7

PROJECT: MOENCH TANNING	PROJECT NO: 605-03-9
DATE: 9-16-83	LOCATION: GOWANDA, N.Y.
DRILLING CONTRACTOR: EARTH DIMENSIONS	INSPECTOR: K. McMANUS
DRILLING METHOD: 3½-INCH HALLOW STEM AUGER	SAMPLING METHOD: 2-INCH SPLIT SPOON STANDARD PENETRATION TEST
ELEVATION:	DATUM:

SAMPLE no.	SAMPLE depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (density, color, SOIL, admixtures, moisture, other notes, ORIGIN)
S-1	0-2'	4	11			FILL, BROWN, LOAMY TOPSOIL
		11	10			FILL, BLACK, CINDERS
S-2	5-7'	2	3	5		
		1	11			FILL, YELLOW (PAINT BOOTH SLUDGE), ODOROUS
						ODOROUS
S-3	10-12'	1	1	10		GRADING TO BROWN, FIBROUS.
		1	4			FILL, BLACK, CINDERS WITH BRICK FRAGMENTS, ODOROUS (WATER AT 11.5')
S-4	15-17'	4	10	15		
		9	1			VERY STIFF, GRAY, SILT & CLAY WITH TRACE SAND AND GRAVEL, MOIST, SLIGHTLY PLASTIC
S-5	20-22'	1	4	20		
		6	100			LOOSE, GRAY, SAND WITH SOME GRAVEL AND LITTLE SILT, MOIST NON-PLASTIC
S-6	25-26'	6	100	25		GRADING TO VERY DENSE, FINE SAND AND SILT, SOME GRAVEL, MOIST, GLACIAL TILL
S-7	30-30.95'		100	30		BOTTOM OF BORING AT 30'
				35		



NOTES: MONITORING WELL INSTALLED. 10 FEET OF 2-INCH DIAMETER PVC WELL SCREEN BACKFILLED WITH #4 SAND TO 6.5 FEET. THERE IS A PROTECTIVE STEEL SLEEVE WITH LOCKING CAP OVER THE STICK-UP. THE BORING WAS ALLOWED TO BACKFILL UP TO 18.5 FEET AND A 1 FOOT BENTONITE PLUG WAS INSTALLED TO SEAL THE HOLE AT 17.5 FEET.

MALCOLM PIRNIE, INC.

BORING 5

PROJECT: MOENCH TANNING	PROJECT NO: 605-03-9
DATE: 9-14-83	LOCATION: GOWANDA, N.Y.
DRILLING CONTRACTOR: EARTH DIMENSIONS	INSPECTOR: C. KRAEMER / K. McMANUS
DRILLING METHOD: 3½-INCH HALLOW STEM AUGERS	SAMPLING METHOD: 2-INCH SPLIT SPOON STANDARD PENETRATION TEST
ELEVATION:	DATUM:

SAMPLE no.	SAMPLE depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (density, color, SOIL, admixtures, moisture, other notes, ORIGIN)	WELL CONST	REMARKS
S-1	0-2'	9	48			FILL, COBBLES AND GRAVEL WITH SAND AND SOME LEATHER SCRAPS		PROTECTIVE STEEL SLEEVE
		23	29					
								CEMENT/ BENTONITE SLURRY
S-2	4.5-6.5'	5	9	5		NO RECOVERY, MOSTLY LEATHER SCRAPS		
		6	8					
S-3	6.5-8.5'	6	6			NO RECOVERY, MOSTLY LEATHER SCRAPS		BENTONITE PELLET SEAL
		5	6					
S-4	9.5-11.5'	3	6	10				#4 SAND
		34	36					
					PVC	VERY DENSE, BROWN, GRAVEL WITH LITTLE SILT AND LITTLE SAND, MOIST, NON PLASTIC (WATER AT 13.5')		2-INCH MACHINE SLOTTED PVC WELL SCREEN
S-5	14.5-16.5'	14	29	15				
		35	21					
						HARD, GRAY, SILT AND CLAY, TRACE GRAVEL, TRACE SAND, MOIST, PLASTIC		
S-6	17.5-19.5'	13	26					BENTONITE PELLET SEAL
		44	74					
S-7	19.5-21.5'	32	74	20				
		70	64			GRADING TO LITTLE GRAVEL & SAND		
						VERY DENSE, GRAY, SAND WITH SOME GRAVEL AND LITTLE SILT, MOIST, NON PLASTIC		BACKFILL TO 18'
S-8	24.5-25.3'	35	100	25				
						GRADING TO FINE SAND & SILT, SOME GRAVEL, MOIST, GLACIAL TILL		
S-9	29.5-30.3'	35	100	30		BOTTOM OF BORING AT 29.5'		
				35				

NOTES: MONITORING WELL INSTALLED. 10 FEET OF 2-INCH DIAMETER PVC WELL SCREEN BACKFILLED WITH #4 SAND TO 6 FEET. THERE IS A PROTECTIVE STEEL SLEEVE WITH LOCKING CAP OVER THE STICK-UP. THE BORING WAS ALLOWED TO BACKFILL UP TO 18 FEET AND A 1 FOOT BENTONITE PLUG WAS INSTALLED TO SEAL THE HOLE AT 17 FEET.

MALCOLM PIRNIE INC

SHEET 1 OF 1

BORING 6

PROJECT: MOENCH TANNING	PROJECT NO: 605-03-9
DATE: 9-15-83	LOCATION: GOWANDA, N.Y.
DRILLING CONTRACTOR: EARTH DIMENSIONS	INSPECTOR: K. McMANUS
DRILLING METHOD: 3½"-INCH HALLOW STEM AUGER	SAMPLING METHOD: 2-INCH SPLIT SPOON STANDARD PENETRATION TEST
ELEVATION:	DATUM:

SAMPLE no.	SAMPLE depth	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (density, color, SOIL, admixtures, moisture, other notes, ORIGIN)	WELL CONST	PROTECTIVE STL. SLEEVE REMARKS
								CEMENT BENTONITE SLURRY
S-1	2-4'	29	38			FILL, COBBLES AND GRAVEL WITH SAND		
		17	16			GRADING TO GRAVEL AND SAND		
S-2	4.5-6.5'	3	4	5		VERY STIFF, BLACK, CLAY WITH SOME SAND AND GRAVEL AND SOME SLAG, MOST PLASTIC, SOME ROOTS		BENTONITE PELLET SEAL
		15	23					#4 SAND
S-3	9.5-11.5'	3	5	10		GRADING TO GRAY, CLAY WITH SOME SILT AND GRAVEL, OCCASIONAL COARSE BLACK SAND LENSES (1")		2-INCH MACHINE SLOTTED PVC WELL SCREEN
		6	9					
S-4	14.5-14.8'	100		15		REFUSAL AT 14.6'		
				20				
				25				
				30				
				35				

NOTES: MONITORING WELL INSTALLED. 10 FEET OF 2-INCH DIAMETER PVC WELL SCREEN WITH #4 SAND TO 4 FEET. THERE IS A PROTECTIVE STEEL SLEEVE WITH LOCKING CAP OVER THE STICK-UP.

MALCOLM PIRNIE, INC.

MALCOLM PIRNIE

OVERBURDEN MONITORING WELL SHEET

WELL NO. MW-4 Sa-93

PROJECT Well Replacement START DATE 9/16/93 END DATE 9/16/93

PROJECT NO. 0605-23-8 FIELD GEOLOGIST J.P. Hilton

LOCATION Moench Tanning Palmer St. LF

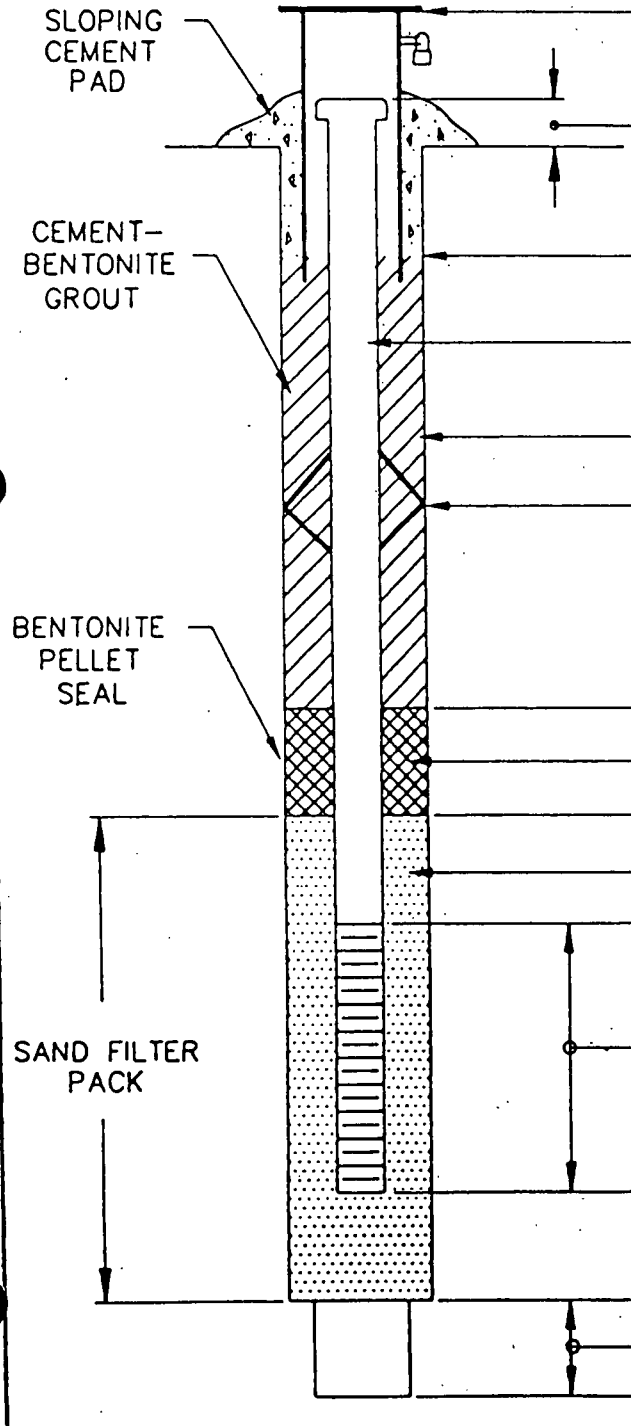
DRILLING CO. Buffalo Drlg.

DRILLER(S) R. Kephart

DRILLING METHOD(S) 6¼" HSA 0-22'

DEVELOPMENT METHOD(S)

4SR



SIZE AND LENGTH OF LOCKABLE PROTECTIVE STEEL CASING 4" X 5.0

LOCKED? X YES __ NO

STICK-UP 2.0

DEPTH TO TOP OF GROUT/ BOTTOM OF CEMENT Surface

RISER DIAMETER 2" AND MATERIAL Sch 40 PVC

BOREHOLE DIAMETER 10.5"

DEPTH TO CENTRALIZERS NA

DEPTH 8.2

PELLET SIZE 3/8"

DEPTH 11.0

SAND SIZE #1 Silica Sand

DEPTH 13.0

SCREEN DIAMETER, 2" SLOT SIZE, 0.006 AND MATERIAL Sch 40 PVC

DEPTH 23.0'

DEPTH 23.3

BACKFILL MATERIAL NA

BOTTOM OF BOREHOLE 23.3

NOTE: DEPTHS ARE FEET BELOW GRADE

OMWSHEET.D -20-90

MONITORING WELL CONSTRUCTION LOG

Down Gradient

PROJECT: Well Installation
PROJECT NO.: 0605-23-8
GROUND ELEV.: _____
FIELD GEOLOGIST: J.P. Hilton

LOCATION: Palmer St LF
BORING: MW-4D-93
DATE: 9/13 - 9/15/93

DRILLER: R. Kephart
DRILLING METHOD: 8¼" HSA 0-24'; 4¼ HSA 24-55; NX Core 55-73
DEVELOPMENT METHOD: _____

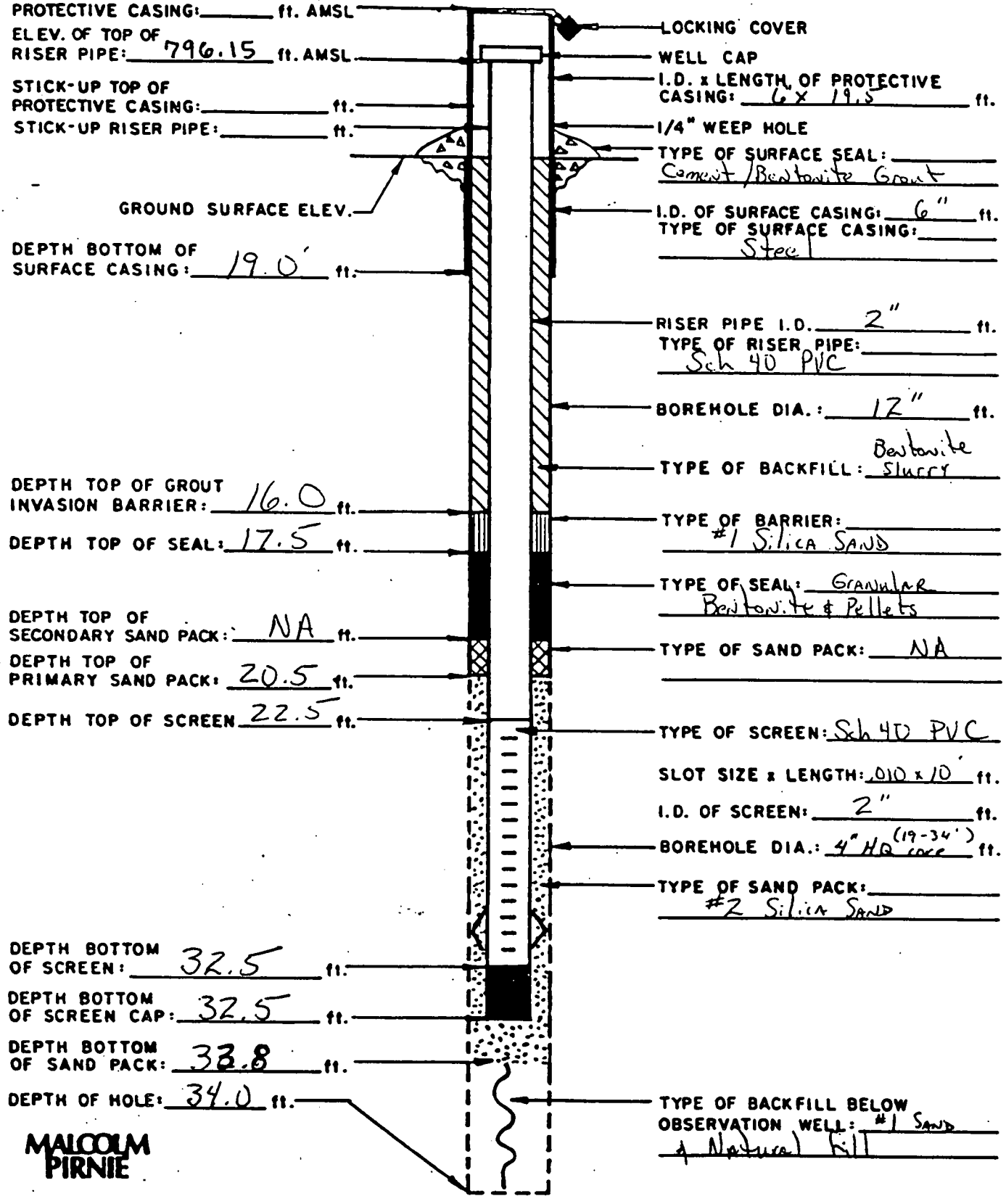
ELEV. OF TOP OF PROTECTIVE CASING: _____ ft. AMSL
ELEV. OF TOP OF RISER PIPE: _____ ft. AMSL
STICK-UP TOP OF PROTECTIVE CASING: 2.9 ft.
STICK-UP RISER PIPE: 2.6 ft.
GROUND SURFACE ELEV.
DEPTH BOTTOM OF SURFACE CASING: 23' ft.
DEPTH TOP OF GROUT INVASION BARRIER: 56.0 ft.
DEPTH TOP OF SEAL: 57.5 ft.
DEPTH TOP OF SECONDARY SAND PACK: NA ft.
DEPTH TOP OF PRIMARY SAND PACK: 60.5 ft.
DEPTH TOP OF SCREEN 62.5 ft.
DEPTH BOTTOM OF SCREEN: 72.5 ft.
DEPTH BOTTOM OF SCREEN CAP: 72.5 ft.
DEPTH BOTTOM OF SAND PACK: 72.9 ft.
DEPTH OF HOLE: 73.0 ft.

LOCKING COVER
WELL CAP
I.D. x LENGTH OF PROTECTIVE CASING: 4" x 5' ft.
1/4" WEEP HOLE
TYPE OF SURFACE SEAL: Cement
I.D. OF SURFACE CASING: 10" ft.
TYPE OF SURFACE CASING: Steel
RISER PIPE I.D. 2" ft.
TYPE OF RISER PIPE: Sch 40 PVC
BOREHOLE DIA.: 8.5" ft.
TYPE OF BACKFILL: Bentonite Grout
TYPE OF BARRIER: #1 Silica Sand
TYPE OF SEAL: 3/8" Bentonite Pellets
TYPE OF SAND PACK: NA
TYPE OF SCREEN: Sch 40 PVC
SLOT SIZE x LENGTH: .010 X 10 ft.
I.D. OF SCREEN: 2" ft.
BOREHOLE DIA.: 4" ft.
TYPE OF SAND PACK: #0 Silica Sand (#2 Q-ROK Equivalent)
TYPE OF BACKFILL BELOW OBSERVATION WELL: Native Cuttings

MALCOLM PIRNIE

MONITORING WELL CONSTRUCTION LOG

PROJECT: Palmer Street Landfill
PROJECT NO.: 0605-17-1
GROUND ELEV.: 795.78
FIELD GEOLOGIST: J.P. Hilton
LOCATION: Persia NY
BORING: MW-6D
DATE: 4/16/90
DRILLER: S. Giacich
DRILLING METHOD: 8 1/4" HSA to 19' HQ core to 34'
DEVELOPMENT METHOD:



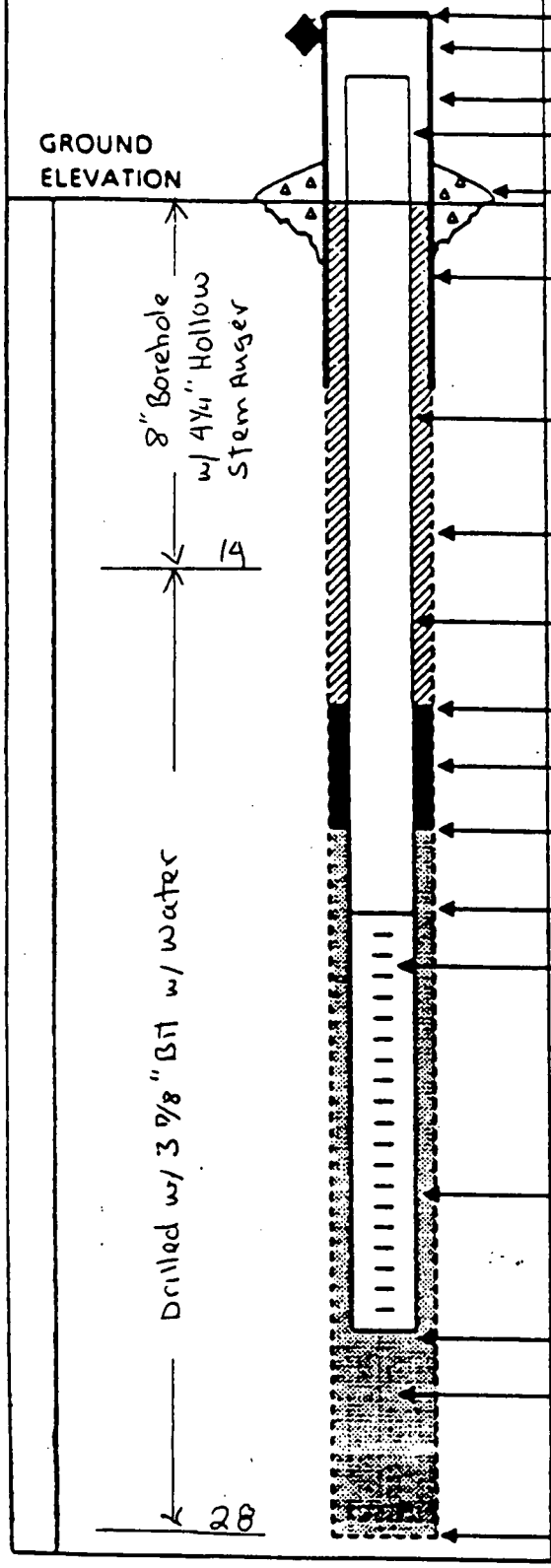
MALCOLM PIRNIE

MALCOLM PIRNIE

OVERBURDEN MONITORING WELL SHEET

PROJECT PALMER ST. LF. LOCATION GOWANDA, NY
PROJECT NO. 0665-10-1 BORING 7
ELEVATION 795.5 ft. DATE 8/10/87
FIELD GEOLOGIST R. O'LASKEY

DRILLER D. ALTROGGIE
DRILLING METHOD 3 7/8" Rotary Bit 4 1/4" H.S. AUGER
DEVELOPMENT METHOD AIR



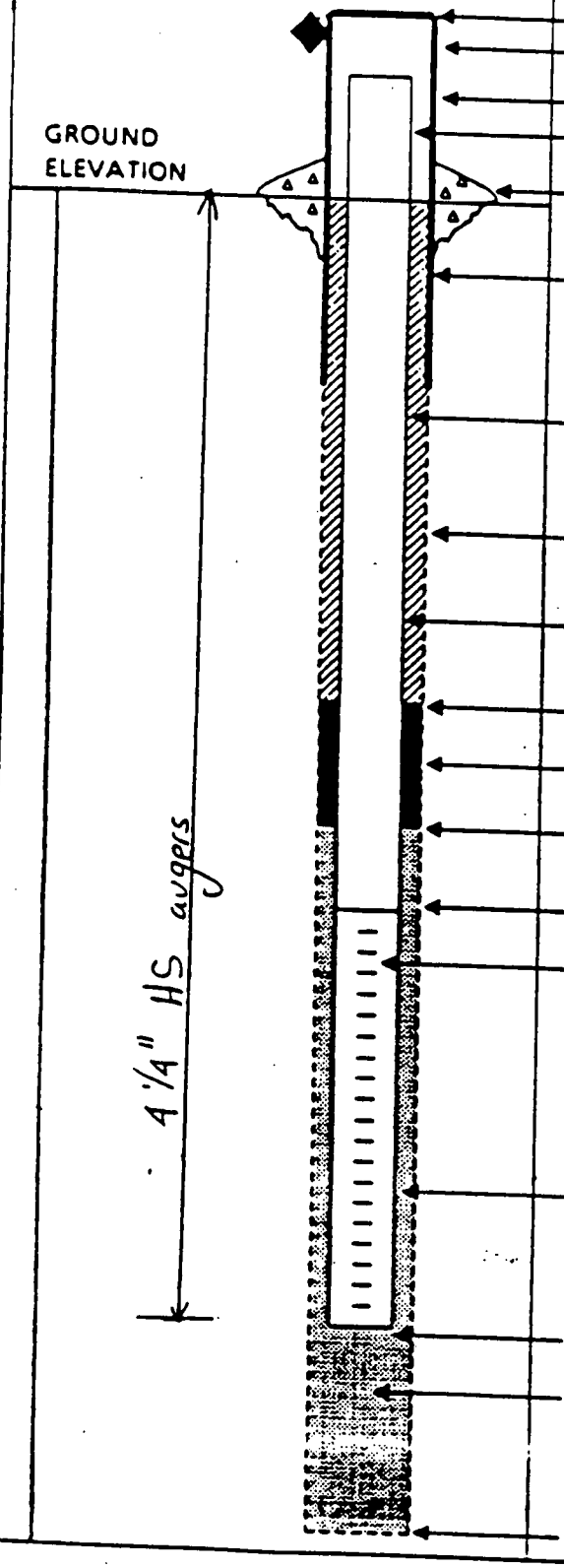
ELEVATION OF TOP OF SURFACE CASING: 800.67'
ELEVATION OF TOP OF RISER PIPE: 800.50'
STICK - UP TOP OF SURFACE CASING: ____
STICK - UP RISER PIPE: ____
TYPE OF SURFACE SEAL: CEMENT
I.D. OF SURFACE CASING: 4"
TYPE OF SURFACE CASING: STEEL
RISER PIPE I.D. 2"
TYPE OF RISER PIPE: SCH 40 PVC
BOREHOLE DIAMETER: 8" to 14' and 4" to 28'
TYPE OF BACKFILL: CEMENT / BENTONITE
ELEVATION / DEPTH TOP OF SEAL: 780.5/17'
TYPE OF SEAL: BENTONITE PELLETS
DEPTH TOP OF SAND PACK: 776.8/20.7'
ELEVATION / DEPTH TOP OF SCREEN: 775.0/22.5'
TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: .010"/5 FT
I.D. OF SCREEN: 2"
TYPE OF SAND PACK: #2 Q-ROC
ELEVATION / DEPTH BOTTOM OF SCREEN: 770.0/27.5'
ELEVATION / DEPTH BOTTOM OF SAND PACK: 769.0/28'
TYPE OF BACKFILL BELOW OBSERVATION WELL: N/A
ELEVATION / DEPTH OF HOLE: 769.0/28'

MALCOLM PIRNIE

OVERBURDEN MONITORING WELL SHEET

PROJECT PALMERST LF. LOCATION GOWANDA, NY
PROJECT NO. 0005-10-1 BORING 7S
ELEVATION 792.5' DATE 8/7/87
FIELD GEOLOGIST R O'LASKEY

DRILLER D. ALTROGGIE
DRILLING METHOD 4¼" HS AUGER
DEVELOPMENT METHOD AIR



ELEVATION OF TOP OF SURFACE CASING: 800.54'
ELEVATION OF TOP OF RISER PIPE: 800.38'
STICK - UP TOP OF SURFACE CASING:
STICK - UP RISER PIPE :
TYPE OF SURFACE SEAL: CEMENT
I.D. OF SURFACE CASING: 4"
TYPE OF SURFACE CASING: STEEL
RISER PIPE I.D. 2"
TYPE OF RISER PIPE: SCH 40 PVC
BOREHOLE DIAMETER: 8"
TYPE OF BACKFILL: CEMENT/BENTONITE
ELEVATION / DEPTH TOP OF SEAL: 795./2½'
TYPE OF SEAL: Bentonite / PELLETS
DEPTH TOP OF SAND PACK: 793.0/4½'
ELEVATION / DEPTH TOP OF SCREEN: 790.5/7'
TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: .010" / 5 FT
I.D. OF SCREEN: 2"
TYPE OF SAND PACK: #2 Q-ROC
ELEVATION / DEPTH BOTTOM OF SCREEN: 785.5/12'
ELEVATION / DEPTH BOTTOM OF SAND PACK: 784.5/13'
TYPE OF BACKFILL BELOW OBSERVATION WELL: N/A
ELEVATION / DEPTH OF HOLE: 784.5/13'

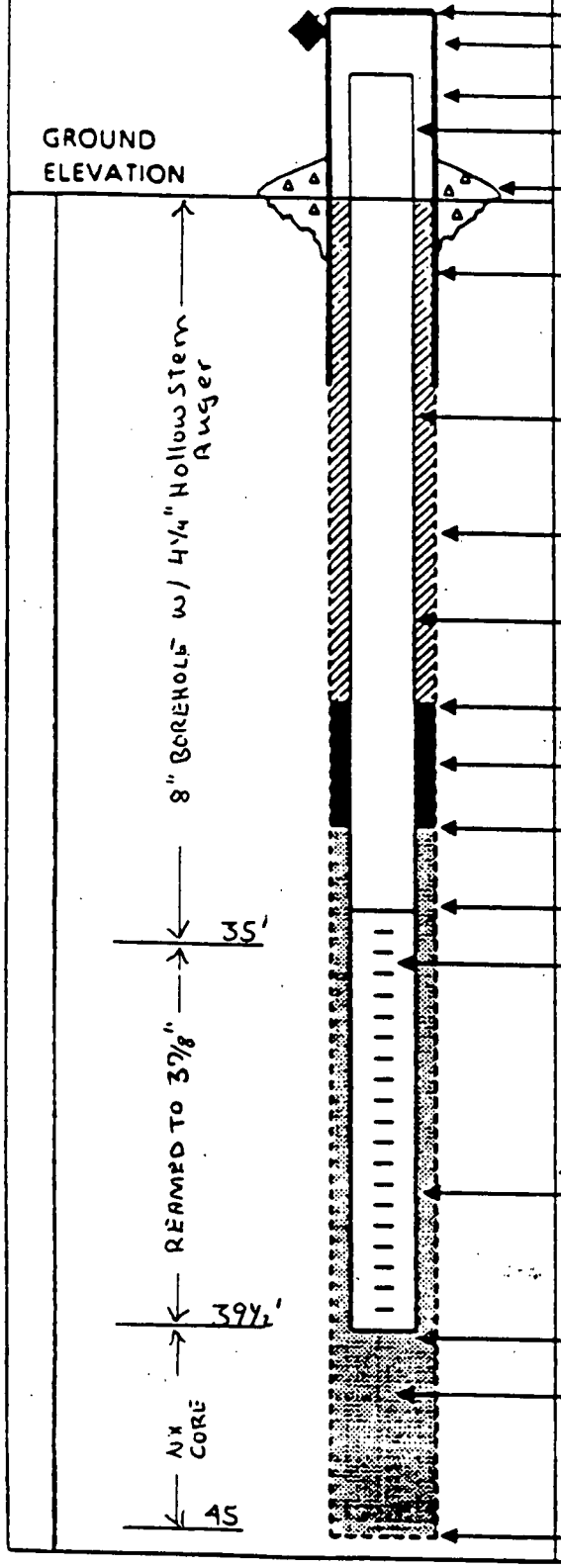
MALCOLM PIRNIE

OVERBURDEN MONITORING WELL SHEET

PROJECT Palmer St. LF
PROJECT NO. 0605-10-1
ELEVATION 797.5'
FIELD GEOLOGIST R. O'Laskey

LOCATION Gowanda, NY
BORING 7D
DATE 8/6/87

DRILLER D. Altroggie
DRILLING METHOD NX CORE 4¼" HS AUGER
DEVELOPMENT METHOD



ELEVATION OF TOP OF SURFACE CASING: 800.55'
ELEVATION OF TOP OF RISER PIPE: 800.40'
STICK - UP TOP OF SURFACE CASING:
STICK - UP RISER PIPE :
TYPE OF SURFACE SEAL: CEMENT
I.D. OF SURFACE CASING: 4"
TYPE OF SURFACE CASING: STEEL
RISER PIPE I.D. 2"
TYPE OF RISER PIPE: SCH 40 PVC
BOREHOLE DIAMETER: -8" to 35'
-4" to 39½'
-3" to 45'
TYPE OF BACKFILL: CEMENT/BENTONITE
ELEVATION / DEPTH TOP OF SEAL: 769.5/28'
TYPE OF SEAL: bentonite pellets
DEPTH TOP OF SAND PACK: 765.5/32'
ELEVATION / DEPTH TOP OF SCREEN: 763.5/34'
TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: 0.010" / 5ft.
I.D. OF SCREEN: 2"
TYPE OF SAND PACK: #2 Q-ROC
ELEVATION / DEPTH BOTTOM OF SCREEN: 758.5/39'
ELEVATION / DEPTH BOTTOM OF SAND PACK: 39½
TYPE OF BACKFILL BELOW OBSERVATION WELL: Cuttings from Reaming w/ 3⅞" Bit and #2 Q ROC
ELEVATION / DEPTH OF HOLE: 752.5/45'

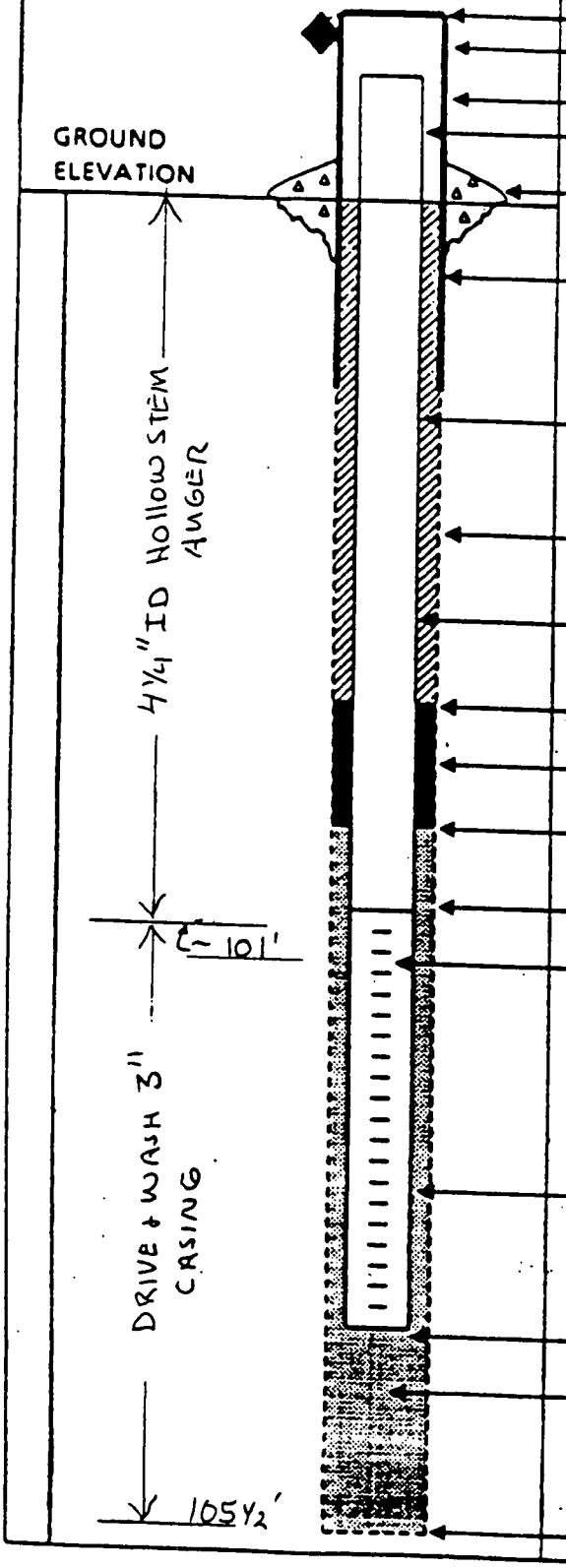
PIRNIE

OVERBURDEN MONITORING WELL SHEET

PROJECT PALMER ST. L.F.
PROJECT NO. 0605-10-1
ELEVATION 292.5
FIELD GEOLOGIST R. O'LASKEY

LOCATION GOWANDA, NY
BORING B
DATE 8/27/87

DRILLER D. ALTROGGIE
DRILLING METHOD as below
DEVELOPMENT METHOD AIR



ELEVATION OF TOP OF SURFACE CASING: 818.53
ELEVATION OF TOP OF RISER PIPE: 818.31
STICK - UP TOP OF SURFACE CASING:
STICK - UP RISER PIPE :
TYPE OF SURFACE SEAL: CEMENT
I.D. OF SURFACE CASING: 4"
TYPE OF SURFACE CASING: STEEL
RISER PIPE I.D. 2"
TYPE OF RISER PIPE: SCH 40 PVC
BOREHOLE DIAMETER: 8" to 101'
TYPE OF BACKFILL: CEMENT/BENTONITE
ELEVATION / DEPTH TOP OF SEAL: 717.5/80'
TYPE OF SEAL: BENTONITE SLURRY
DEPTH TOP OF SAND PACK: 700.5/97'
ELEVATION / DEPTH TOP OF SCREEN: 697.0/100.5'
TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: .010" / 5FT
I.D. OF SCREEN: 2"
TYPE OF SAND PACK: COLLAPSED FORMATION (SAND AND GRAVEL
ELEVATION / DEPTH BOTTOM OF SCREEN: 692.0/105.5'
ELEVATION / DEPTH BOTTOM OF SAND PACK: 692.0/105.5'
TYPE OF BACKFILL BELOW OBSERVATION WELL: Collapsed Sand and Gravel
ELEVATION / DEPTH OF HOLE: 692.0/105.5'

MALCOLM PIRNIE

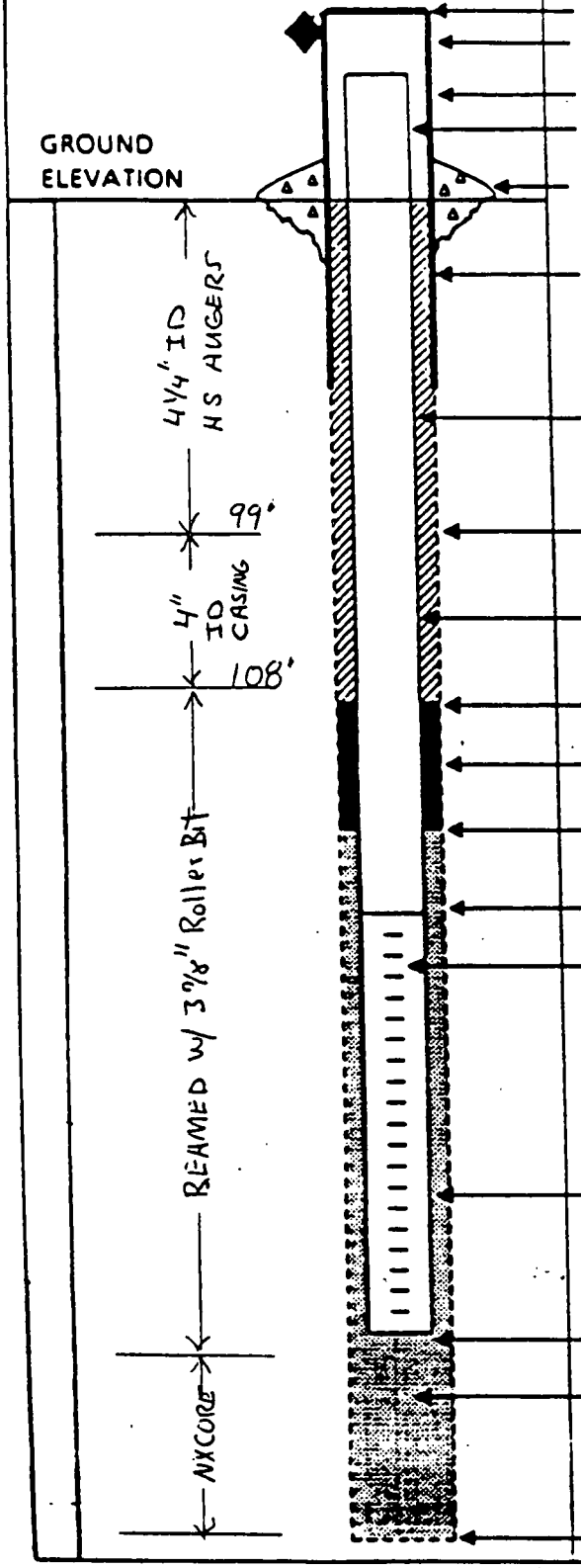
OVERBURDEN

MONITORING WELL SHEET

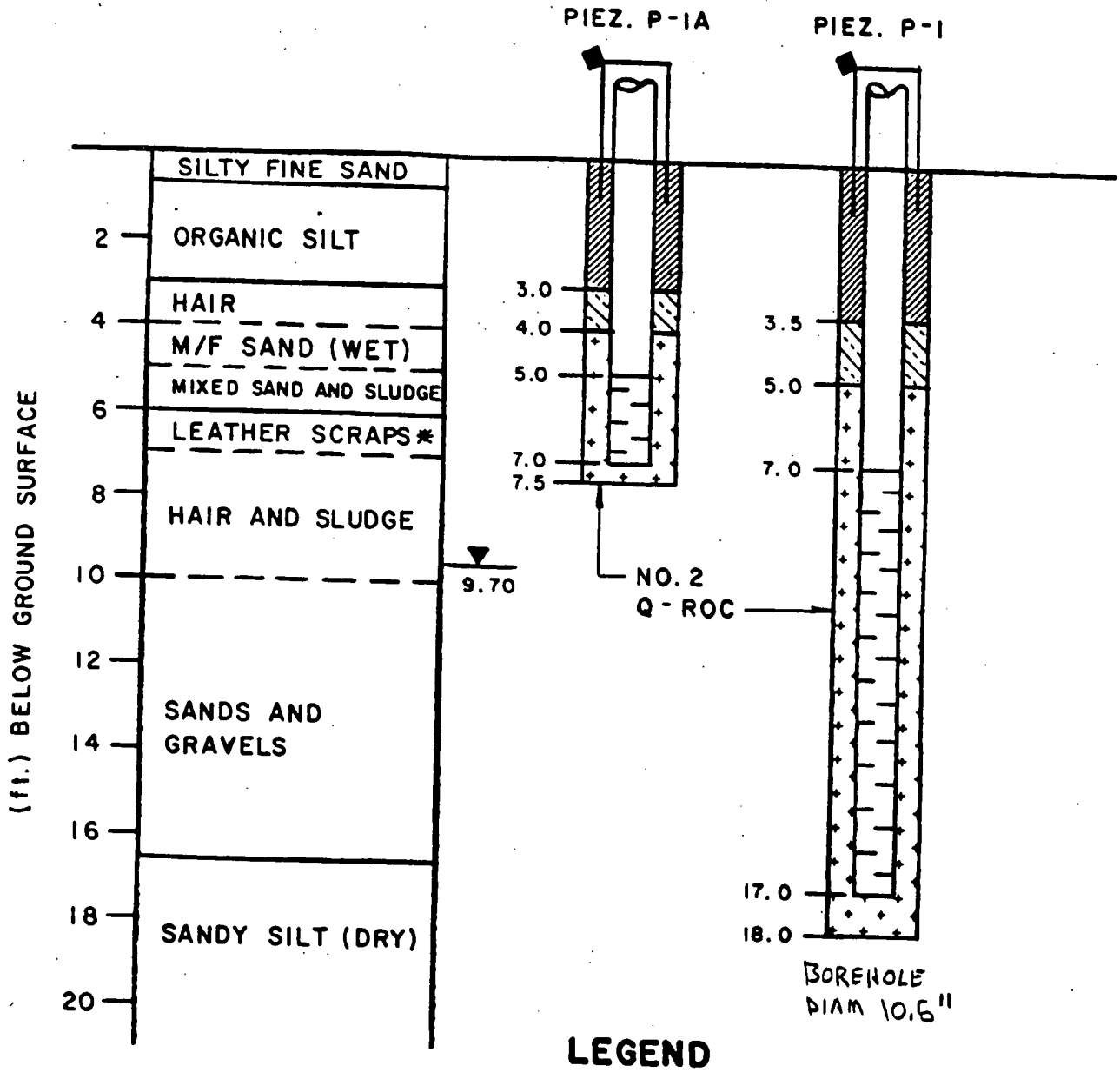
PROJECT PALMER ST. LF
PROJECT NO. 0605-10-1
ELEVATION 816.0'
FIELD GEOLOGIST R. O'LASKEY

LOCATION GOWANDA, NY
BORING 8D
DATE 8/21/87

DRILLER D. AITROGGLE
DRILLING METHOD Hollow Stem Auger, mud Rotary, Drive & Wash
DEVELOPMENT METHOD AIR



ELEVATION OF TOP OF SURFACE CASING: 818.63'
ELEVATION OF TOP OF RISER PIPE: 818.45'
STICK - UP TOP OF SURFACE CASING: ____
STICK - UP RISER PIPE: ____
TYPE OF SURFACE SEAL: CEMENT
I.D. OF SURFACE CASING: 4"
TYPE OF SURFACE CASING: STEEL
RISER PIPE I.D. 2"
TYPE OF RISER PIPE: SCH 40 PVC
BOREHOLE DIAMETER: 4" 108' to 122'
TYPE OF BACKFILL: CEMENT/BENTONITE
ELEVATION / DEPTH TOP OF SEAL: 707.0/109'
TYPE OF SEAL: BENTONITE SLURRY
DEPTH TOP OF SAND PACK: 701.5/114.5'
ELEVATION / DEPTH TOP OF SCREEN: 699.0/117'
TYPE OF SCREEN: PVC
SLOT SIZE x LENGTH: .010" / 5 FT
I.D. OF SCREEN: 2"
TYPE OF SAND PACK: #2 Q-ROC
ELEVATION / DEPTH BOTTOM OF SCREEN: 694.0/122'
ELEVATION / DEPTH BOTTOM OF SAND PACK: 693.0/123'
TYPE OF BACKFILL BELOW OBSERVATION WELL: Cuttings from Reaming w/ 3 7/8"-11. Bit.
ELEVATION / DEPTH OF HOLE: 689.0/127'



LEGEND

- WATER LEVEL ON 8/2/88
- BENTONITE PELLETS
- SCREENED SOIL/CUTTINGS
- SILICA FLOUR
- POROUS CUP
- CEMENT BENTONITE GROUT
- SAND PACK

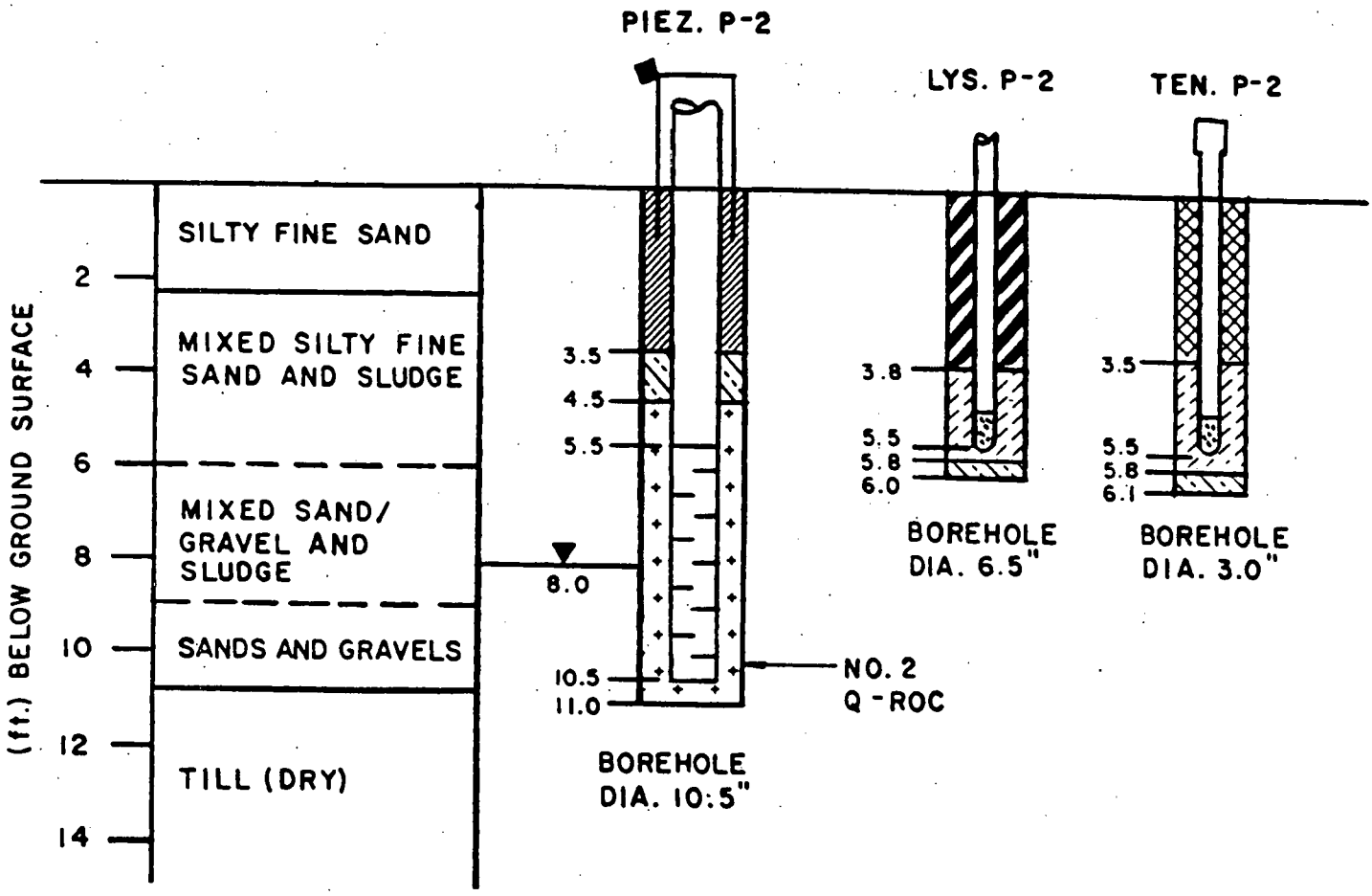
NOTE: * SAMPLE SPOON ENCOUNTERED MIXED SLUDGE AND FINE SAND AT 6FT. IN BORING P-1A, LEATHER SCRAP LAYER WAS ABSENT.

VERT. SCALE : 1"= 4'-0"

MALCOLM PIRNIE

MOENCH TANNING COMPANY
PALMER STREET LANDFILL

PIEZOMETER CONSTRUCTION DIAGRAM
NOVEMBER 1988



LEGEND

- BENTONITE SLURRY
- WATER LEVEL ON 8/2/88
- BENTONITE PELLETS
- SCREENED SOIL/CUTTINGS
- SILICA FLOUR
- POROUS CUP
- CEMENT BENTONITE GROUT
- SAND PACK

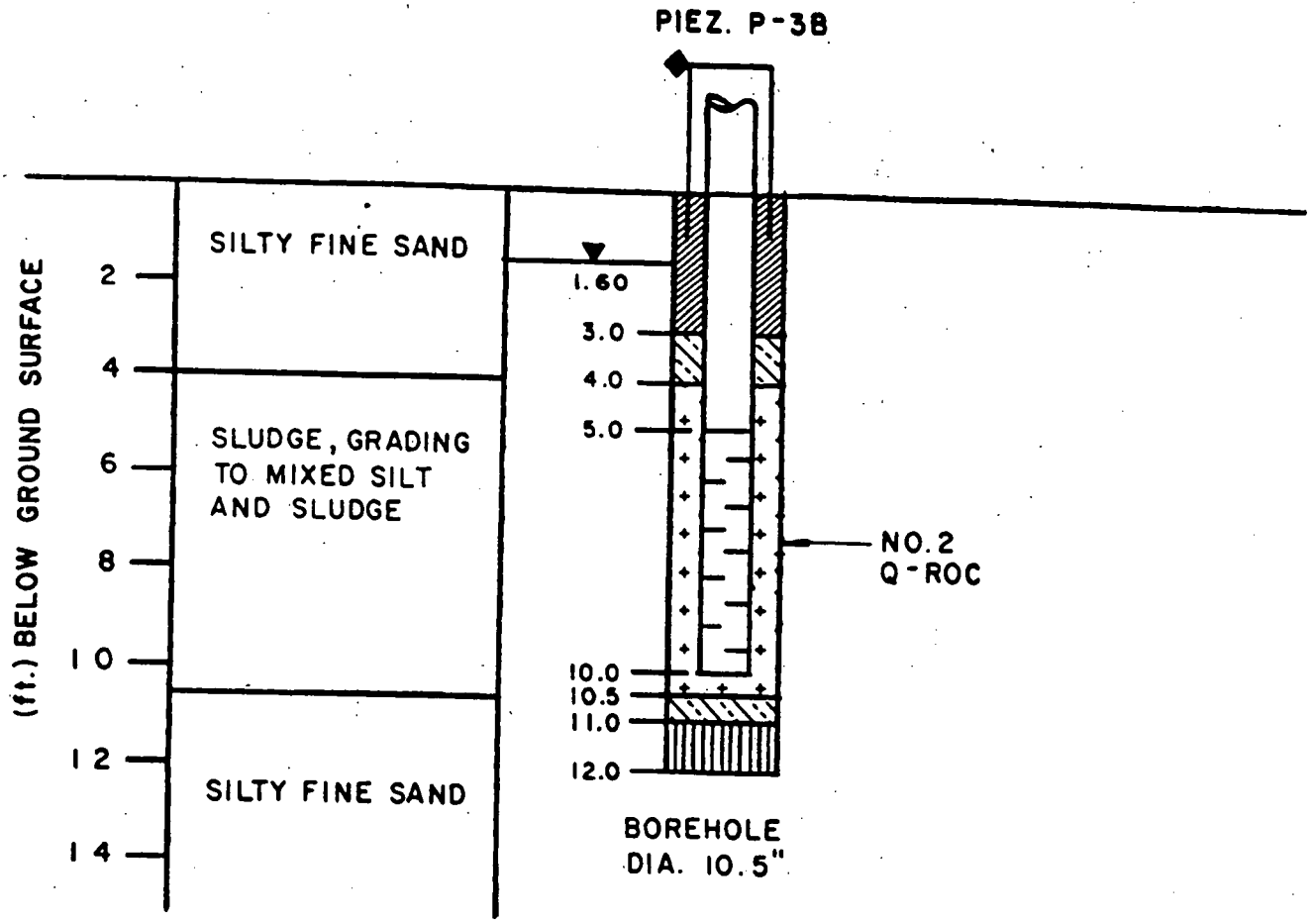
VERT. SCALE : 1" = 4'-0"

MALCOLM PIRNIE

MOENCH TANNING COMPANY
PALMER STREET LANDFILL

PIEZOMETER CONSTRUCTION DIAGRAM

NOVEMBER 1988



LEGEND

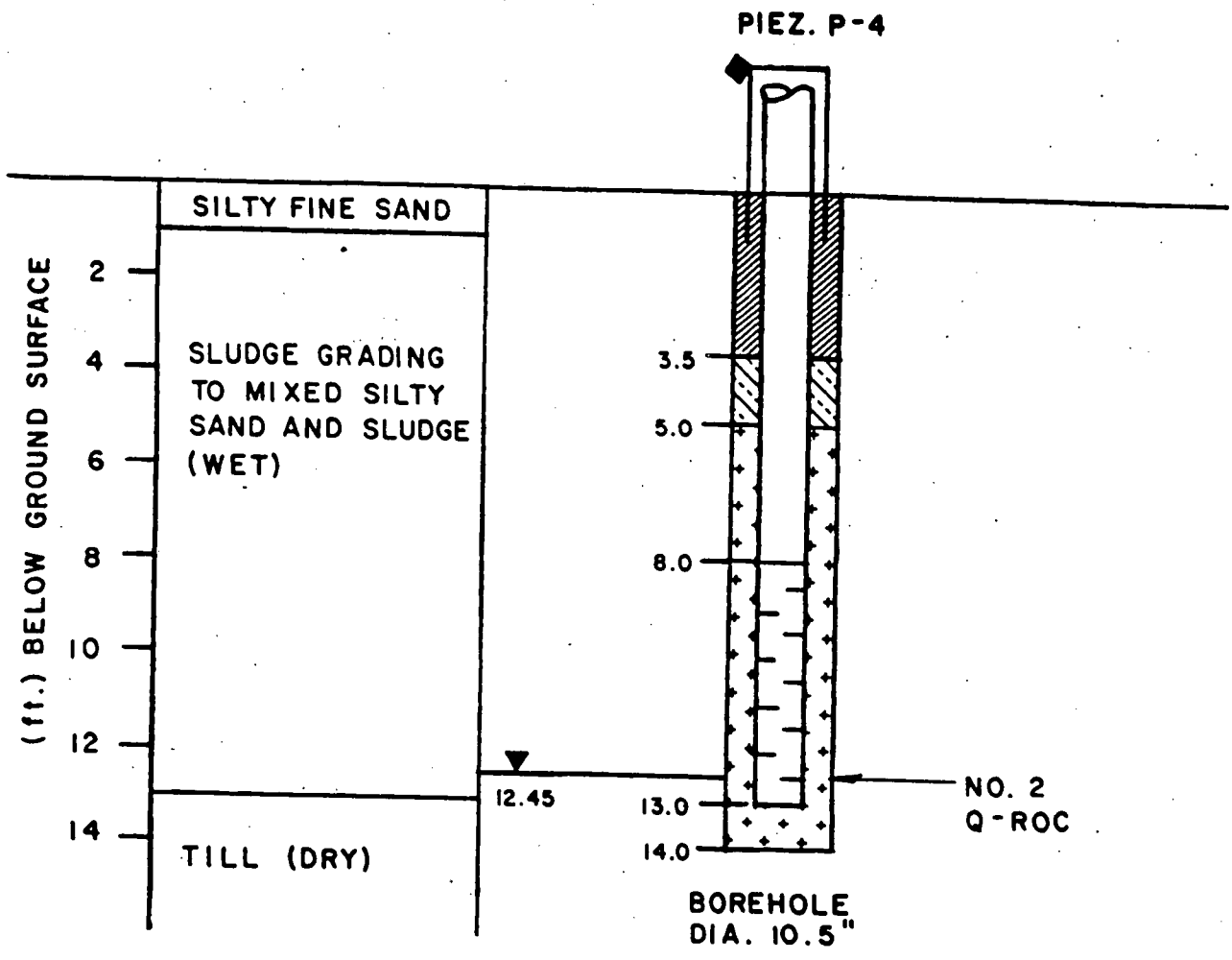
- COLLAPSED FORMATION
- WATER LEVEL ON 8/2/88
- BENTONITE PELLETS
- SCREENED SOIL/CUTTINGS
- SILICA FLOUR
- POROUS CUP
- CEMENT BENTONITE GROUT
- SAND PACK

VERT. SCALE : 1"= 4'-0"

MALCOLM PIRNIE

MOENCH TANNING COMPANY
PALMER STREET LANDFILL

PIEZOMETER CONSTRUCTION DIAGRAM
NOVEMBER 1988



LEGEND

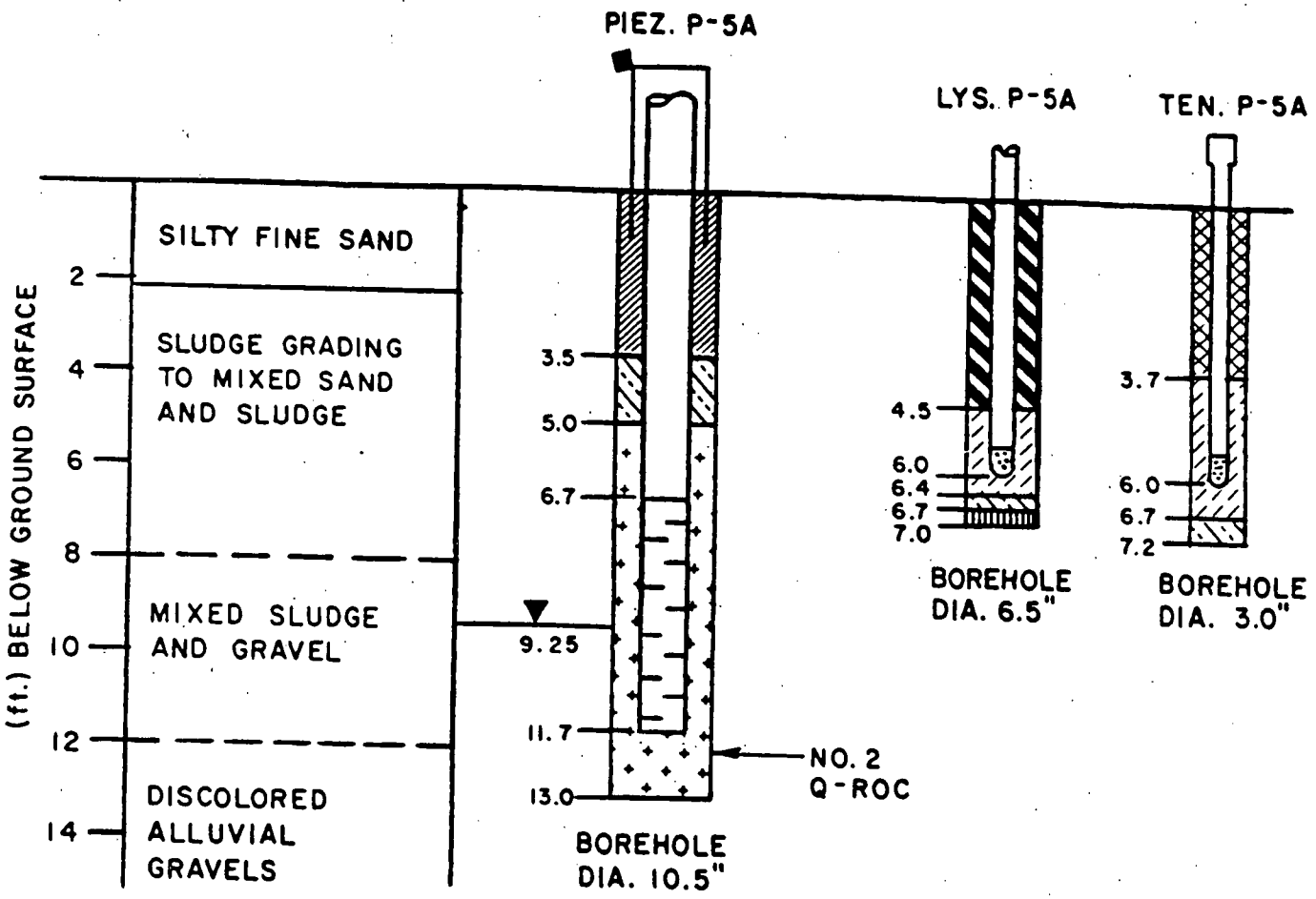
- WATER LEVEL ON 8/2/88
- BENTONITE PELLETS
- SCREENED SOIL/CUTTINGS
- SILICA FLOUR
- POROUS CUP
- CEMENT BENTONITE GROUT
- SAND PACK

VERT. SCALE : 1"= 4'-0"

MALCOLM PIRNIE

MOENCH TANNING COMPANY
PALMER STREET LANDFILL

PIEZOMETER CONSTRUCTION DIAGRAM
NOVEMBER 1988



LEGEND

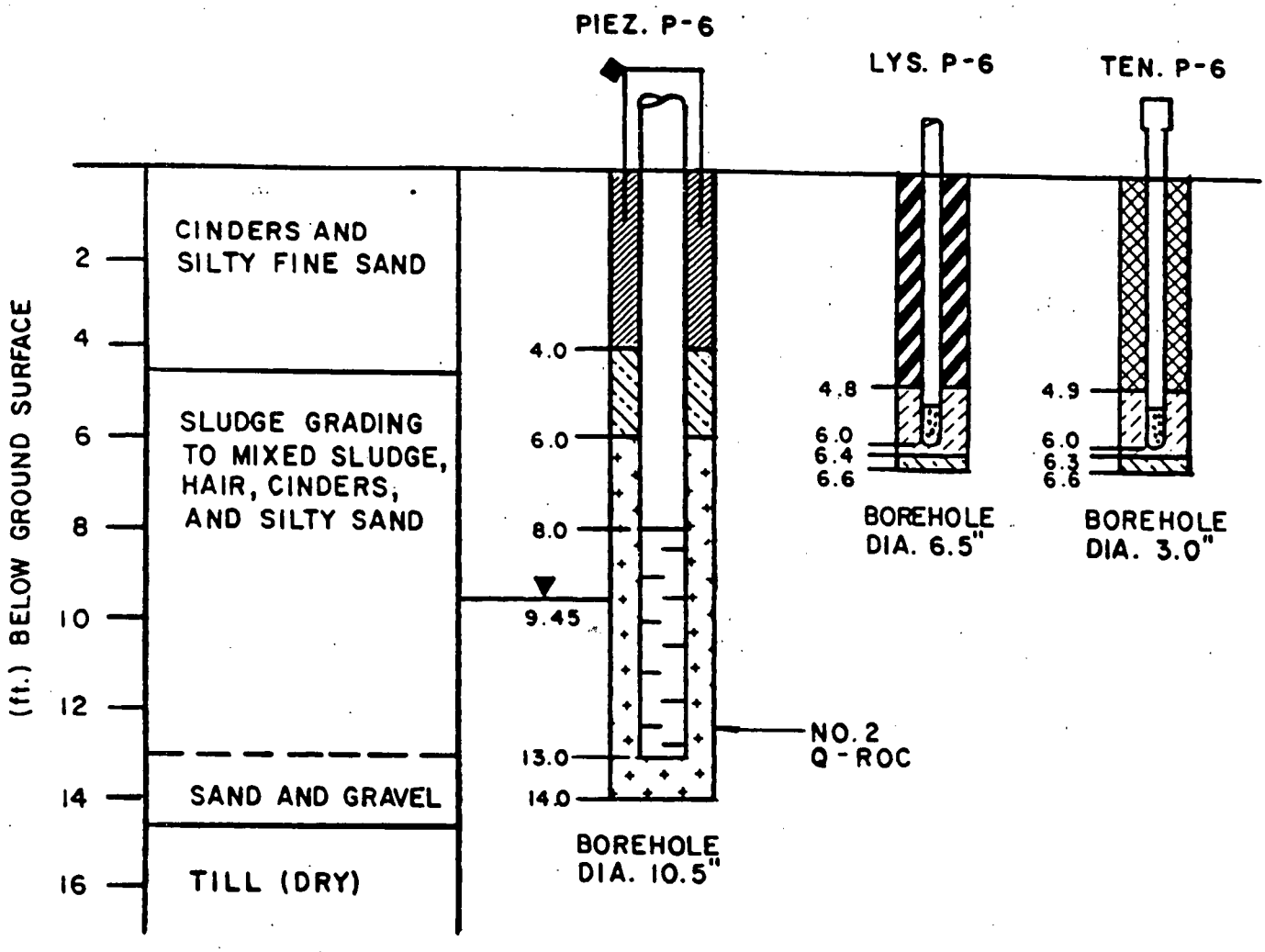
- BENTONITE SLURRY
- COLLAPSED FORMATION
- WATER LEVEL ON 8/2/88
- BENTONITE PELLETS
- SCREENED SOIL/CUTTINGS
- SILICA FLOUR
- POROUS CUP
- CEMENT BENTONITE GROUT
- SAND PACK

VERT. SCALE : 1"= 4'-0"

MALCOLM PIRNIE

MOENCH TANNING COMPANY
PALMER STREET LANDFILL

PIEZOMETER CONSTRUCTION DIAGRAM
NOVEMBER 1988



LEGEND

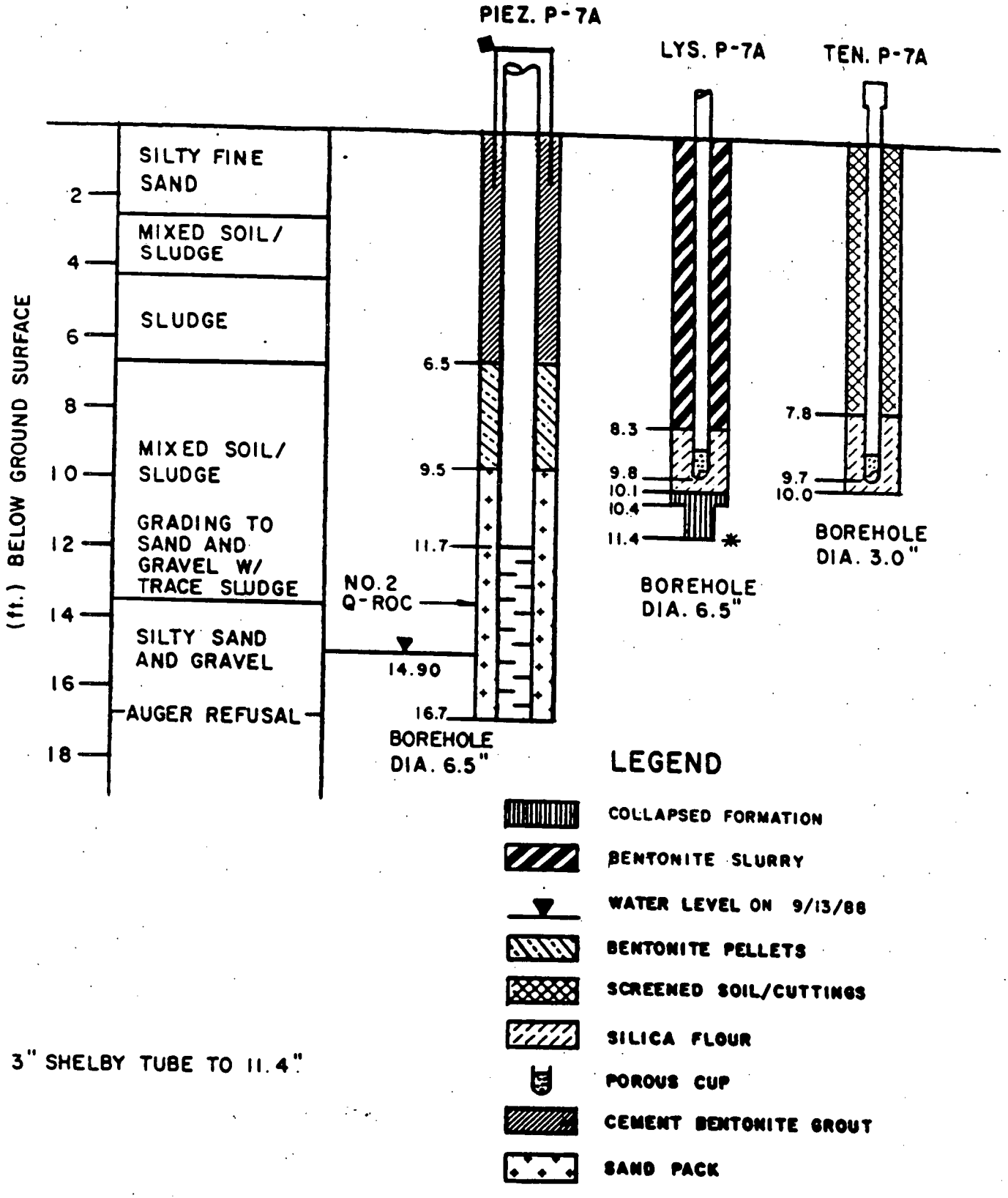
- BENTONITE SLURRY
- WATER LEVEL ON 8/2/88
- BENTONITE PELLETS
- SCREENED SOIL/CUTTINGS
- SILICA FLOUR
- POROUS CUP
- CEMENT BENTONITE GROUT
- SAND PACK

VERT. SCALE : 1"= 4'-0"

MALCOLM PIRNIE

MOENCH TANNING COMPANY
PALMER STREET LANDFILL

PIEZOMETER CONSTRUCTION DIAGRAM
NOVEMBER 1988



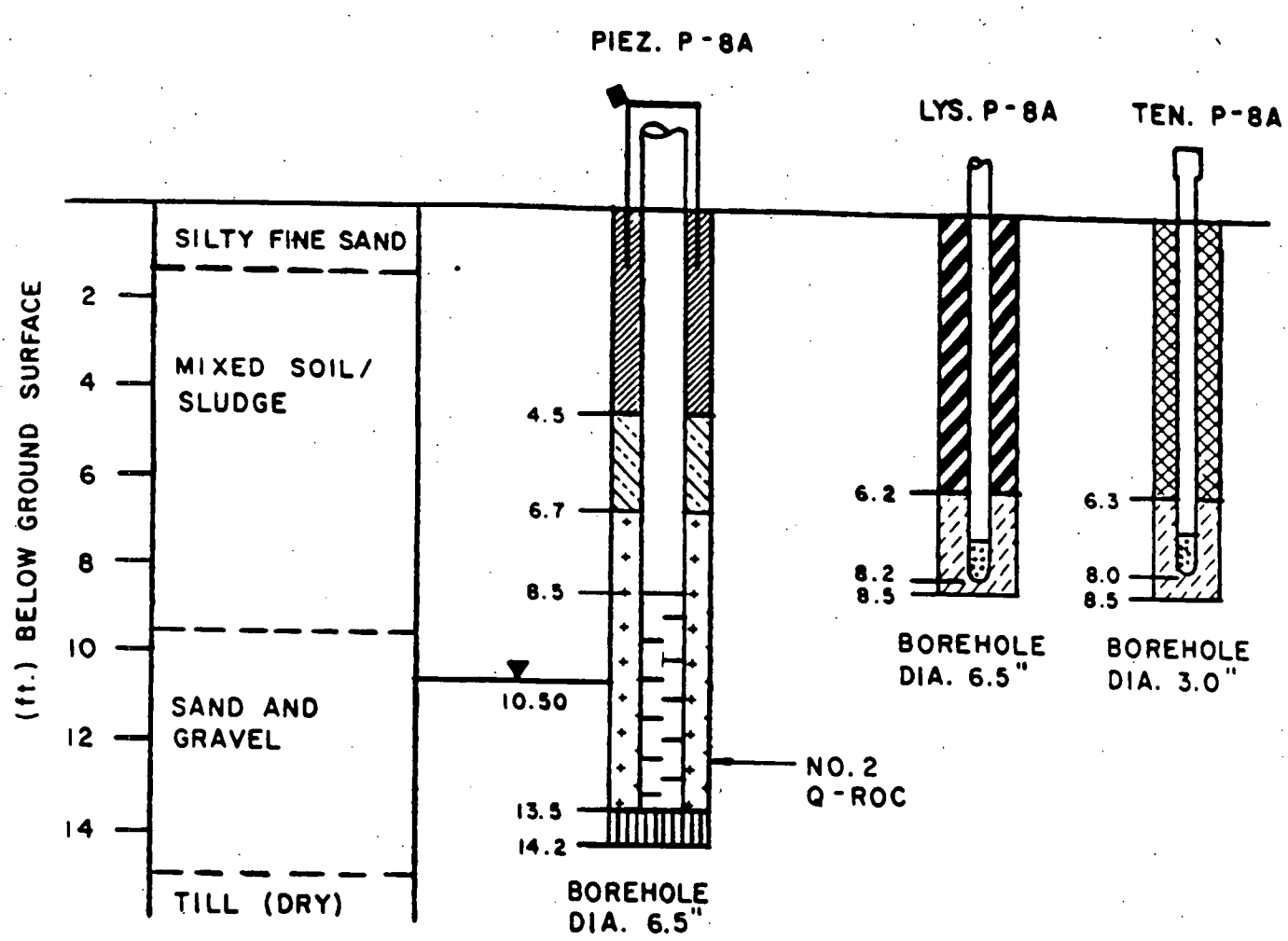
* 3" SHELBY TUBE TO 11.4"

VERT. SCALE : 1"= 4'-0"

MALCOLM PIRNIE

MOENCH TANNING COMPANY
PALMER STREET LANDFILL

PIEZOMETER CONSTRUCTION DIAGRAM
NOVEMBER 1988



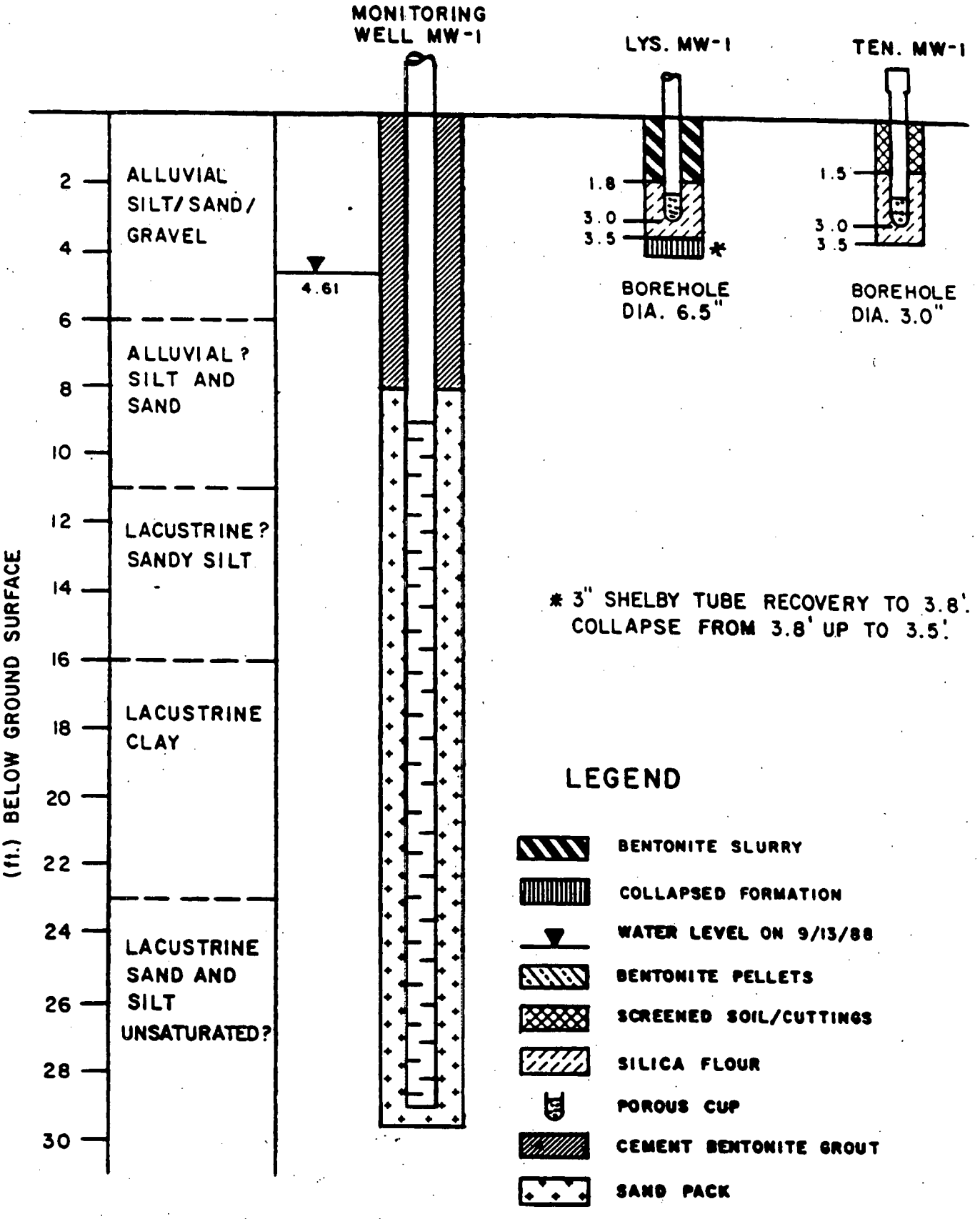
LEGEND

- COLLAPSED FORMATION
- BENTONITE SLURRY
- WATER LEVEL ON 9/13/88
- BENTONITE PELLETS
- SCREENED SOIL/CUTTINGS
- SILICA FLOUR
- POROUS CUP
- CEMENT BENTONITE GROUT
- SAND PACK

VERT. SCALE : 1"= 4'-0"

MALCOLM PIRNIE

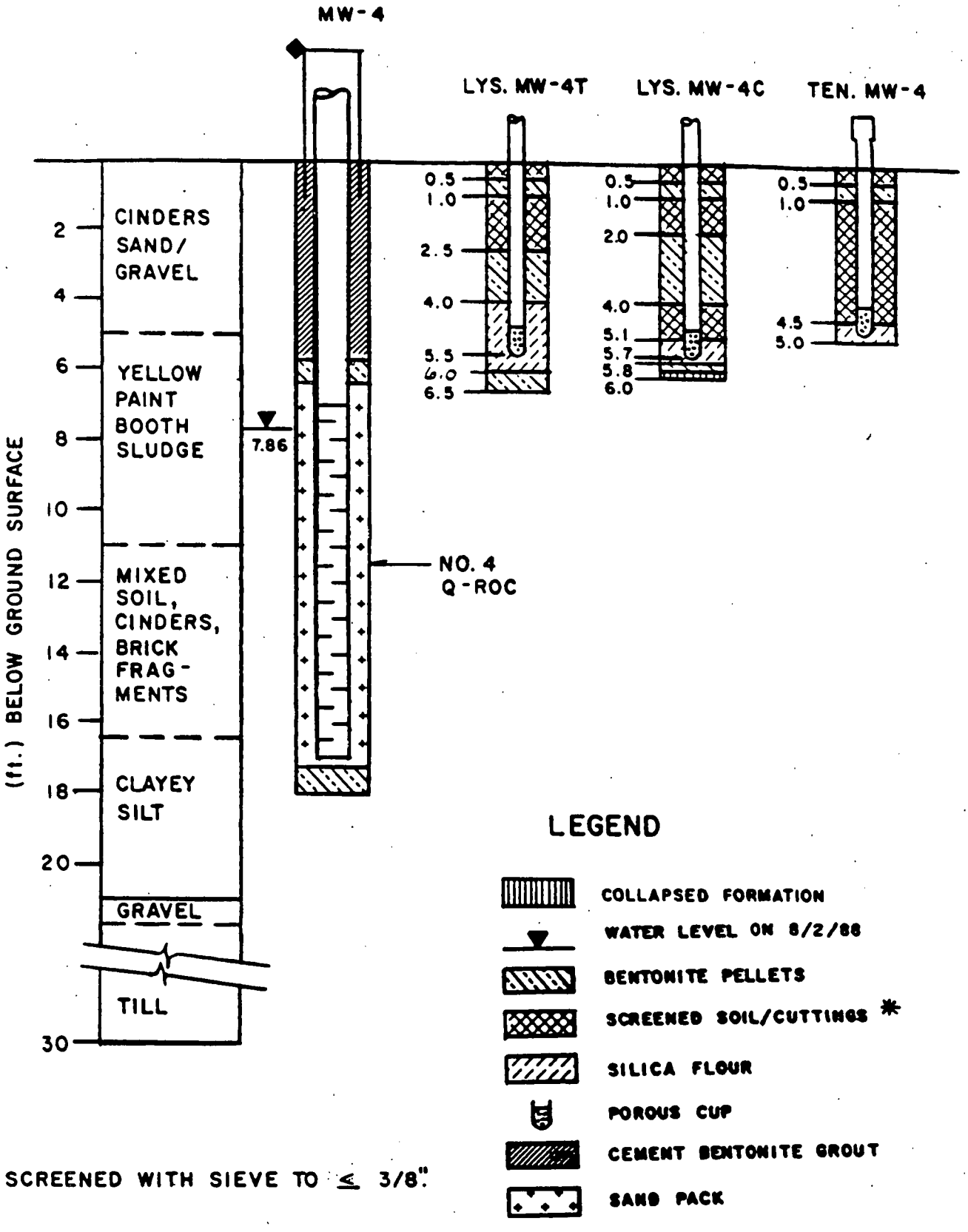
MOENCH TANNING COMPANY
PALMER STREET LANDFILL
PIEZOMETER/LYSIMETER
CONSTRUCTION DIAGRAM
NOVEMBER 1988



VERT. SCALE : 1"= 4'-0"

MALCOLM PIRNIE

MOENCH TANNING COMPANY
PALMER STREET LANDFILL
PIEZOMETER/LYSIMETER CONSTRUCTION DIAGRAM
NOVEMBER 1988



LEGEND

- COLLAPSED FORMATION
- WATER LEVEL ON 8/2/88
- BENTONITE PELLETS
- SCREENED SOIL/CUTTINGS *
- SILICA FLOUR
- POROUS CUP
- CEMENT BENTONITE GROUT
- SAND PACK

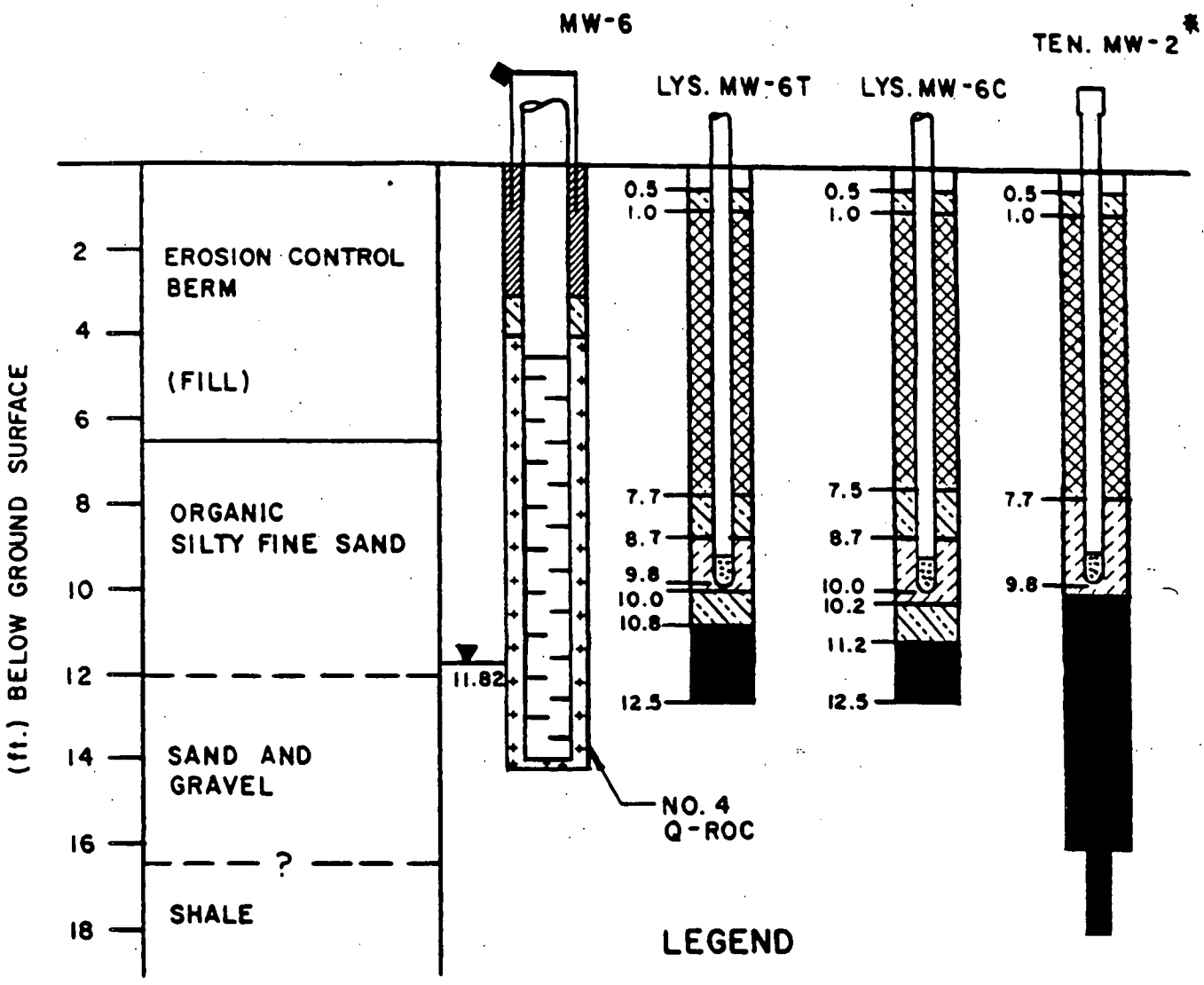
* SCREENED WITH SIEVE TO ≤ 3/8".

VERT. SCALE : 1" = 4'-0"

MALCOLM PIRNIE

MOENCH TANNING COMPANY
PALMER STREET LANDFILL

LYSIMETER CONSTRUCTION DIAGRAM
NOVEMBER 1988



LEGEND

- BACKFILL
- WATER LEVEL ON 8/2/88
- BENTONITE PELLETS
- SCREENED SOIL/CUTTINGS
- SILICA FLOUR
- POROUS CUP
- CEMENT BENTONITE GROUT
- SAND PACK

* BORING LOG INCLUDED IN APPENDIX.

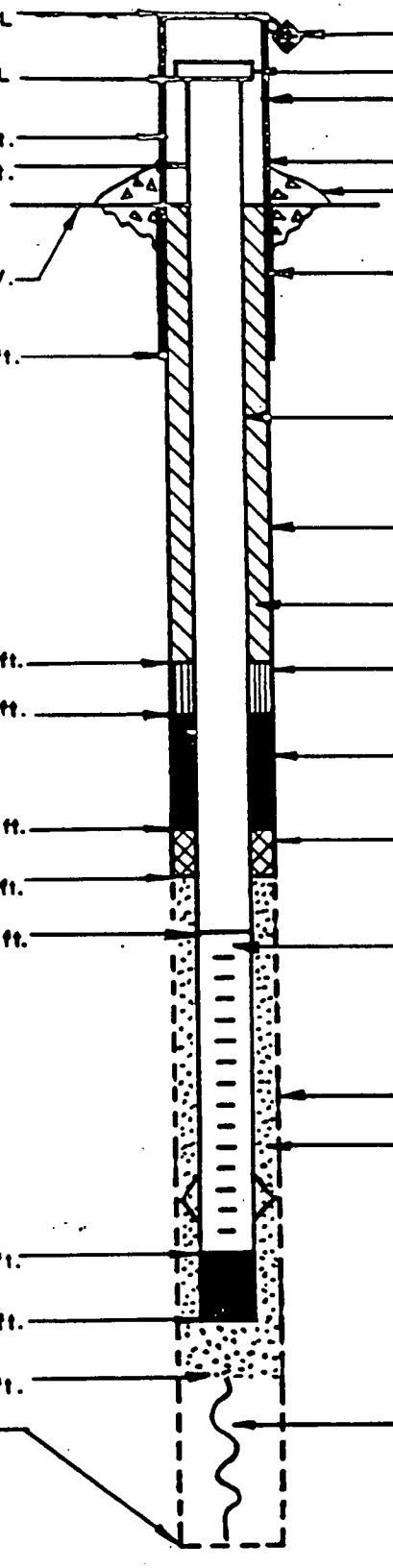
VERT. SCALE : 1" = 4'-0"

MALCOLM PIRNIE

MOENCH TANNING COMPANY
PALMER STREET LANDFILL
LYSIMETER CONSTRUCTION DIAGRAM
NOVEMBER 1988

MONITORING WELL CONSTRUCTION LOG

PROJECT: Palmer St. Landfill
PROJECT NO.: 0605-17-1
GROUND ELEV.: 804.34
FIELD GEOLOGIST: J.P. Hilton
LOCATION: Persia NY
BORING: P-6A
DATE: 4/18/90
DRILLER: T. Wittmeyer
DRILLING METHOD: 8¼" HSA to 16.0'; 4¼" HSA to 20.8'
DEVELOPMENT METHOD:



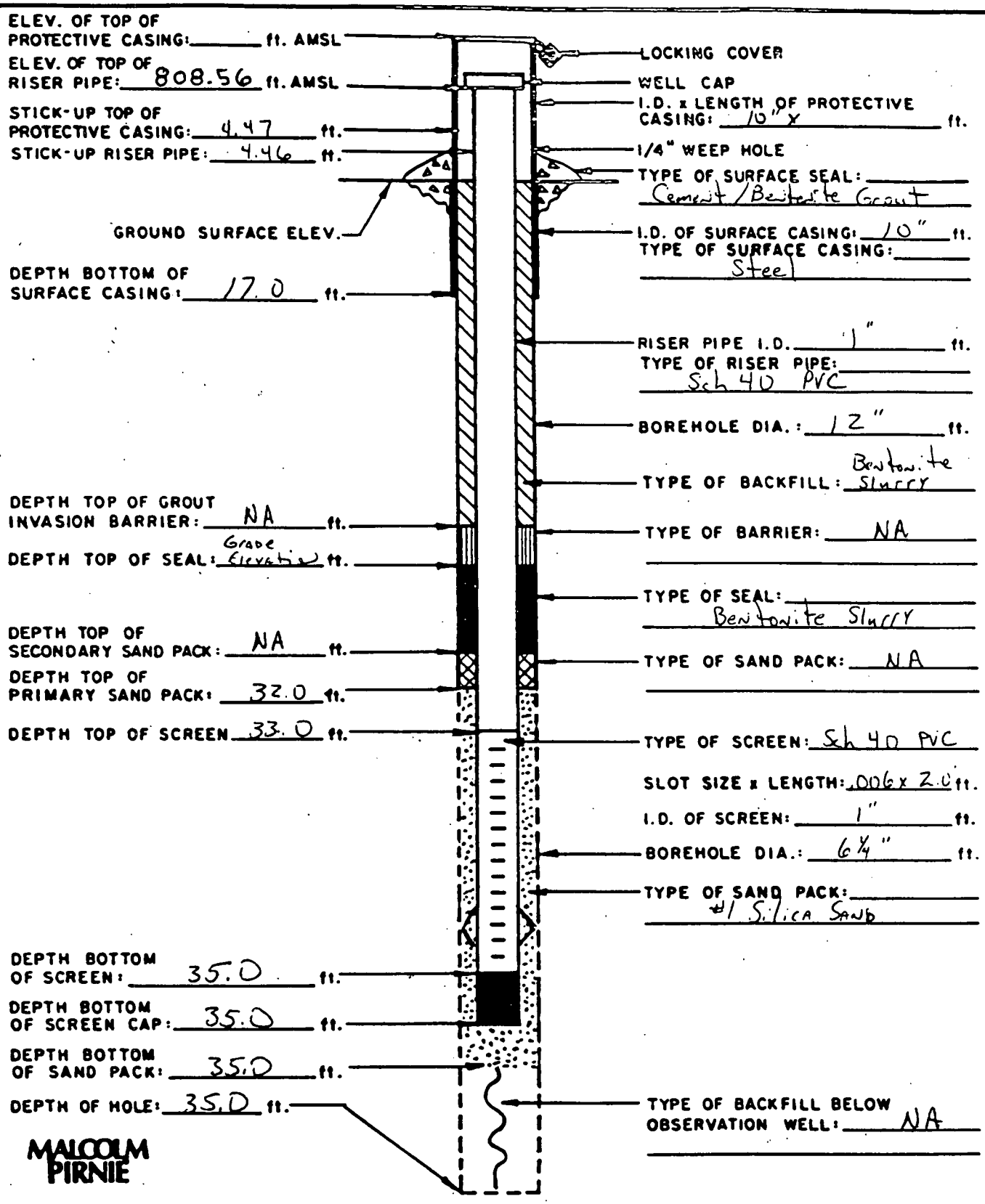
ELEV. OF TOP OF PROTECTIVE CASING: _____ ft. AMSL
ELEV. OF TOP OF RISER PIPE: 805.56 ft. AMSL
STICK-UP TOP OF PROTECTIVE CASING: 2.1 ft.
STICK-UP RISER PIPE: 4.8 ft.
GROUND SURFACE ELEV.
DEPTH BOTTOM OF SURFACE CASING: 16.0 ft.
DEPTH TOP OF GROUT INVASION BARRIER: NA ft.
DEPTH TOP OF SEAL: Grade Elevations ft.
DEPTH TOP OF SECONDARY SAND PACK: NA ft.
DEPTH TOP OF PRIMARY SAND PACK: 17.4 ft.
DEPTH TOP OF SCREEN 18.4 ft.
DEPTH BOTTOM OF SCREEN: 20.4 ft.
DEPTH BOTTOM OF SCREEN CAP: 20.4 ft.
DEPTH BOTTOM OF SAND PACK: 20.8 ft.
DEPTH OF HOLE: 20.8 ft.

LOCKING COVER
WELL CAP
I.D. x LENGTH OF PROTECTIVE CASING: 10" x 18.1 ft.
1/4" WEEP HOLE
TYPE OF SURFACE SEAL: Cement/Bentonite Grout
I.D. OF SURFACE CASING: 10" ft.
TYPE OF SURFACE CASING: Steel
RISER PIPE I.D. 1" ft.
TYPE OF RISER PIPE: Sch 40 PVC
BOREHOLE DIA.: 12" ft.
TYPE OF BACKFILL: Bentonite Slurry
TYPE OF BARRIER: NA
TYPE OF SEAL: Bentonite Slurry
TYPE OF SAND PACK: NA
TYPE OF SCREEN: Sch 40 PVC
SLOT SIZE x LENGTH: .006 x 2.0' ft.
I.D. OF SCREEN: 1" ft.
BOREHOLE DIA.: 6¼" ft.
TYPE OF SAND PACK: #1 Silica Sand
TYPE OF BACKFILL BELOW OBSERVATION WELL: #1 Silica Sand

MALCOLM PIRNIE

MONITORING WELL CONSTRUCTION LOG

PROJECT: Palmer St landfill
PROJECT NO.: 0605 17 1
GROUND ELEV.: 804.08
FIELD GEOLOGIST: J.P. Hilton
LOCATION: Perrin NY
BORING: P-6B
DATE: 4/17/90
DRILLER: T. Wittmeyer
DRILLING METHOD: 8¼" HSA to 17.0' 4¼" HSA to 35'
DEVELOPMENT METHOD:



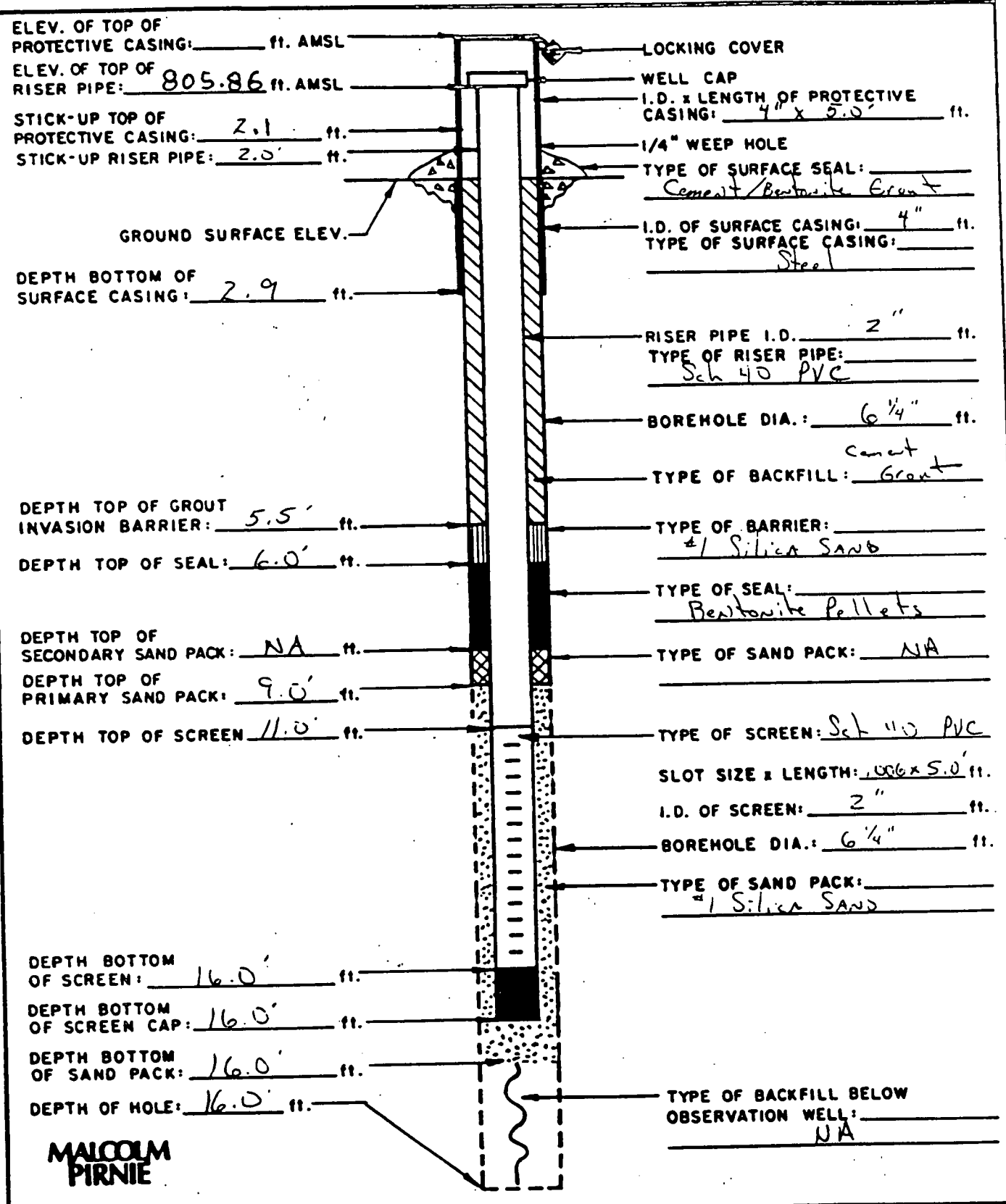
ELEV. OF TOP OF PROTECTIVE CASING: _____ ft. AMSL
ELEV. OF TOP OF RISER PIPE: 808.56 ft. AMSL
STICK-UP TOP OF PROTECTIVE CASING: 4.47 ft.
STICK-UP RISER PIPE: 4.46 ft.
GROUND SURFACE ELEV.
DEPTH BOTTOM OF SURFACE CASING: 17.0 ft.
DEPTH TOP OF GROUT INVASION BARRIER: NA ft.
DEPTH TOP OF SEAL: Grade Elevation ft.
DEPTH TOP OF SECONDARY SAND PACK: NA ft.
DEPTH TOP OF PRIMARY SAND PACK: 32.0 ft.
DEPTH TOP OF SCREEN 33.0 ft.
DEPTH BOTTOM OF SCREEN: 35.0 ft.
DEPTH BOTTOM OF SCREEN CAP: 35.0 ft.
DEPTH BOTTOM OF SAND PACK: 35.0 ft.
DEPTH OF HOLE: 35.0 ft.

LOCKING COVER
WELL CAP
I.D. x LENGTH OF PROTECTIVE CASING: 10" X _____ ft.
1/4" WEEP HOLE
TYPE OF SURFACE SEAL: Cement/Bentonite Grout
I.D. OF SURFACE CASING: 10" ft.
TYPE OF SURFACE CASING: Steel
RISER PIPE I.D. 1" ft.
TYPE OF RISER PIPE: Sch 40 PVC
BOREHOLE DIA.: 12" ft.
TYPE OF BACKFILL: Bentonite Slurry
TYPE OF BARRIER: NA
TYPE OF SEAL: Bentonite Slurry
TYPE OF SAND PACK: NA
TYPE OF SCREEN: Sch 40 PVC
SLOT SIZE x LENGTH: .006 x 2.0 ft.
I.D. OF SCREEN: 1" ft.
BOREHOLE DIA.: 6¼" ft.
TYPE OF SAND PACK: #1 Silica Sand
TYPE OF BACKFILL BELOW OBSERVATION WELL: NA

MALCOLM PIRNIE

MONITORING WELL CONSTRUCTION LOG

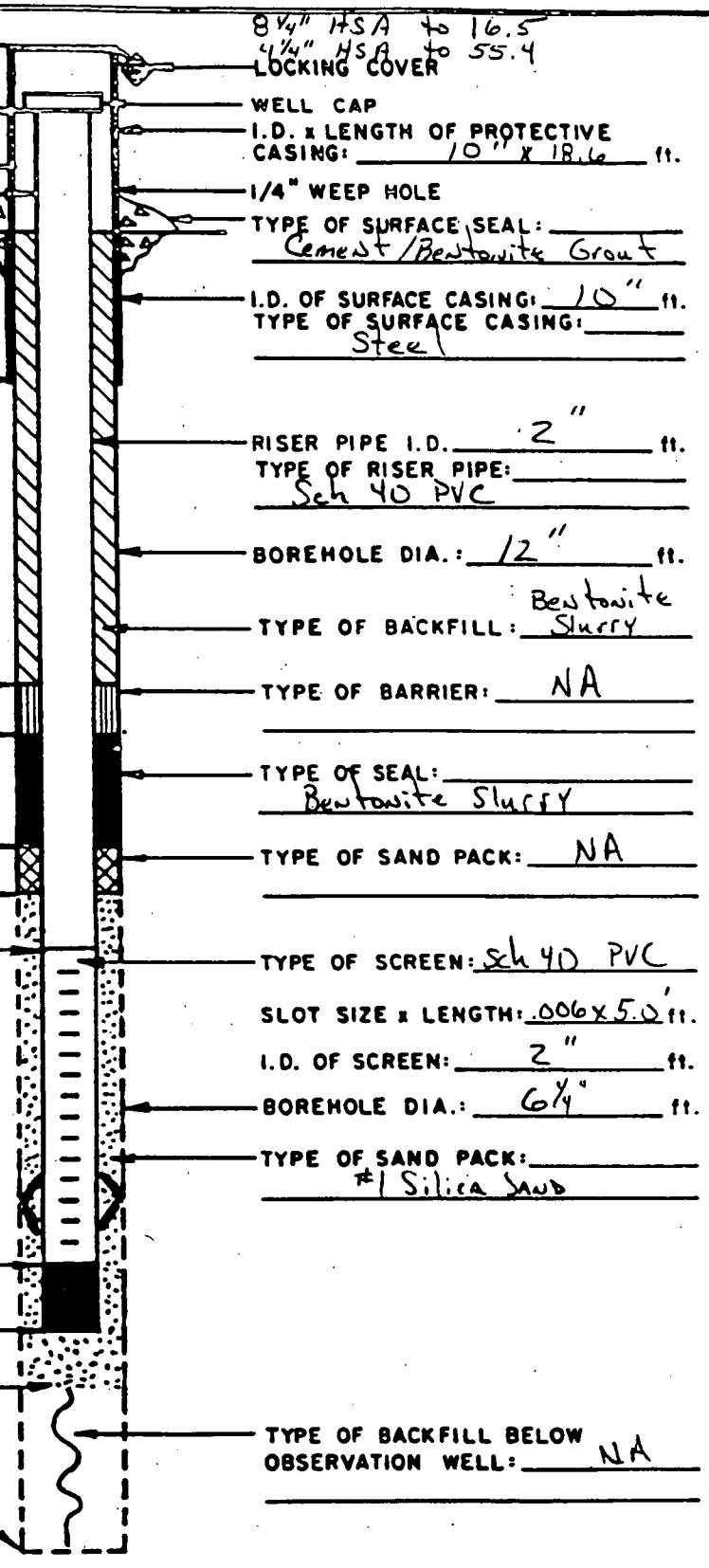
PROJECT: Palmer Street
LOCATION: Peria, NY
PROJECT NO.: 0695-17-1
BORING: PMW-6c
GROUND ELEV.: 803.39
DATE: Wed 5/9/90
FIELD GEOLOGIST: J.D Hilland
DRILLER: Keith Dawson BUFFALO DRILLING
DRILLING METHOD: 4¼" HSA
DEVELOPMENT METHOD:



MALCOLM PIRNIE

MONITORING WELL CONSTRUCTION LOG

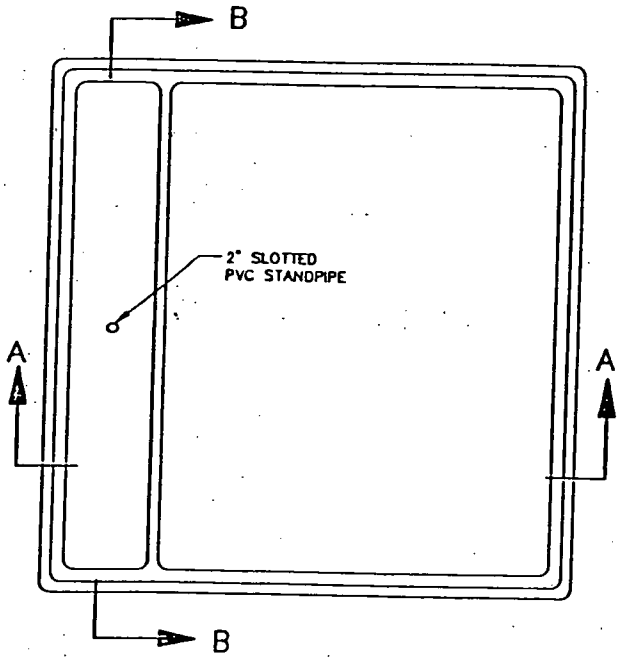
PROJECT: Palmer Street Landfill
PROJECT NO.: 0605-17-1
GROUND ELEV.: 804.40
FIELD GEOLOGIST: J.P. Hilton
LOCATION: Persia, NY
BORING: P-60
DATE: Thur 4/12/90
DRILLER: S. Gingrich
DRILLING METHOD: 8¼" HSA to 16.5'; 4¼" HSA thru 10" casing to 55.4'
DEVELOPMENT METHOD:



ELEV. OF TOP OF PROTECTIVE CASING: _____ ft. AMSL
ELEV. OF TOP OF RISER PIPE: 806.59 ft. AMSL
STICK-UP TOP OF PROTECTIVE CASING: 2.1 ft.
STICK-UP RISER PIPE: 2.15 ft.
GROUND SURFACE ELEV.
DEPTH BOTTOM OF SURFACE CASING: 16.5' ft.
DEPTH TOP OF GROUT INVASION BARRIER: NA ft.
DEPTH TOP OF SEAL: Surface ft.
DEPTH TOP OF SECONDARY SAND PACK: NA ft.
DEPTH TOP OF PRIMARY SAND PACK: 48.1 ft.
DEPTH TOP OF SCREEN 50.4 ft.
DEPTH BOTTOM OF SCREEN: 55.4 ft.
DEPTH BOTTOM OF SCREEN CAP: 55.4 ft.
DEPTH BOTTOM OF SAND PACK: 55.4 ft.
DEPTH OF HOLE: 55.4 ft.

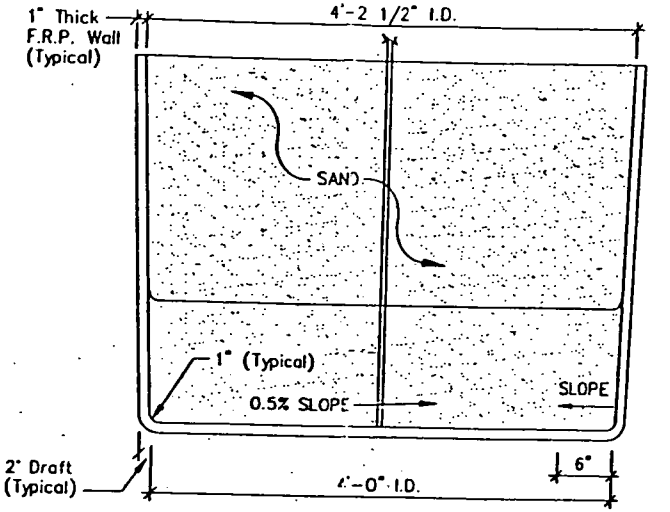
LOCKING COVER
WELL CAP
I.D. x LENGTH OF PROTECTIVE CASING: 10" x 18.6 ft.
1/4" WEEP HOLE
TYPE OF SURFACE SEAL: Cement/Bentonite Grout
I.D. OF SURFACE CASING: 10" ft.
TYPE OF SURFACE CASING: Steel
RISER PIPE I.D. 2" ft.
TYPE OF RISER PIPE: Sch 40 PVC
BOREHOLE DIA.: 12" ft.
TYPE OF BACKFILL: Bentonite Slurry
TYPE OF BARRIER: NA
TYPE OF SEAL: Bentonite Slurry
TYPE OF SAND PACK: NA
TYPE OF SCREEN: Sch 40 PVC
SLOT SIZE x LENGTH: .006 x 5.0' ft.
I.D. OF SCREEN: 2" ft.
BOREHOLE DIA.: 6¼" ft.
TYPE OF SAND PACK: #1 Silica Sand
TYPE OF BACKFILL BELOW OBSERVATION WELL: NA

MALCOLM PIRNIE

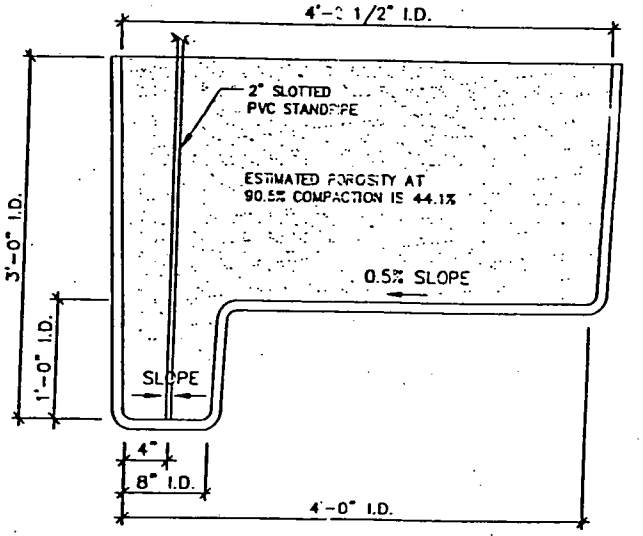


PLAN

SECTION B–B



SECTION A–A



MTC-23-INF

TYPICAL INFILTROMETER BY HEY'S ENTERPRISES
AS INSTALLED AT PALMER STREET LANDFILL

INFILTROMETER

MOENCH TANNING COMPANY 3/20 [illegible]

MALCOLM PIRNIE

ATTACHMENT B

PURGING & SAMPLE COLLECTION PROCEDURES

Appendix ____: Item _____ - WELL PURGING PRIOR TO SAMPLING

Applicability: GENERAL Revision No.: 1 Date: 2/7/91

Prepared By: MKR Date: 11/28/89 Approved By: RHO Date: 2/7/91

1.0 INTRODUCTION

This guideline presents methods for well purging prior to ground water sample collection in order to collect representative ground water samples. Purging involves the removal of at least three to five volumes of water in wells with moderate yields and at least one volume from wells with low yields (slow water level recovery). Sampling should commence as soon as the well has adequately recharged.

2.0 WELL PURGING METHODOLOGY

1. Place plastic on the ground around the well to prevent equipment from touching the ground. Unlock and carefully remove the well cover to avoid introducing foreign material into the well. Monitor the top of the well casing for organic vapors using a photoionization detector (HNu), if applicable. If a reading of greater than 5 ppm is recorded, the well should be allowed to vent until levels drop below 5 ppm before proceeding with purging.

2. Measure the depth to water and total well depth prior to purging the well. Calculate the volume of water in the well based on the water level below top of casing and the total depth of well using the following equation:

$$V = 5.825\ I^2\ (D-W)$$

V = one well volume (gallon)
I = inside diameter of well casing (feet)
D = Well Depth (feet)
W = Depth to Water from Top of Casing (feet)

3. For wells where the water level is 20 feet or less below the top of casing, use a suction-lift pump to purge the well. Measure the purged volume using a calibrated container and record measurements in a field notebook. Use dedicated new low density polyethylene tubing for each well. During this evacuation of shallow wells, the intake opening of the pump tubing should be positioned just below the surface of the

water. As the water level drops, lower the tubing as needed to maintain flow. The intake level should not be lowered past the top of the screen. Pumping from the top of the water column will ensure proper flushing of the well. Continue pumping until the required volumes are removed. Adjust the purging rate to maintain the water level above the screen.

For wells that exhibit an elevated turbidity (values greater than 50 NTU), maintain a purging rate which limits drawdown of the water level in the well. This procedure will reduce the hydraulic gradient in the well vicinity and limit piping of sediment particles through the sand pack and into the well. Use a peristaltic pump to achieve purging rates below the minimum rat of a suction lift pump.

For wells where the screen straddles the water table, maintain purging at a rate which matches the rate of recovery of the well (well yield). If the well purges to dryness and is slow to recharge (greater than 15 minutes), terminate evacuation.

4. For wells where the water level is initially below about 20 feet, or draw down to this level because of a slow recharge rate, conduct purging using one of three (3) devices:

   - Bailer - A bottom filling bailer with a leader made of teflon stainless steel wire or single strand poly-propylene monofilament of at least 10-feet long which is attached to a dedicated 1/4-inch nylon rope, should be used.

   - Well Wizard Purge Pump - This is a pneumatic pump that uses compressed air to push water to the surface. Ground water is in contact with the drive air during the pumping process, therefore the pump is not used for sampling. Drive air is fully contained within the pump apparatus.

   - Waterra™ pump - This is a manually operated pump which uses dedicated polyethylene tubing and a check valve, and can be used as an optional method for purging deeper

wells. The pump and tubing should be removed prior to sampling.

Prior to use in a well, the bailer, exterior pump bodies, and pump tubing should be cleaned using decontamination protocols specified for the program.

5. Purging will continue until a predetermined volume of water has been removed. Record measurements for pH, temperature, conductivity and turbidity during purging. The stability of these measurements with time can be used to guide the decision to discontinue purging.

6. Record well purging data in the Project Field Book or on the attached "Well Development/Purging Log" form.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: _____

PROJECT NO.: _____

STAFF: _____

DATE: _____

WELL NO.: _____

① TOTAL CASING AND SCREEN LENGTH (FT.): _____

② CASING INTERNAL DIAMETER (in.): _____

③ WATER LEVEL BELOW TOP OF CASING (FT.) _____

④ VOLUME OF WATER IN CASING (GAL.) _____

$V = 0.0408 (②)^2 \times (① - ③) =$ _____ GAL.

WELL I.D.	VOL. GAL./FT
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										

COMMENTS:

MALCOLM PIRNIE

Appendix ____: Item _____ - GROUND WATER SAMPLING USING POLYETHYLENE BAILERS

Applicability: GENERAL Revision No.: ____ Date: 4/24/92

Prepared By: DMH Date: 4/24/92 Approved By: DMH Date: 4/24/92

1.0 INTRODUCTION

This guideline presents a method for collecting a ground water sample after the monitoring well has been purged and has sufficiently recovered. Sampling should be carried out according to the following protocol:

2.0 METHODOLOGY

1. Perform sampling within three hours after purging if the well has recovered sufficiently to sample, or within 24 hours after evacuation, if the well recharges slowly. If the well does not yield sufficient volume for all required laboratory analytical testing (including quality control), a decision should be made to prioritize analyses based on contaminants of concern at the site. Analyses will be prioritized in the order of the parameters volatilization sensitivity. After volatile organics have been collected, field parameters must be measured from the next sample collected. If a well takes longer than 24 hours to recharge, the Project Manager should be consulted.

2. Following purging and recharging the well, collect samples into appropriate containers using a stainless steel or polytetrafluoroethylene bailer. The bailer should be equipped with a leader made of Teflon, stainless steel wires or single strand polypropylene monofilament of at least ten feet long which is attached to a new, dedicated 1/4-inch nylon rope. The bailer should be lowered slowly below the surface of the water so as to allow the water to touch only the "leader" and not the nylon rope. Prior to its use in the field, the stainless steel bailer and "leader" should be cleaned according to decontamination protocols specified for the program.

3. For wells that are known to produce turbid samples (values greater than 50 NTU), the bailer should be lowered and retrieved at a rate that limits surging of the well.

4. Prelabel all sample bottles in the field using a waterproof permanent marker. The following information should be included on the label:

   - Site name
   - Sample identification code
   - Project number
   - Date/time of sample collection (month, day, year)
   - Sampler's initials
   - Preservation added (if any)
   - Analysis to be performed

5. Collect samples into pre-cleaned bottles provided by the analytical laboratory with the appropriate preservative(s) added, and the samples placed in coolers for shipment to the designated laboratory. Chain of custody procedures should be adhered to upon sample collection.

   All samples will be total (unfiltered) unless the project specific work plan states otherwise. Should sample filtration be required, ground water samples will be pressure-filtered through 0.45 um filters in the field using air.
   --Option: Vaccum pump & Erwinmeyer flask with .45um filter.

6. Collect a separate sample of approximately 200 mls into an appropriate container to measure pH, conductivity, temperature and turbidity in the field.

7. Record well sampling data in the Project Field Book or on the attached "Water Sampling Field Data Sheet."

3.0 REFERENCES

(a) USEPA, September 1986, RCRA Groundwater Monitoring Technical Enforcement Guidance Document.

WATER SAMPLING FIELD DATA SHEET

PROJECT: _____ TYPE OF SAMPLE: _____

CLIENT: _____ LOCATION NO.: _____

JOB NO.: _____ LAB SAMPLE NO.: _____

WELL DATA: DATE: _____ TIME: _____

Casing Diameter (inches): _____ Casing Material: _____

Screened Interval (ft BGS): _____ Screen Material: _____

Static Water Level Below TOR (ft): _____ Bottom Depth (ft): _____

Elevation Top of Well Riser: _____ Datum Ground Surface: _____

PURGING DATA: DATE: _____ TIME: Start: _____ Finish: _____

Method: _____ Pumping Rate (gal/min): _____

Well Volumes Purged ($V=\pi R^2H/231$): _____ Was well purged dry? _____ Yes _____ No

Standing Volume (gal): _____ Was well purged below sand pack? ___ Yes ___ No

Volume Purged (gal): _____

Well I.D. (inches)	Volume (gal/ft)
2	0.17
4	0.66
6	1.50

Is purging equipment dedicated to sample location?

Yes _____ No _____

Field Personnel: _____

SAMPLING DATA: DATE: _____ TIME: Start: _____ Finish: _____

Method: _____ Sampler: _____

Present Water Level (ft): _____ Air Temperature (°F): _____

Depth of Sample (ft): _____ Weather Conditions: _____

Is sampling equipment dedicated to sample location? Yes _____ No _____

PRESERVATION DATA: DATE: _____ TIME: Start: _____ Finish: _____

Filtered: _____ Yes _____ No Cool to 4°C: _____

Preservative: _____ H_2SO_4 _____ HNO_3 _____ NaOH _____ Other

PHYSICAL AND CHEMICAL DATA:

Appearance: Clear: _____ Turbid: _____ Color: _____

Contains Sediment: _____ Odor: _____ Other: _____

Temperature (°C): _____ pH: _____ Specific Conductivity (umhos/cm): _____

Turbidity (NTU): _____ Other: _____

REMARKS:

MALCOLM PIRNIE

Appendix ____: Item _____ - SURFACE WATER SAMPLING

Applicability: GENERAL Revision No.: ____ Date: _____

Prepared By: MKR Date: 1/18/90 Approved By: KLB Date: 2/2/90

1.0 INTRODUCTION

This guideline presents a method for the collection of surface water samples. The most widely used method for collection involves a sampler consisting of an adjustable clamp attached to the end of a two or three piece telescoping aluminum tube that serves as the handle. The clamp is used to secure a precleaned laboratory sample bottle. Using the sample bottle for actual sampling eliminates the need for other equipment. This method also reduces the risk of introducing other variables into a sampling event.

2.0 METHODOLOGY

1. Assemble the sampler. Make sure that the sample bottle and the bolts and nuts that secure the clamp to the pole are tightened properly.

2. With proper protective garment and gear, take a grab sample by slowly submerging the sample bottle with minimal surface disturbance.

3. Collect samples from near shore unless boats are feasible and permitted.

4. Retrieve the sampler from the surface water with minimal disturbance. (If sample bottles were not used for sample collection, carefully transfer the water samples to appropriate precleaned sample bottles).

5. Cap the sample bottle and remove from the sampler. Follow procedures for preservation, if required, and sample handling.

6. Dismantle the sampler and store in plastic bags for subsequent decontamination.

7. Record available information for the pond, stream or other body of water that was sampled, such as its size, location and depth in the Project Field Book. Approximate sampling points should be identified on a sketch of the water body.

3.0 REFERENCES

New Jersey Department of Environmental Protection, 1988, Field Sampling Procedures Manual: Bureau of Environmental Measurements and Quality Assurance CN 028, 414 p.

Appendix ____: Item _____ - WATER LEVEL MONITORING

Applicability: GENERAL Revision No.: ____ Date: _____

Prepared By: MKR Date: 11/20/89 Approved By: GHF Date: 11/22/89

1.0 INTRODUCTION

This guideline presents a method for obtaining water levels from monitoring wells/piezometers. The groundwater levels measured in the monitoring wells can be used to determine groundwater flow directions and when combined with hydraulic conductivity data, flow rates.

Water levels in monitoring wells should be measured using an electronic water level indicator which has been checked to ensure it is operational, prior to mobilizing to the field.

2.0 METHODOLOGY

1. Pre-clean water level probe and lower portion of cable with DI water and dry with a clean tissue. A solvent wash and acid wash are not required for cleaning of the water level meter.

2. Lower probe slowly into the monitoring well until the audible alarm, which indicates water, sounds.

3. Read depth from the graduated cable to the nearest 100th (0.01) of a foot using either the v-notched reference point on the well riser or the highest point on the well riser as a reference. Repeat the measurement for confirmation and record the water level in the Project Field Book or on a "Groundwater Levels" form (attached).

4. Remove the probe from the well slowly, drying the cable and probe with a clean tissue.

5. Replace well cap and lock protective cap in place. Repeat decontamination procedures if additional measurements are to be taken.

Revised 3/94

3.0 EQUIPMENT REQUIREMENTS

- personal protective garment and gear (if applicable)
- water level indicator
- tissues
- Project Field Book

4.0 REFERENCES

USEPA, September 1986, RCRA Ground Water Monitoring Technical Enforcement Guidance Document, 9950.1

033

GROUND WATER LEVEL LOG

	DATE											
WELL / BOREHOLE NO.	REFERENCE POINT (RP)	RP ELEV. (ft. AMSL)	DEPTH BRP (ft.)	ELEV. (ft. AMSL)	DEPTH BRP (ft.)	ELEV. (ft. AMSL)	DEPTH BRP (ft.)	ELEV. (ft. AMSL)	DEPTH BRP (ft.)	ELEV. (ft. AMSL)	DEPTH BRP (ft.)	ELEV. (ft. AMSL)

BRP = BELOW REFERENCE POINT   TOC = TOP OF CASING   TOR = TOP OF RISER   GS = GROUND SURFACE

MALCOLM PIRNIE

MALCOLM PIRNIE

ATTACHMENT C

CALIBRATION OF FIELD EQUIPMENT

Appendix F: Item _____ - CALIBRATION AND MAINTENANCE OF PORTABLE FIELD pH/Eh METER

Applicability: GENERAL Revision No.: ___ Date: _____

Prepared By: THF Date: 12/22/89 Approved By: KLB Date: 12/22/89

1.0 INTRODUCTION

This guideline presents a method for calibration of a portable pH/Eh meter. The pH/Eh meter measures and provides a log scale reading of the hydrogen ion concentration of a water sample (pH function) or of the oxidation/reduction potential of a water sample (Eh function). In order to ensure an accurate reading, the pH/Eh meter must be calibrated prior to use in the field.

2.0 ACCURACY

The calibrated accuracy of the pH/Eh meter will be:

pH - 0.1 pH unit, over the temperature range of -2°C to 40°C.

Eh - -1 to +1 millivolts over the range of -700 to +700 millivolts. (not required for Palmer St. landfill)

3.0 CALIBRATION

Calibrate all field test equipment at the beginning of each sampling day and check and recalibrate according to the manufacturer's specifications. Calibrate the pH/Eh meter by immersing the sensing probe in a container of certified pH buffer solution traceable to the National Bureau of Standards, and compare the meter reading to the known value of the buffer solution, which is stirred. If the reading obtained by the meter does not agree with the known value of the buffer solution, adjust the "standardize" control until the desired reading is obtained. In addition,

measure the temperature of the buffer solutions, and adjust the temperature setting of the meter accordingly. Typically, pH 4.0, 7.0 and 10.0 buffers will be used for calibration purposes. Two-point calibrate the meter in the field at the beginning and end of each group of measurements. Select the two points to bracket the range of expected field measurements. The narrowest range possible is desired to maximize accuracy. This procedure will apply to both the pH and Eh functions of the meter, since there is no need to standardize the Eh function to any additional buffer or to compensate for solution temperature.

4.0 MAINTENANCE

1. When not in use or between measurements, keep the pH/Eh probe immersed in or moist with buffer solution.

2. Check the meter batteries at the end of each day and recharge when needed.

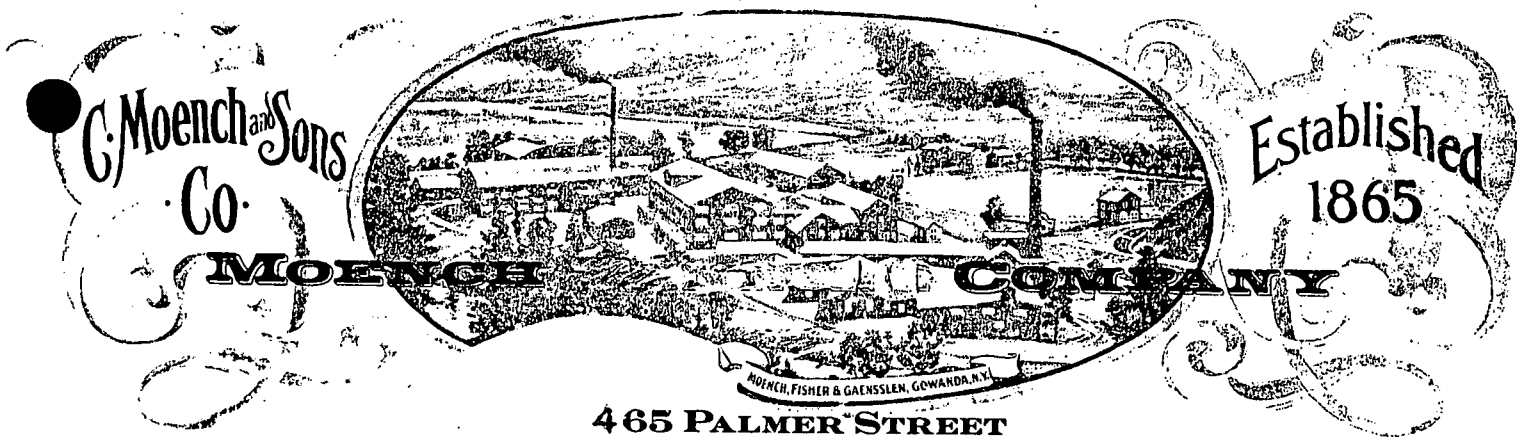
3. Replace the pH/Eh probe any time that the meter response time becomes greater than two minutes or the metering system consistently fails to retain its calibrated accuracy for a minimum of ten sample measurements.

4. If a replacement of the pH/Eh probe fails to resolve instrument response time and stability problems, the equipment officer will send the instrument to its manufacturer for maintenance and repair.

5. Maintain a log for each monitoring instrument. Record all maintenance performed on the instrument on this log with date and name of the organization performing the maintenance.

5.0 DATA VALIDATION

Document all instrument calibrations in the field notebook, indicating the meter readings before and after the meter has been adjusted. Also document the pH buffers used to calibrate the meter. This is important, not only for data validation, but also to establish maintenance schedules and component replacement.



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PALMER STREET LANDFILL
GROUNDWATER MONITORING

calibrated by: _____

RECORD OF CALIBRATION:

Instrument:	date	reading b/f 4 – after	Test
Slope-Water Level Indicator			Probe response to water.
Grace-Conductivity meter			Read standardize liquid & calibrate. zero calibrate.
Cole-Parmer(multi meter)			
Ph---			Calibrate to buffer(s) solutions. ph- ph-
Temperature			Calibrate to standard thermometer.
Eh ---- (Pt. Peter L/F)			Calibrate to stand-liquids.

Appendix ____: Item _____ - CALIBRATION AND MAINTENANCE OF PORTABLE CONDUCTIVITY METER

Applicability: GENERAL Revision No.: 1 Date: 12/29/89

Prepared By: THF Date: 12/29/89 Approved By: KLB Date: 12/29/89

1.0 INTRODUCTION

This guideline presents a method for checking the calibration of a portable field conductivity meter. The conductivity meter is factory calibrated and measures and provides a direct reading of the conductivity of a water sample. In order to ensure an accurate reading, the calibration of the conductivity meter must be checked prior to use in the field.

2.0 ACCURACY

The calibrated accuracy of the specific-conductance meter is within three percent of full-scale over the temperature range of -2°C to 40°C.

3.0 CALIBRATION

The instrument has been calibrated by the manufacturer according to factory specifications. All test equipment must be field checked at the beginning of each sampling day [6NYCRR 360-2-11(a)(12)(v)(a)] using a calibration solution having a known specific conductivity and salinity. Check the factory calibration by immersing the sensor probe in a container of manufacturer-prepared standard solution of known specific conductivity. Turn the meter on and allow approximately 30 seconds for response. If the reading obtained does not agree with the known specific conductivity of the solution, proceed as follows:

- Turn the instrument off, and mechanically zero the meter in accordance with the instruction manual (if possible).

- Turn the instrument on and check the battery power. If necessary, place the meter on charge for several hours.
- Clean and dry the probe thoroughly. With the probe not in the solution, turn the meter on and adjust the range selector to the lowest range available. The meter reading should be within two minor divisions of zero. If the response is outside this range, return the meter to the manufacturer for repair.
- Place the electrode in the manufacturer-prepared solution of known salinity. Adjust the "salinity" control to match that of the standard solution.
- If the above steps fail to adequately calibrate the meter, consult the manufacturer.

4.0 MAINTENANCE

1. Check the meter batteries at the end of each day and recharge when needed.
2. Track the meter response time and stability to determine the need for instrument maintenance. When response time becomes greater than two minutes and the meter must be recalibrated more than once per day, send the instrument to the manufacturer for maintenance and repair.
3. Maintain a log for each specific-conductance meter. Record all maintenance performed on the instrument on this log with date and name of organization performing the maintenance.

5.0 DATA VALIDATION

Document all instrument calibration checks, indicating the meter readings before and after the meter has been adjusted. The standard solution used to calibrate the meter will also be documented.

Appendix ____: Item _____ - CALIBRATION AND MAINTENANCE OF PORTABLE FIELD TURBIDITY METER

Applicability: GENERAL Revision No.: ____ Date: _____

Prepared By: THF Date: 2/9/90 Approved By: KLB Date: 2/9/90

TUrbidity Mater readings are not required for Palmer St. landfill; only visual evaluation.

Appendix ____: Item _____ - CALIBRATION AND MAINTENANCE OF PORTABLE DISSOLVED OXYGEN METER (NOT REQUIRED FOR PALMER ST)

Applicability: GENERAL Revision No.: ____ Date: _____

Prepared By: EWM Date: 04/16/90 Approved By: KLB Date: 04/24/90

Dissolved Oxygen readings are not required for Palmer Street landfill.

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ATTACHMENT D

SAMPLING EQUIPMENT DECONTAMINATION PROCEDURE

Appendix ____: Item _____ - SAMPLING EQUIPMENT DECONTAMINATION PROTOCOLS

Applicability: NYSDEC-SPECIFICATION Revision No.: 2 Date: 12/5/89

Prepared By: AJM Date: 10/31/89 Approved By: KLB Date: 12/12/89

1.0 INTRODUCTION

This guideline presents a method for the decontamination of sampling equipment used in the collection of environmental samples.

2.0 HEALTH AND SAFETY

Nitric acid is a strong oxidizing agent as well as being extremely corrosive to the skin and eyes. Solvents such as acetone, methanl, hexane, and isopropanol are flammable liquids. Limited contact with skin can cause irritation, while prolonged contact may result in dermititis. Eye contact with the solvents may cause irritation or temporary corneal damage. Safety glasses with protective side shields, neoprene or nitrile gloves, and long-sleeve protective clothing must be worn whenever acids and solvents are being used.

3.0 METHODOLOGY

1. All equipment used in sampling must be clean and free from residue of any previous samples. To accomplish this, the following procedures are to be followed:

   a. wash equipment thoroughly with non-phosphate detergent and tap water[1] using a brush to remove any particulate matter or surface film;

   b. rinse with tap water[1];

   c. rinse with a 10% HNO_3 solution[2];

g. rinse with deionized water (demonstrated-analyte-free)[4]; (three times)

h. air dry; and

i. wrap in aluminum foil (shiny side out) (if longterm storage)

2. Well excavation equipment, such as submersible pumps and bailers, which are put into the borehole must be decontaminated following the procedures listed above. All excavation tubing must be dedicated to individual wells, (i.e., tubing cannot be reused).

3. Bailer cord must be cleaned with non-phosphate detergent and demonstrated analyte-free deionized water before use. Cord can be reused; it is not necessary to dedicate it to individual wells. If a ten (10) foot or greater length leader is being used, only the leader need be cleaned (assumes bailer cord is not allowed to contact water).

4. All unused sample bottles and sampling equipment must be maintained in such a manner that there is no possibility of casual contamination.

4.0 EQUIPMENT REQUIREMENTS

- personal protective garment and gear
- brush, buckets, and wash basins
- squirt bottles
- supply of solvents and water
- aluminum foil

5.0 REFERENCES

New York State Department of Environmental Conservation, Division of Hazardous Substances Regulation, August 1989, RCRA Quality Assurance Project Plan Guidance.

Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual, April 1, 1986. USEPA Region IV.

NOTES

(1) Tap water may be used from any municipal water treatment system. The use of an untreated potable water supply is not an acceptable substitute.

(2) Omit this step if metals are not being analyzed. For carbon steel split spoon samplers, a 1% rather than 10% HNO_3 solution should be used.

(3) This solvent rinse can be omitted if organics are not being analyzed. Alternatively, if approval from NYSDEC has been granted, use pesticide grade isopropanol as the cleaning solvent. Isopropanol is better suited as a cleaning solvent than acetone, methanol and hexane for the following reasons:

- Acetone is a parameter analyzed for on the Target Compound List (TCL); therefore the detection of acetone in samples collected using acetone rinsed equipment is suspect;
- Almost all grades of methanol contain 2-butanone (MEK) contamination. As for acetone, 2-butanone is a TCL compound. Thus, the detection of 2-butanone in samples collected using methanol rinsed equipment is suspect. In addition, methanol is much more hazardous than either isopropanol or acetone.
- Hexane is not miscible with water (hydrophobic) and therefore, is not an effective rinsing agent unless the sampling equipment is dry. Isopropanol is extremely miscible in water (amphoteric), making it an effective rinsing agent on either wet or dry equipment.

(4) Deionized water must be demonstrated to be analyte-free water. The criteria for analyte-free water are the Method Detection Limits (MDLs) for the analytes. Specifically for the common laboratory contaminants listed below, the allowable limits are set at three times the respective MDLs determined by the most sensitive analytical method:

1. Methylene Chloride
2. Acetone
3. Toluene
4. 2-Butanone
5. Phthalates